Lockheed Martin Corporation
6801 Rockledge Drive MP: CCT-246
Bethesda, MD 20817
Telephone 301-548-2209

November 18, 2015

VIA PRIVATE CARRIER

Ms. Sharon D. Kenny, MEng, PMP, CHMM
U.S. EPA Region III
Land and Chemicals Division
1650 Arch St.
Mail Code 3LC40
Philadelphia, PA 19103

Subject: Transmittal of the 2015 Surface Water Sampling Report for
Lockheed Martin Corporation; Middle River Complex
2323 Eastern Boulevard, Middle River, Baltimore County, Maryland

Dear Ms. Kenny:

For your information, please find enclosed two hard copies with CD of the above-referenced document. This document addresses surface water sampling conducted on June 10, 2015 along five transects in Dark Head Cove (at Outfalls 005, 006, 007, 008, and 009) and at two locations in Cow Pen Creek near the western plume of trichloroethene and 1,4 dioxane in groundwater. Eleven additional locations along the five transects in Dark Head Cove were resampled for polychlorinated biphenyls in August 2015.

Please let me know if you have any questions. My office phone is (301) 548-2209.

Sincerely,

Thomas D. Blackman
Project Lead, Environmental Remediation

Enclosures
cc: (via email without enclosure)
Gary Schold, MDE
Mark Mank, MDE
Lynnette Drake, Lockheed Martin
Christine Kline, Lockheed Martin
Norman Varney, Lockheed Martin
John Morgan, LMCPI
Dave Brown, MRAS
Michael Martin, Tetra Tech
Cannon Silver, CDM Smith

cc: (via mail with enclosure)
James Carroll, MDE
Tom Green, LMCPI
Mike Musheno, LMCPI
Justin Tetlow, MRAS
Doug Mettee, Lockheed Martin MST

cc: (via mail with CD enclosure)
Jann Richardson, Lockheed Martin

Lockheed Martin Corporation
6801 Rockledge Drive MP: CCT-246
Bethesda, MD 20817
Telephone (301) 548-2227

November 18, 2015 **VIA PRIVATE CARRIER**

Mr. James R. Carroll
Program Administrator
Land Restoration Program
Land Management Administration
Maryland Department of the Environment
1800 Washington Boulevard, Suite 625
Baltimore, Maryland 21230

Subject: Transmittal of the 2015 Surface Water Sampling Report for
Lockheed Martin Corporation; Middle River Complex
2323 Eastern Boulevard, Middle River, Baltimore County, Maryland

Dear Mr. Carroll:

For your review, please find enclosed two hard copies with CD of the above-referenced document. This document addresses surface water sampling conducted on June 10, 2015 along five transects in Dark Head Cove (at Outfalls 005, 006, 007, 008, and 009) and at two locations in Cow Pen Creek near the western plume of trichloroethene and 1,4 dioxane in groundwater. Eleven additional locations along the five transects in Dark Head Cove were resampled for polychlorinated biphenyls in August 2015. We respectfully request to receive any comments you may have by January 22, 2016.

Please let me know if you have any questions. My office phone is (301) 548-2227.

Sincerely,

Lynnette Drake
Remediation Analyst, Environmental Remediation

Enclosures
cc: (via email without enclosure)
Gary Schold, MDE
Mark Mank, MDE
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Mike Musheno, LMCPI
Justin Tetlow, MRAS
Doug Mettee, Lockheed Martin MST

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Jann Richardson, Lockheed Martin

2015 Surface Water Sampling Report
Middle River Complex
2323 Eastern Boulevard
Middle River, Maryland

Prepared for:

Lockheed Martin Corporation

Prepared by:

Tetra Tech, Inc.

November 2015

Michael Martin, P.G.
Regional Manager

Anthony Apanavage, P.G.
Project Manager

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

APPENDICES

LIST OF FIGURES

LIST OF TABLES

ACRONYMS

AWQC	ambient water quality criteria
BTAG	(USEPA) Biological Technical Advisory Group
ºC	degrees Celsius
COC	chain of custody
COMAR	*Code of Maryland Regulations*
DO	dissolved oxygen
ESA	environmental site assessment
GIS	geographic information system
GLM	Glenn L. Martin Company
HHRA	human health risk assessment
IDW	investigation-derived waste
Lockheed Martin	Lockheed Martin Corporation
MDE	Maryland Department of the Environment
µg/L	microgram(s) per liter
mg/L	milligram(s) per liter
MRC	Middle River Complex
mS/cm	milliSiemen(s) per centimeter
mv	millivolt(s)
MW	monitoring well
NRWQC	national recommended water quality criteria
NTU	nephelometric turbidity unit(s)
ORP	oxidation-reduction potential
PCB	polychlorinated biphenyl
PCBH	polychlorinated biphenyl homologs
PDF	portable document format
pH	a measure of hydrogen-ion content indicating relative acidity or alkalinity
PM	project manager
REC	recognized environmental condition
SC	specific conductance
S.U.	standard unit(s)
SW	surface water
TCE	trichloroethene

Tetra Tech	Tetra Tech, Inc.
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

Section 1
Introduction

On behalf of Lockheed Martin Corporation (Lockheed Martin), Tetra Tech, Inc. (Tetra Tech) has prepared this *2015 Surface Water Monitoring Report* for the Lockheed Martin Middle River Complex (MRC) in Middle River, Maryland (see Figure 1-1). This report addresses surface water sampling conducted on June 10, 2015 along five transects in Dark Head Cove (at Outfalls 005, 006, 007, 008, and 009) and at two locations in Cow Pen Creek near the western plume of trichloroethene (TCE) and 1,4-dioxane in groundwater. Eleven additional locations along the five transects in Dark Head Cove were resampled for polychlorinated biphenyls (PCBs) in August 2015. These locations were resampled because a laboratory error occurred during analysis of the samples collected during the June sampling event.

The sampling objective was to provide additional and updated surface-water-quality data for Dark Head Cove and Cow Pen Creek to determine whether volatile organic compounds (VOCs) in groundwater at the site are impacting the surface water in Dark Head Cove and Cow Pen Creek. Additional objectives were to determine concentrations of polychlorinated biphenyls in surface water, and to determine 1,4-dioxane concentrations in Cow Pen Creek surface water near the western trichloroethene and 1,4-dioxane groundwater plumes.

Two of the Dark Head Cove transects (Outfalls 006 and 008) are downgradient of the eastern trichloroethene plume in groundwater. Groundwater contamination might be introduced to surface water by groundwater seepage or by groundwater infiltration into drains and outfalls that discharge to surface water. Surface water quality can also be affected by constituents in creek-bottom sediment. This report is organized as follows:

Section 2—Site Background: Briefly describes the site and where detailed background information and reports of previous investigations can be found.

Section 3—Investigation Approach and Methodology: Presents the technical approach to surface water sampling and describes the field methodology employed.

Section 4—Results: Presents the field program's investigation results.

Section 5—Summary: Summarizes the investigation approach and findings.

Section 6—References: Cites references used to compile this report.

Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2013 ESRI and its data suppliers).

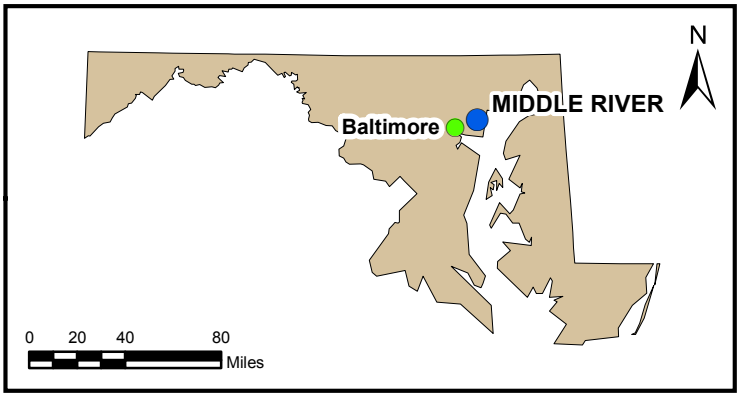

FIGURE 1-1

MIDDLE RIVER COMPLEX LOCATION MAP

Lockheed Martin Middle River Complex
Middle River, Maryland

DATE MODIFIED:	CREATED BY:
09/18/15	JEE

TETRA TECH

Map Document: (P:\GIS\Middle_River\MapDocs\MXD\mrc_sitemap_may2015.mxd)
09/18/15 -- JEE

Section 2
Site Background

The Middle River Complex (MRC), at 2323 Eastern Boulevard in Middle River, Maryland, is part of the Chesapeake Industrial Park, approximately 11.5 miles northeast of Baltimore, Maryland. The MRC comprises approximately 161 acres and includes 12 main buildings, an active industrial area and yard, perimeter parking lots, an athletic field, a vacant concrete lot, trailer storage areas, and numerous grassy spaces along its perimeter. The MRC is bounded by Eastern Boulevard (Route 150) to the north, Martin State Airport to the east, Dark Head Cove to the south, and Cow Pen Creek to the west. Figure 2-1 shows the MRC layout.

LMC Properties, Inc. (the current MRC property owner) is responsible for facility and building management and maintenance. The main tenant at the site, MRA Systems, Inc. (a subsidiary of General Electric Company), designs, manufactures, fabricates, tests, overhauls, repairs, and maintains aeronautical structures, parts, and components for military and commercial applications. Lockheed Martin Mission Systems & Training (a Lockheed Martin Corporation [Lockheed Martin] business segment) conducts engineering and fabricates, assembles, tests, and otherwise supports vertical-launch systems. A Lockheed Martin subsidiary, Applied NanoStructured Solutions, LLC, also occupies a portion of MRC, where it researches and designs nanotechnology applications.

In 1929, the Glenn L. Martin Company (GLM) (a predecessor entity of Lockheed Martin) acquired large parcels of undeveloped land in Middle River, Maryland on which to manufacture aircraft for United States government and commercial clients. In the early 1960s, GLM merged with American-Marietta Company to form Martin Marietta Corporation. Around 1975, the adjacent airport to the east (currently Martin State Airport, comprising approximately 750 acres) was transferred to the State of Maryland. In 1995, Martin Marietta Corporation merged with Lockheed to form Lockheed Martin Corporation. Shortly after the merger, General Electric Company acquired most of Lockheed Martin's aeronautical business in Middle River and a General Electric subsidiary, MRA Systems, Inc., began operations at MRC.

Numerous environmental investigations have been conducted at the Lockheed Martin MRC. These include underground storage-tank closures and abandonments, soil excavations, Phase I environmental site assessments (ESAs), and Phase II ESAs. A 2003 facility-wide Phase I ESA at the Lockheed Martin MRC identified 13 recognized environmental conditions (RECs) at the facility, associated primarily with then-current site conditions (Earth Tech, 2003). Subsequent review of historical site activities identified another 18 RECs at the facility (Tetra Tech, 2004). Many RECs are in the southern portion of the facility along the waterfront.

Soil and groundwater sampling have identified sporadic soil and groundwater contamination in environmental media underlying the facility. Studies of soil and groundwater are ongoing (Tetra Tech, 2012a). The MRC was previously entered into the Maryland Department of the Environment (MDE) Voluntary Cleanup Program. Remediation of the MRC is being transitioned to the MDE Controlled Hazardous Substances regulatory framework to allow both on- and off-site issues to be addressed under the same program.

Sampling of surface water and sediment adjacent to the MRC's southern and western property boundaries was first done in March 2005. Subsequent samples were collected in 2005, 2010, 2011, and 2012 to characterize surface water and sediment, to support design development of the sediment remedy, and to support storm drainage investigations. The objective of the current annual sampling program is to determine the extent to which key groundwater and surface soil contaminants have been transported to surface water. Table C-2 in Appendix C summarizes detected concentrations of the primary chemicals of concern at the site (i.e., trichloroethene [TCE], *cis*-1,2-dichloroethene, vinyl chloride, and 1,4-dioxane) for sampling episodes conducted between 2012 and 2015.

Thirteen surface water samples were collected from Dark Head Cove and Cow Pen Creek in June 2013. All samples were chemically analyzed for volatile organic compounds (VOCs); samples collected in Cow Pen Creek were also analyzed for 1,4-dioxane. These samples were collected to evaluate VOC and 1,4-dioxane concentrations that might be emanating from stormwater outfalls or groundwater plumes. TCE was detected at low concentrations in all Dark Head Cove samples, and in one of two samples collected in Cow Pen Creek (in 12 of 13 surface water samples). However, no TCE concentration (0.35*J*–1.9*J* micrograms per liter [µg/L]) exceeded its ecological surface-water screening level (21 µg/L), its human health consumption-of-

aquatic-organism screening level (300 µg/L), or its site-specific swimming screening level (10 µg/L). Acetone was detected in 11 of 13 samples, at concentrations (1.5*J*–9.3*J* µg/L), well below its ecological surface-water screening level of 1,500 µg/L (Tetra Tech, 2013b).

Thirteen surface water samples were again collected from Cow Pen Creek and Dark Head Cove on June 9, 2014 (Tetra Tech, 2014a) and chemically analyzed for VOCs, 1,4-dioxane (for the two Cow Pen Creek samples only), and polychlorinated biphenyls (PCBs) (for the Dark Head Cove samples only). These analyses were performed to determine if these constituents are emanating from stormwater outfalls, sediments, or groundwater plumes originating at the MRC. Note that during this sampling episode, PCB analysis was modified from United States Environmental Protection Agency (USEPA) Method 8082 to USEPA Method 680, based on comments received from USEPA on the *Block E Remedial Action Plan* dated February 18, 2014 (Tetra Tech, 2014b).

TCE was detected at low concentrations in nine of the 11 Dark Head Cove samples, but no TCE concentrations (0.30*J*–0.54*J* µg/L) exceeded its ecological surface-water screening level (21 µg/L), its human health consumption-of-aquatic-organism screening level (300 µg/L), or its site-specific swimming screening level (10 µg/L). TCE was not detected in the two samples collected from Cow Pen Creek. Carbon disulfide was detected in one of 13 samples, at a concentration (0.24*J* µg/L) below its ecological surface-water screening level of 0.92 µg/L (Tetra Tech, 2014a).

1,4-Dioxane was detected in both samples collected from Cow Pen Creek, at concentrations of 0.16 µg/L and 0.24 µg/L. The highest concentration (0.24*J* µg/L) of 1,4-dioxane was nearly six orders of magnitude (nearly 100,000 times) lower than its USEPA ecological screening level (22,000 µg/L). Pentachlorobiphenyls and tetrachlorobiphenyls are the only PCB homologs detected, in seven of 11 samples. Pentachlorobiphenyls (0.012–0.015 µg/L) were detected in two of 11 samples analyzed for PCBs, and tetrachlorobiphenyls (0.0066*J*–0.024 µg/L) were detected in six of 11 samples.

All detected PCB concentrations exceeded the USEPA Biological Technical Advisory Group (BTAG) (0.00064 µg/L) and human health consumption-of-aquatic-organism (0.000074 µg/L) criteria. PCB concentrations in three samples (SW5A2, SW5B, and SW6B) also exceeded the chronic NRWQC criterion (0.014 µg/L). A human health risk assessment (HHRA) was conducted based on the 2014 surface water sampling results using available MDE and USEPA risk assessment

guidance, similar to previous HHRAs conducted for Dark Head Cove and Cow Pen Creek (Appendix D). The resultant cancer and noncancer risk estimates indicate no significant risk from exposures due to swimming in Dark Head Cove.

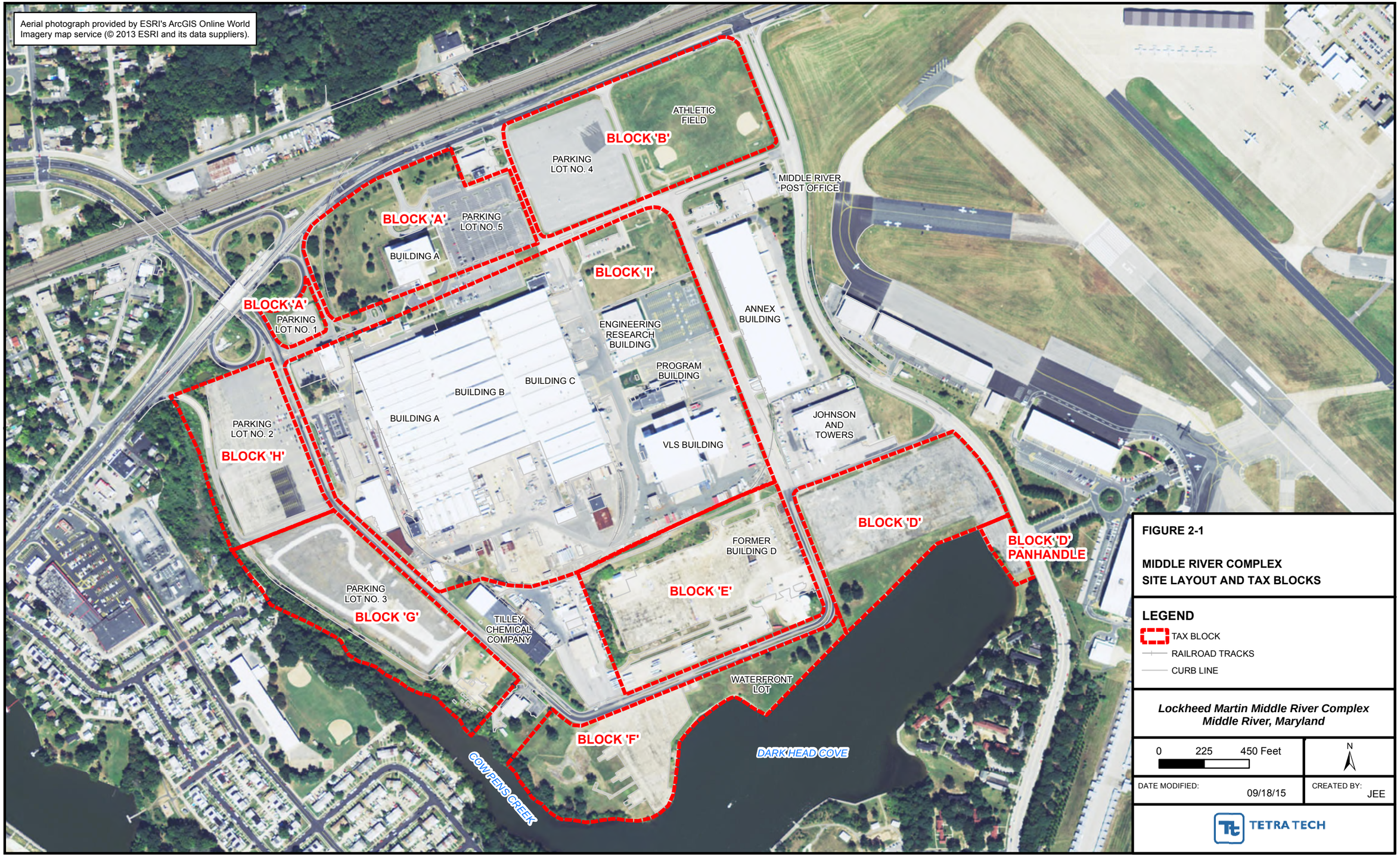

FIGURE 2-1

MIDDLE RIVER COMPLEX
SITE LAYOUT AND TAX BLOCKS

LEGEND

- TAX BLOCK
- RAILROAD TRACKS
- CURB LINE

Lockheed Martin Middle River Complex
Middle River, Maryland

0 225 450 Feet

N

DATE MODIFIED: 09/18/15

CREATED BY: JEE

TETRA TECH

Map Document: (P:\GIS\Middle_River\MapDocs\MXD\mrc_tax_blocks_jul2014_aerial.mxd)
09/18/15 -- JEE

Section 3
Investigation Approach and Methodology

3.1 SURFACE WATER SAMPLING

The objective of the 2015 surface water sampling described herein is to provide additional and updated surface-water-quality data for Dark Head Cove and Cow Pen Creek. Specifically, the current goals are to determine whether:

- volatile organic compounds (VOCs) detected in groundwater are reaching Dark Head Cove and Cow Pen Creek through groundwater infiltration or transport via storm drains
- 1,4-dioxane detected in groundwater is reaching Cow Pen Creek through groundwater infiltration or transport through storm drains
- polychlorinated biphenyls (PCBs) detected in Block E soils are reaching Dark Head Cove through the storm drain system and/or whether PCBs in surface water are due to contaminants in sediment

Concentrations of PCBs, VOCs, and 1,4-dioxane in surface water were determined through laboratory analysis of the samples. These compounds are known contaminants at the Middle River Complex (MRC), and may migrate into adjacent surface bodies via groundwater and surface water flow.

Thirteen surface water samples were collected from Dark Head Cove and Cow Pen Creek on June 10, 2015 (Figure 3-1). Eleven were collected in Dark Head Cove and two were collected in Cow Pen Creek. All samples were analyzed for VOCs (the primary contaminants of concern in MRC groundwater). Samples collected from Dark Head Cove were also analyzed for PCB Aroclors, and samples from Cow Pen Creek were analyzed for 1,4-dioxane. Sampling methods were consistent with the *2014–2015 Groundwater and Surface Water Monitoring Work Plan* (Tetra Tech, Inc. [Tetra Tech], 2014c). The 11 locations in Dark Head Cove were resampled for PCB Homologs in August due to an analysis error in the laboratory (for the samples collected in June).

3.1.1 Surface Water Sampling and Analyses

Surface water samples were collected in Dark Head Cove along transects at Outfalls 005 through 009 (Figure 3-1). Two samples were collected along each transect near Outfalls 006–009: one sample per transect was collected 10-feet from shore ("A" sample) and a second was collected 50-feet from shore ("B" sample). At Outfall 005 (which has two outlets), one sample was collected at each outlet 10-feet from shore ("A1" and "A2" samples), and a single sample was collected 50-feet from shore, approximately midway between the two outlets ("B" sample). Surface water samples from Cow Pen Creek were collected near the western trichloroethene (TCE) plume. Samples were collected along the approximate centerline of the creek upstream and downstream of the estimated boundaries of the western TCE plume. Table 3-1 summarizes (by surface water sampling location) the chemical analyses conducted for the 2015 monitoring program (Tetra Tech, 2014c).

Surface water samples were collected as grab samples using direct-fill sampling techniques. All samples were collected approximately one foot below the water surface using a stainless-steel discrete-interval sampler (i.e., a "bacon bomb" sampler). The sampler was lowered to approximately one foot below the water surface and the check valve was engaged to allow it to fill; the sampler was then brought to the surface and the water was removed through a valve to fill laboratory-supplied containers. Laboratory-cleaned, hydrochloric-acid-preserved, 40-milliliter (mL) sample vials were used for VOC analysis; separate containers were used to collect samples for 1,4-dioxane and PCB analysis. All equipment was cleaned after each sample had been collected. The discrete-interval sampler was cleaned after each use by rinsing with potable water; no decontamination fluids other than potable water were used, so collecting and disposing of rinse water generated during this sampling event was not necessary.

Samples collected on June 10, 2015 were analyzed at a fixed-base laboratory (ALS Environmental, Middletown, Pennsylvania) for VOCs via United States Environmental Protection Agency (USEPA) Method 8260C, for 1,4-dioxane via Method 522, and (in error) for PCB Aroclors via Method 8082. One duplicate VOC sample was collected. Trip blanks were provided in each cooler containing VOC samples to ensure quality assurance/quality control. Water-quality parameters, including temperature, pH (a measure of hydrogen-ion content indicating relative acidity or alkalinity), specific conductance (SC), salinity, turbidity, dissolved oxygen (DO), color, and oxidation-reduction potential (ORP), were measured at all surface water sampling locations at the time of sampling (Table 4-3). Although listed in the work plan, hardness was not measured because

samples for hardness-dependent metals were not collected during this round. The water depth at each sampling location was also recorded.

Tidal stages were recorded on June 10, 2015 before sampling began and after it ended, using the MRC Cow Pen Creek direct-read staff gauge. The staff gauge read 4.53 feet at 8:30 a.m. and 4.72 feet at 9:43 a.m. Tide data for the North Point station (south of Middle River, Maryland) reported high tide at 1:51 a.m., low tide at 8:21 a.m., and high tide at 1:50 p.m. Surface water samples were collected at low tide between 8:00 a.m. and 9:36 a.m., at the end of the falling limb of the tidal cycle and the beginning of its rising limb (Maryland Department of Natural Resources, 2015). All information was documented on surface water sample forms (Appendix A) and in the master site logbook.

Surface-water sampling locations (horizontal locational coordinates) were surveyed using a handheld global positioning system receiver and recorded in the field logbook. Sampling locations were recorded in degrees, minutes, and seconds using geographical latitude and longitude coordinates, and have an accuracy of approximately 15 feet. Coordinates were converted to the Maryland State Plane North American Datum 1983 (feet) for use in the MRC geographical information system (GIS).

On August 13, 2015, 11 locations along the five transects in Dark Head Cove were resampled for PCB homologs by USEPA Method 680. In June, the laboratory had erroneously analyzed the previous 11 samples for PCB Aroclors by USEPA Method 8082, instead of by the requested Method 680. Water-quality parameters, including temperature, pH (a measure of hydrogen-ion content indicating relative acidity or alkalinity), specific conductance (SC), salinity, turbidity, dissolved oxygen (DO), color, and oxidation-reduction potential (ORP), were measured at all surface water sampling locations at the time of sampling (Table 4-4). The water depth at each sampling location was also recorded.

3.1.2 Documentation

A master site logbook was maintained as an overall record of field activities. Sample documentation includes completing a chain of custody (COC) form and matrix-specific sampling log sheets. A COC form is standardized to summarize and document pertinent sample information, such as sample identification and type, matrix, date and time of collection, preservation, requested

analysis, and the times and dates of custody transfers. Sample custody procedures document sample acquisition and integrity. The COC form accompanies the data-validation report in Appendix B.

3.1.3 Sample Nomenclature and Handling

Surface water samples were identified with a unique sample-identification tag. Surface water samples were labeled with an "SW" prefix followed by the sample number, followed by an "A" (designating a sample collected 10 feet from the shoreline) or a "B" (designating a sample collected 50 feet from the shoreline), followed by a six-digit sampling date. For example, a surface water sample collected on June 10, 2015 from transect MRC-SW6 at the 10-foot ("A") location is labeled MRC-SW6A-061015. The trip blank is labeled with a "TB" prefix followed by the blank's six-digit submittal date (e.g., TB-061015).

Sample handling includes field-related considerations concerning the selection of sample containers, preservatives, allowable holding times, and analyses requested. Proper custody procedures were followed throughout all phases of sample collection and handling. COC protocols used throughout sample handling ensure the evidentiary integrity of sample containers.

Sample containers were released under signature from the laboratory and accepted under signature by the sampler(s) or individual responsible for maintaining custody until the sample containers were transferred to the sampler(s). Transport containers returned to the laboratory were sealed with strapping tape and a tamper-proof custody seal. The custody seal includes the signature of the individual initially releasing the transport container, along with the date and time.

3.1.4 Equipment Decontamination

To minimize decontamination, both dedicated and disposable equipment (e.g., gloves, rope) were used for surface water sampling. The stainless-steel discrete-interval sampler (i.e., a "bacon bomb" sampler) was rinsed with distilled water before the first sample was collected and after each use.

3.1.5 Waste Management

No investigation-derived waste (IDW) was generated during this surface water sampling event. General waste (i.e., gloves, rope, etc.) was disposed of in the proper waste disposal containers at the facility.

3.2 DATA MANAGEMENT

Laboratory data-handling procedures met the requirements of the laboratory subcontract. All analytical and field data are maintained in project files. These files include copies of the COC forms, sampling log forms, sampling location maps, and documentation of laboratory quality assurance.

3.2.1 Data Tracking and Control

A cradle-to-grave sample-tracking system was used from the beginning to the end of the sampling event. This system allows for early detection of errors made in the field so adjustments can be made while the field team is still mobilized. Before field mobilization, the field operations leader coordinated and initiated sample tracking. Sample jar labels were handwritten in the field and reviewed to ensure that they were accurate and adhered to work plan requirements.

The project manager (PM) coordinated with the analytical laboratory to ensure that they were aware of the number and types of samples and analyses being submitted. On each day that samples were collected in the field, the field operations leader forwarded that day's COC forms to the PM (or designee) and the laboratory. The PM or their designee confirmed that the COC forms provided the information required by the work plan. After all requested analyses had been completed, the laboratory submitted an electronic deliverable for every sample delivery group. When all electronic deliverables had been received from the laboratory, the PM or their designee ensured that the laboratory had performed all requested analyses.

3.2.2 Sample Information

Data from field measurements were recorded using appropriate log sheets and summarized in tabular form. Raw instrument-data from the laboratory were also tabulated. The field operations leader verified field data daily; laboratory data were verified by the group supervisor and then by the laboratory's quality control/documentation department.

3.2.3 Project Data Compilation

The analytical laboratory generated a portable document format (PDF) file of the analytical data packages, as well as electronic database deliverables. The electronic data were checked against the PDF file from the laboratory and updated as required by applying data-qualifier flags during data

validation. All data, such as units of measure and chemical nomenclature, are consistent with the project database.

3.2.4 Geographical Information System

Data management systems consist of a relational database and GIS used to manage environmental information pertaining to the MRC. The relational database stores chemical, geological, hydrogeological, and other environmental data collected during environmental investigations; the GIS is created from the relational database and contains subsets of the larger data pool. The GIS allows posting of environmental data onto base maps to represent the information graphically. Compiled sampling, chemical, and positional data were incorporated into the GIS.

3.3 DATA REVIEW

Data from the laboratory were entered into a sample database and evaluated against various screening criteria. Data validation (consisting of data completeness, holding time, calibrations, laboratory contamination, and detection limits) was completed concurrent with the data evaluation. The review was based on USEPA Region 3's *Modifications to the National Functional Guidelines for Data Review* (USEPA, 1993 and 1994) and the specifics of the analytical method used. Data from this sampling event consist of chemical results from surface water samples. Appendix C contains tables of all 2015 MRC surface water sample analytical data, and includes validation qualifiers, non-detects, and analytical detection limits.

Validation of the MRC data concluded that they are acceptable for their intended uses (i.e., risk screening and risk assessment). The *J*-flag appears on the chemical-results tables in Section 4, and all flags appear in Appendices B and C. The data qualifiers (i.e., flags) applied to the chemical results during data validation are listed below:

J The analyte is considered present in the sample, but the value is estimated and may not meet highest accuracy or precision standards. In this program, samples were qualified with "*J*" because quantitation was above the method detection limit but below the laboratory reporting limit.

U Not detected; the analyte was not detected at the reported value.

UJ The analyte was not detected, but the quantitation or detection limit may be inaccurate or imprecise.

UR The analyte was not detected but the result is unreliable due to serious deficiencies in satisfying quality control criteria.

Table 3-1
Chemical Analyses of Surface Water Samples, June/August 2015
Cow Pen Creek and Dark Head Cove
Lockheed Martin, Middle River Complex, Middle River, Maryland
Page 1 of 2

Sampling location	Sample number	Distance from shore (feet)	Analytical parameters	Sampling month	Number of samples
Dark Head Cove					
Outfall 005	SW5A1 SW5A2 SW5B	10[(1)] 10[(1)] 50	Volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs)[(2)] field parameters	**June** **August—**Only field parameters and PCB homolog samples were collected	1 1 1
Outfall 006 and near the eastern trichloroethene (TCE) plume	SW6A SW6B	10 50	VOCs, PCBs[(2)], field parameters	**June** **August—**Only field parameters and PCB homolog samples were collected	1 1
Outfall 007	SW7A SW7B	10 50	VOCs, PCBs[(2)], field parameters	**June** **August**—Only field parameters and PCB homolog samples were collected	1 1
Outfall 008 and near the eastern TCE plume	SW8A SW8B	10 50	VOCs, PCBs[(2)], field parameters	**June** **August—**Only field parameters and PCB homolog samples were collected	1 1
Outfall 009	SW9A SW9B	10 50	VOCs, PCBs[(2)], field parameters	**June** **August—**Only field parameters and PCB homolog samples were collected	1 1

[(1)]Two near-shore samples (10-feet out) were collected at Outfall 005 only. One near-shore sample was collected at the other Dark Head Cove outfalls (006–009).

[(2)]On August 13, 2015, 11 additional resamples were collected along the five transects in Dark Head Cove for PCB homologs by USEPA Method 680.

Table 3-1
Chemical Analyses of Surface Water Samples, June/August 2015
Cow Pen Creek and Dark Head Cove
Lockheed Martin, Middle River Complex, Middle River, Maryland
Page 2 of 2

Sampling location	Sample number	Distance from shore (feet)	Analytical parameters	Sampling month	Number of samples
Cow Pen Creek					
Near the western TCE plume	SW1A SW2A	Upstream Downstream (both centerline)	VOCs, 1,4-dioxane, field parameters	**June**	1 1

(1) Two near-shore samples (10-feet out) were collected at Outfall 005 only. One near-shore sample was collected at the other Dark Head Cove outfalls (006–009).

(2) On August 13, 2015, 11 additional resamples were collected along the five transects in Dark Head Cove for PCB homologs by USEPA Method 680.

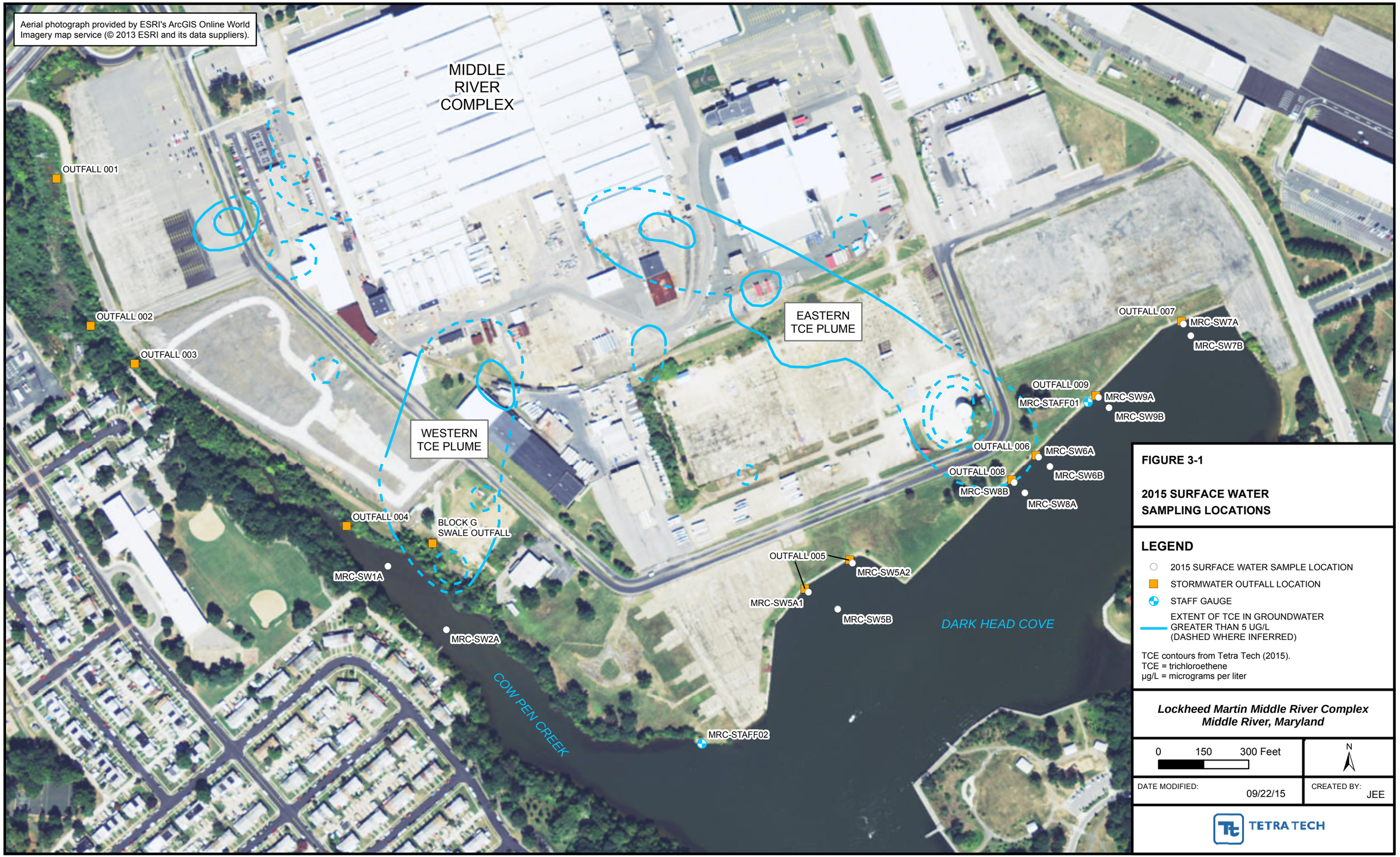

FIGURE 3-1

2015 SURFACE WATER SAMPLING LOCATIONS

LEGEND

- 2015 SURFACE WATER SAMPLE LOCATION
- STORMWATER OUTFALL LOCATION
- STAFF GAUGE
- EXTENT OF TCE IN GROUNDWATER GREATER THAN 5 UG/L (DASHED WHERE INFERRED)

TCE contours from Tetra Tech (2015).
TCE = trichloroethene
µg/L = micrograms per liter

Lockheed Martin Middle River Complex
Middle River, Maryland

0 150 300 Feet

N

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Section 4
Results

Validated surface-water chemical data of the chemical analytes detected in the June and August 2015 surface-water samples were used to generate a statistical summary table (Table 4-1) and a table (Table 4-2) listing positive detections (only). Tables 4-1 and 4-2 are based on the full data listing in Appendix C (Table C-1). Table 4-2 compares surface-water sampling results to several applicable screening criteria, including:

- United States Environmental Protection Agency (USEPA) Region 3 Biological Technical Advisory Group (BTAG) freshwater screening benchmarks (USEPA, 2006)
- USEPA Region 5 ecological screening level for 1,4-dioxane in water (USEPA, 2003)
- USEPA national recommended water quality criteria (NRWQC) for acute and chronic aquatic-organism exposures, and NRWQC for human health aquatic-organism consumption (USEPA, 2009)
- State of Maryland ambient water quality criteria (AWQC) for acute and chronic aquatic-organism-exposures, and AWQC for human health aquatic-organism-consumption (*Code of Maryland Regulations*, 2014)
- Site-specific screening levels for swimming, developed by Lockheed Martin Corporation (Lockheed Martin) to assess volatile organic compounds (VOCs) at Frog Mortar Creek near Martin State Airport (Tetra Tech, Inc., [Tetra Tech], 2013)

4.1 VOLATILE ORGANIC COMPOUNDS

As shown in Table 4-1, four VOCs were detected in surface water. Trichloroethene (TCE), the primary VOC associated with the Middle River Complex (MRC) groundwater plumes, was detected in one of 11 samples (7%) collected from Dark Head Cove (SW5A2). TCE was not detected in the two samples collected from Cow Pen Creek. Other VOCs detected in surface water samples include acetone (11 of 13 samples), chloroform (two of 13 samples), and toluene (two of 13 samples). *cis*-1,2-Dichloroethene and vinyl chloride, breakdown products of TCE and *cis*-1,2-dichloroethene, respectively, and common VOCs in MRC groundwater plumes, were not detected in the samples. As shown in Table 4-2, all detected VOC concentrations are low, and less than

screening criteria. The sole detection of TCE is "*J*" qualified, because the concentration is above the method detection limit but below the laboratory practical quantitation-limit.

Figure 4-1 shows the distribution of TCE in the Dark Head Cove and Cow Pen Creek for the 2015 sampling episode. The sole TCE detection (0.42*J* micrograms per liter [µg/L] at MRC-SW5A2) is from a sample collected near Outfall 005. TCE concentrations in 2014 (see Table C-2 in Appendix C) ranged from 0.3*J* µg/L (MRC-SW5A2) to 0.54 µg/L (MRC-SW8A). Similar to the current sampling episode, the highest TCE concentrations (1.1–1.9 µg/L) in 2013 were from samples (MRC-SW5A1, MRC-SW5A2, and MRC-SW5B) collected near Outfall 005. In contrast, the highest TCE concentrations detected in 2012 (0.55*J*–0.82*J* µg/L) and 2014 (0.52*J*–0.54*J* µg/L) were in samples collected from transects at Outfalls 006 and 008, near the eastern TCE groundwater plume (see Table C-2 in Appendix C).

The 2015 TCE concentration (0.42*J* µg/L) is similar to the maximum TCE concentration detected in 2014 (0.54*J* µg/L at Outfall 008). Both of these concentrations are approximately one-third that of the maximum TCE concentration detected in 2013 (1.9 µg/L at Outfall 005). Note that the distribution of the contaminants can be affected by tidal fluxes of the creek. Acetone was detected in 11 of 13 samples at concentrations ranging from 4.1*J* µg/L in sample SW5B (collected 50 feet from Outfall 005) to 8.2*J* µg/L in samples SW8A (collected 10 feet from Outfall 008) and SW9B (collected 50 feet from Outfall 008). The maximum acetone concentration is well below its ecological surface-water screening-level (1,500 µg/L).

USEPA and the State of Maryland have not established acute or chronic freshwater criteria for TCE or acetone. However, they have established a human health consumption-of-aquatic-organism criterion of 300 µg/L (when adjusted for the Maryland Department of the Environment [MDE] risk level of 1×10^{-05} [i.e., a one in 100,000 risk probability]). The BTAG ecological screening levels for TCE and acetone are 21 µg/L and 1,500 µg/L, respectively.

The maximum TCE concentration (0.42*J* µg/L) detected in this investigation is at least one order of magnitude (i.e., a factor of 10) lower than the lowest (i.e., most conservative) regulatory screening level (21 µg/L), and more than 23 times below its site-specific screening-criterion (10 µg/L) for evaluating exposure risks to swimmers. As stated earlier, toluene (0.24*J* µg/L [SW5A2] and 0.25*J* µg/L [SW2A]) and chloroform (0.42*J* µg/L [SW7B] and 0.68*J* µg/L [SW7A])

were each detected in two of 13 samples. All results are below ecological and human-health screening criteria.

4.2 1,4-DIOXANE

As shown in Figure 4-1, 1,4-dioxane was detected at a concentration of 0.13*J* µg/L in both samples (SW1A and SW2A) collected from Cow Pen Creek. This concentration is nearly six orders of magnitude (nearly 100,000 times) lower than the USEPA ecological screening level (22,000 µg/L). Although the detected concentration in both samples is the same, sample SW1A was collected closer to the leading edge of the western 1,4-dioxane plume (i.e., near well MRC-MW12A) than SW2A.

4.3 POLYCHLORINATED BIPHENYLS

No polychlorinated biphenyls (PCBs) were detected in any surface water sample collected in Dark Head Cove during the June 2015 (USEPA Method 8082) and August 2015 (USEPA Method 680) surface-water sampling. However, in 2014, the PCB homologs pentachlorobiphenyls and tetrachlorobiphenyls were detected in two (0.012–0.015 µg/L) and in six (0.0066*J*–0.024 µg/L) of 11 samples (respectively). All 2014 detections of PCBs (seven samples) exceed the BTAG (0.00064 µg/L) and human health consumption-of-aquatic-organism (0.000074 µg/L) screening criteria. PCB concentrations in three of the samples (SW5A2, SW5B, and SW6B) collected in 2014 exceed the national recommended ambient water quality criteria (NRWQC) criterion (0.014 µg/L) for chronic exposure.

The highest concentrations of tetrachlorobiphenyls detected in samples collected in 2014 were near Outfall 005; lower concentrations were detected near Outfalls 006 and 008. Pentachlorobiphenyls detected in 2014 were in sample MRC-SW6B (0.015 µg/L) and sample MRC-SW7A (0.012 µg/L); these samples were collected near Outfalls 006 and 007, respectively. The reduction in Dark Head Cove PCB concentrations from 2014 to 2015 may be attributed to dredging conducted in the winter of 2014/2015 during the sediment removal action. Details of the dredging operations are in *Construction Means and Method Plan, Outfall 005 Sediment Removal Action* (Tetra Tech, 2014d).

A human health risk assessment (HHRA) was conducted in 2014 before the sediment removal action began. The HHRA assessed PCB concentrations detected in the surface waters of Dark Head

Cove, assuming that recreational swimming occurred in the cove. Risk estimate results are in Appendix D.

The HHRA assumed that a swimmer is exposed to cove surface water via dermal and ingestion pathways while swimming. The HHRA used available MDE and USEPA risk assessment guidance, similar to previous HHRAs conducted for Dark Head Cove and Cow Pen Creek. The resultant cancer and noncancer risk estimates indicate no significant risk from exposures due to swimming in Dark Head Cove.

Cancer-risk estimates were less than the MDE risk-management benchmark of 1×10^{-5} (i.e., a one-in-100,000 probability of developing cancer) and did not exceed the USEPA target risk-range of 1×10^{-4} to 1×10^{-6} (i.e., a one-in-10,000 to one-in-one-million probability of developing cancer). Noncancer risk estimates did not exceed a hazard index of 1 (i.e., adverse noncarcinogenic health effects are not anticipated as a consequence of exposure). The HHRA used conservative (i.e., health protective) parameters, and consequently likely overestimated risks to human receptors swimming in Dark Head Cove. Therefore, regulatorily unacceptable risk due to PCB concentrations in surface water was not present, even before sediment removal began.

4.4 WATER-QUALITY PARAMETERS

Water-quality parameters measured in the field in June 2015 for each surface water sample are in Table 4-3. Data were collected for color, pH, specific conductivity (SC), temperature, turbidity, dissolved oxygen (DO), salinity, and oxidation-reduction potential (ORP). The June 2015 pH values are consistent with natural surface water in this region. SC is closely associated with salinity, and samples with lower salinity had an expected lower SC, and vice versa. Water temperature was lower in Cow Pen Creek samples, which also had lower salinity and SC as compared to samples from Dark Head Cove. These results may be due to runoff into the creek, or restricted water flow into or out of the creek.

Turbidity was consistent in most samples, with the highest turbidity found in Cow Pen Creek sample SW1A, possibly due to the shallow creek depths in that location. As expected, DO concentrations are higher in colder water samples. All DO levels are typical or on the high side of typical values, indicating a healthy estuarine environment. ORP values are all positive, which is

consistent with an oxygen-rich environment. All parameters are typical of a tidally controlled estuarine environment.

Water-quality parameters measured in the field in August 2015 for each surface water sample are in Table 4-4. Data were collected for color, pH, SC, temperature, turbidity, DO, salinity, and ORP. Water-quality parameters collected during resampling in August 2015 are similar to the data collected in June 2015, except for water temperature, which increased approximately three degrees Celsius (3ºC) to an average of 27.86ºC. The pH values measured in August 2015 are also consistent with natural surface water in this region. SC is closely associated with salinity, and samples with lower salinity had an expected lower SC, and vice versa.

Turbidity was consistent in most samples, with the highest turbidity found in samples SW5A1 and SW5A2. DO levels in August are similar to the DO levels detected in June. All DO levels are typical or on the high side of typical values, indicating a healthy estuarine environment. ORP values are all positive, which is consistent with an oxygen-rich environment. All parameters are typical of a tidally controlled estuarine environment.

Table 4-1

Statistical Summary of Analytes Detected in Surface Water Samples, June 2015
Lockheed Martin Middle River Complex, Middle River, Maryland

Chemical	Frequency of detection		Mininum non-detect concentration	Maximum non-detect concentration	Mininum detected concentration		Maximum detected concentration		Sample with maximum detected concentration	Mean of all samples	Mean of positve detections	Standard deviation
	number	percent										
Volatile organic compounds (µg/L)												
ACETONE	11/13	85	3.1	3.1	4.1	J	8.2	J	MRC-SW8A,9B-061015	5.088	5.732	2.026
CHLOROFORM	2/13	15	0.21	0.21	0.42	J	0.68	J	MRC-SW7A-061015	0.173	0.550	0.175
TOLUENE	2/13	15	0.23	0.23	0.24	J	0.25	J	MRC-SW2A-061015	0.135	0.245	0.049
TRICHLOROETHENE	1/13	8	0.33	0.33	0.42	J	0.42	J	MRC-SW5A2-061015	0.185	0.420	0.071
Semivolatile organic compounds (µg/L)												
1,4-DIOXANE	2/2	100	--	--	0.13		0.13		MRC-SW1A,2A-061015	0.130	0.130	0.000

Footnotes:
Statistical calculations used one-half the sample quantitation limit as a proxy concentration for non-detect samples, and one-half the detection limit for B-qualified data.
J - Positive result is considered estimated
µg/L - micrograms per liter
SW - surface water
U - not detected at the concentration shown left of the letter.
-- Value not available because analyte was detected in all samples analyzed.

Table 4-2

Analytes Detected in Surface Water Samples, June 2015
Lockheed Martin Middle River Complex, Middle River, Maryland

LOCATION SAMPLE ID SAMPLE DATE	National Recommended Ambient Water Quality Criteria[1] Freshwater Acute	 Chronic	Ecological Surface Water Screening Level[2]	Human Health Consumption of Organism Only[1, 4]	Swimming Screening Levels[6]	MRC-SW1A MRC-SW1A-061015 20150610	MRC-SW2A MRC-SW2A-061015 20150610	MRC-SW5A1 MRC-SW5A1-061015 20150610	MRC-SW5A2 MRC-SW5A2-061015 20150610	MRC-SW5B MRC-SW5B-061015 20150610	MRC-SW6A MRC-SW6A-061015 20150610	MRC-SW6B MRC-SW6B-061015 20150610	MRC-SW7A MRC-SW7A-061015 20150610
VOLATILES (UG/L)													
Acetone	NA	NA	1500	NA	NA	6 J	6.1 J	5.5 J	5.6 J	4.1 J	5.8 J	4.7 J	--
Chloroform	NA	NA	1.8	470	NA	--	--	--	--	--	--	--	0.68 J
Toluene	NA	NA	2	15000	NA	--	0.25 J	--	0.24 J	--	--	--	--
Trichloroethene	NA	NA	21	300	10	--	--	--	0.42 J	--	--	--	--
SEMIVOLATILES (UG/L)													
1,4-Dioxane	NA	NA	NA	NA	NA	0.13	0.13	NA	NA	NA	NA	NA	NA

Shading indicates value exceeds a screening criterion.

1. National Recommended Water Quality Criteria (http://water.epa.gov/scitech/swguidance/standards/current/index.cfm); and Maryland Numerical Criteria for Toxic Substances in Surface Waters, Code of Maryland Regulations (COMAR) 26.08.02.03 (http://www.dsd.state.md.us./comar/comarhtml/26/26.08.02.03-2.htm)

2. United States Environmental Protection Agency Region 3 Biological Technical Advisory Group Freshwater Screening Benchmarks.

3. Carcinogenic criterion is set at incremental cancer risk of 1×10^{-5}

4. Site specific screening levels developed for trichloroethene by Lockheed Martin for Frog Mortar Creek studies at Martin State Airport.

-- - not detected at the method detection limit

J - result is estimated

µg/l - micrograms per liter

NA - criterion not available (columns 2-6) or not analyzed (remaining columns).

SW - surface water

Table 4-2

Analytes Detected in Surface Water Samples, June 2015
Lockheed Martin Middle River Complex, Middle River, Maryland

LOCATION / SAMPLE ID / SAMPLE DATE	National Recommended Ambient Water Quality Criteria[1] Freshwater Acute	National Recommended Ambient Water Quality Criteria[1] Freshwater Chronic	Ecological Surface Water Screening Level[2]	Human Health Consumption of Organism Only[1, 4]	Swimming Screening Levels[6]	MRC-SW7B MRC-SW7B-061015 20150610	MRC-SW8A MRC-SW8A-061015 20150610	MRC-SW8B MRC-SW8B-061015 20150610	MRC-SW9A MRC-SW9A-061015 20150610	MRC-SW9A MRC-SW9A-061015-AVG 20150610	MRC-SW9A MRC-SW9A-061015-D 20150610	MRC-SW9B MRC-SW9B-061015 20150610
VOLATILES (UG/L)												
Acetone	NA	NA	1500	NA	NA	4.3 J	8.2 J	--	4 J	4.55	5.1 J	8.2 J
Chloroform	NA	NA	1.8	470	NA	0.42 J	--	--	--	--	--	--
Toluene	NA	NA	2	15000	NA	--	--	--	--	--	--	--
Trichloroethene	NA	NA	21	300	10	--	--	--	--	--	--	--
SEMIVOLATILES (UG/L)												
1,4-Dioxane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Shading indicates value exceeds a screening criterion.

1. National Recommended Water Quality Criteria (http://water.epa.gov/scitech/swguidance/standards/current/index.cfm); and Maryland Numerical Criteria for Toxic Substances in Surface Waters, Code of Maryland Regulations (COMAR) 26.08.02.03 (http://www.dsd.state.md.us./comar/comarhtml/26/26.08.02.03-2.htm)

2. United States Environmental Protection Agency Region 3 Biological Technical Advisory Group Freshwater Screening Benchmarks.

3. Carcinogenic criterion is set at incremental cancer risk of 1×10^{-5}

4. Site specific screening levels developed for trichloroethene by Lockheed Martin for Frog Mortar Creek studies at Martin State Airport.

-- - not detected at the method detection limit

J - result is estimated

µg/l - micrograms per liter

NA - criterion not available (columns 2-6) or not analyzed (remaining columns).

SW - surface water

Table 4-3
Field Measurements for Surface-Water Quality, June 2015
Cow Pen Creek and Dark Head Cove
Lockheed Martin Middle River Complex, Middle River, Maryland

Sample No.	Color	pH (S.U.)	SC (mS/cm)	Temperature (ºC)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP (mv)
SW1A	Gr/Br	6.06	2.96	22.23	10.67	4.07	1.4	206
SW2A	Gr/Br	6.64	2.97	22.49	1.36	4.19	1.5	162
SW5A1	Gr/Br	7.52	3.89	24.62	8.17	5.74	2.1	170
SW5A2	Gr/Br	7.51	3.89	24.58	6.79	5.87	2.1	168
SW5B	Gr/Br	7.58	3.89	24.60	5.10	5.76	2.1	170
SW6A	Gr/Br	7.28	3.85	24.35	5.01	6.01	2.0	169
SW6B	Gr/Br	7.31	3.86	24.35	5.83	6.30	2.0	170
SW7A	Gr/Br	6.86	3.50	23.78	5.86	6.59	1.9	170
SW7B	Gr/Br	6.99	3.73	24.06	6.71	6.67	1.9	167
SW8A	Gr/Br	7.34	3.84	24.23	5.41	6.58	2.0	171
SW8B	Gr/Br	7.32	3.87	24.41	3.89	5.91	2.0	170
SW9A	Gr/Br	7.12	3.74	24.22	5.60	6.39	2.0	168
SW9B	Gr/Br	7.15	3.78	24.23	7.41	6.13	2.0	167
Average	**Gr/Br**	**7.13**	**3.67**	**24.6**	**5.99**	**5.86**	**1.92**	**171.3**

ºC— degrees Celsius
DO— dissolved oxygen
Gr/Br— greenish brown
mg/L— milligram(s) per liter
mS/cm—milliSiemen(s) per centimeter
mv— millivolt(s)
NTU— nephelometric turbidity unit(s)
ORP— oxidation-reduction potential
pH— hydrogen ion content (a measure of acidity or alkalinity)
SC— specific conductance
S.U.— standard unit(s)

Table 4-4
Field Measurements for Surface-Water Quality, August 2015
Cow Pen Creek and Dark Head Cove
Lockheed Martin Middle River Complex, Middle River, Maryland

Sample No.	Color	pH (S.U.)	SC (mS/cm)	Temperature (ºC)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP (mv)
SW5A1	Gr/Br	7.48	3.00	27.84	6.62	4.40	1.6	158
SW5A2	Gr/Br	7.44	3.01	27.97	6.45	4.39	1.6	158
SW5B	Gr/Br	7.57	3.00	27.30	5.12	4.52	1.6	156
SW6A	Gr/Br	7.39	2.98	27.66	5.01	4.63	1.6	156
SW6B	Gr/Br	7.42	3.00	27.92	5.94	4.57	1.6	157
SW7A	Gr/Br	6.16	2.90	28.19	2.03	6.90	1.5	193
SW7B	Gr/Br	6.79	2.99	28.44	2.78	5.79	1.6	174
SW8A	Gr/Br	7.32	2.97	27.62	5.17	6.53	1.5	161
SW8B	Gr/Br	7.41	3.00	27.91	5.72	4.74	1.6	159
SW9A	Gr/Br	7.94	2.98	27.30	2.21	4.79	1.5	132
SW9B	Gr/Br	7.62	3.00	28.31	4.02	4.66	1.6	144
Average	**Gr/Br**	**7.32**	**2.98**	**27.86**	**4.64**	**5.08**	**1.57**	**158.9**

ºC— degrees Celsius
DO— dissolved oxygen
Gr/Br— greenish brown
mg/L— milligram(s) per liter
mS/cm— milliSiemen(s) per centimeter
mv— millivolt(s)
NTU— nephelometric turbidity unit(s)
ORP— oxidation-reduction potential
pH— hydrogen ion content (a measure of acidity or alkalinity)
SC— specific conductance
S.U.— standard unit(s)

Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2013 ESRI and its data suppliers).

EASTERN TCE PLUME

WESTERN TCE PLUME

BLOCK G SWALE OUTFALL

MRC-SW1A
1,4-DIOXANE 0.13
ACETONE 6 J

MRC-SW2A
1,4-DIOXANE 0.13
ACETONE 6.1 J
TOULENE 0.25 J

MRC-SW7A
CHLOROFORM 0.68 J

9OF001

OUTFALL 007

MRC-SW7B
ACETONE 4.3 J
CHLOROFORM 0.42 J

OUTFALL 009

MRC-SW9A
ACETONE 5.1 J

MRC-SW9B
ACETONE 8.2 J

MRC-SW6A
ACETONE 5.8 J

OUTFALL 006

MRC-SW6B
ACETONE 4.7 J

OUTFALL 008

MRC-SW8A
ACETONE 8.2 J

MRC-SW8B
NO ANALYTES DETECTED

OUTFALL 005E

MRC-SW5A2
ACETONE 5.6 J
TOLUENE 0.24 J
TRICHLOROETHENE 0.42 J

OUTFALL 005W

MRC-SW5A1
ACETONE 5.5 J

MRC-SW5B
ACETONE 4.1 J

COW PEN CREEK

DARK HEAD COVE

FIGURE 4-1

ANALYTES DETECTED IN SURFACE WATER SAMPLES, JUNE 2015
COW PEN CREEK AND DARK HEAD COVE

LEGEND

- △ 2015 SURFACE WATER SAMPLE LOCATION
- ■ STORMWATER OUTFALL LOCATION (UPDATED APRIL 2015)
- EXTENT OF TCE IN GROUNDWATER GREATER THAN 5 UG/L (DASHED WHERE INFERRED)

J = estimated value
All concentrations shown are in micrograms per liter (µg/L).

TCE contours from Tetra Tech (2015).

Lockheed Martin Middle River Complex
Middle River, Maryland

0 100 200 Feet

N

DATE MODIFIED: 09/29/15

CREATED BY: JEE

TETRA TECH

Map Document: (P:\GIS\Middle_River\MapDocs\MXD\mrc_sw_tags_sep2015.mxd)
09/29/15 -- JEE

Section 5
Summary

A summary Lockheed Martin Corporation's (Lockheed Martin's) June/August 2015 Cow Pen Creek and Dark Head Cove surface water investigation follows:

- Water samples were collected at 13 locations from Cow Pen Creek and Dark Head Cove on June 10, 2015 and chemically analyzed for volatile organic compounds (VOCs), 1,4-dioxane (for the two Cow Pen Creek samples only), and polychlorinated biphenyls (PCBs) (for the Dark Head Cove samples only). These analyses were performed to determine if these constituents are emanating from stormwater outfalls, sediments, or groundwater plumes originating at the Middle River Complex (MRC). Two of three volatile organic compound source areas (Block G and E) are being remediated under a response action plan in accordance with a pending consent order with the Maryland Department of the Environment (MDE). Groundwater remediation is scheduled to begin at a third area (Block I) in 2016. The groundwater response action uses enhanced anaerobic-bioremediation to treat areas with high groundwater concentrations of volatile organic compounds.

- The laboratory erroneously analyzed the June samples from Dark Head Cove for PCB Aroclors using Method 8082. On August 13, 2015, samples were collected at the Dark Head Cove location and analyzed for PCB homologs using the requested Method 680.

- Samples were collected from the northern shoreline in Dark Head Cove along five transects at Outfalls 005 through 009. At four transects (Outfalls 006 through 009), one sample was collected near the shoreline ("A" sample) and a second was collected approximately 50 feet from the shoreline ("B" sample). At Outfall 005 (which has two outlets), two samples were collected 10-feet from shore at the end of each outlet, and a third sample was collected 50-feet from shore between the two outlets. Each sample was collected approximately one foot below the water surface.

- Surface water samples in Cow Pen Creek were collected near the western trichloroethene (TCE) plume. Samples were collected along the approximate centerline of the creek upstream and downstream of the estimated boundaries of the western trichloroethene plume.

- Chemical data were validated in accordance with the United States Environmental Protection Agency (USEPA) *Region III Modifications to the National Functional Guidelines for Organic Data Review* (USEPA, 1993 and 1994) and the specifics of the analytical methods used.

- Sampling results were screened against the following standards:

- United States Environmental Protection Agency Region 3 Biological Technical Advisory Group (BTAG) ecological freshwater screening-benchmarks

- United States Environmental Protection Agency Region 5 ecological screening level for 1,4-dioxane

- United States Environmental Protection Agency national recommended water quality criteria (NRWQC) for acute and chronic aquatic-organism exposures and for human health aquatic-organism consumption

- State of Maryland ambient water quality criteria (AWQC) for acute and chronic aquatic-organism exposures and for human health aquatic-organism consumption

- Site-specific screening levels developed by Lockheed Martin Corporation for evaluating risks to recreational swimmers from exposure to volatile organic compounds in surface water

- The volatile organic compound trichloroethene was detected at a low concentration (0.42*J* micrograms per liter [µg/L]) in one of 11 surface water samples collected in Dark Head Cove (SW5A2). Trichloroethene was not detected in the two Cow Pen Creek samples.
- The sole trichloroethene detection in Dark Head Cove did not exceed its ecological surface-water screening level, the human health consumption-of-aquatic-organism screening level, or the site-specific swimming screening level.

  - The trichloroethene detection was from one of three samples collected near Outfall 005 East (MRC-SW5A2).

  - The areas near Dark Head Cove Outfalls 006 and 008 are suspected of being influenced by the lower portion of the eastern trichloroethene plume that originates north of Chesapeake Park Plaza in Tax Block E; however, trichloroethene was not detected in these samples in June 2015.

  - Historically, trichloroethene concentrations in transects near Outfalls 007 and 009 varied little with distance from the shoreline (i.e., concentrations in samples collected near the shoreline have been similar to concentrations in samples collected 50 feet from the shoreline), however, no TCE concentrations were detected in these samples in June 2015.

- The trichloroethene-degradation products *cis*-1,2 dichloroethene, *trans*-1,2 dichloroethene, and vinyl chloride were all not detected in any of the June surface water samples.

- The volatile organic compound acetone was detected in 11 of the 13 samples, at concentrations ranging from 4.1*J* µg/L (in sample SW5B collected 50 feet from Outfall 005) to 8.2*J* µg/L (in sample SW8A collected 10 feet from Outfall 008). The highest acetone concentration is well below its ecological surface-water screening-level (1,500 µg/L).

- Toluene (0.24*J* µg/L [SW5A2] and 0.25*J* µg/L [SW2A]) and chloroform (0.42J µg/L [SW7B] and 0.68*J* µg/L [SW7A]) were each detected in two of 13 samples. All results are below both ecological and human health screening-criteria. These additional volatile organic compounds were not detected in 2014 or 2013. However, low estimated concentrations of *cis*-1,2-dichloroethene were detected at three sampling locations during the 2013 sampling.

- 1,4-dioxane was detected at a concentration of 0.13*J* µg/L in both samples (SW1A and SW2A) collected from Cow Pen Creek, at a concentration nearly six orders of magnitude (nearly 100,000 times) lower than its United Stated Environmental Protection Agency ecological screening level (22,000 µg/L). Sample SW1A was collected closer to the leading edge of the western 1,4-dioxane plume (i.e., near well MRC-MW12A) than was SW2A, but both samples show the same result.

    - 1,4-Dioxane is likely being discharged to Cow Pen Creek from the western 1,4-dioxane groundwater plume.

    - 1,4-Dioxane was detected in both samples collected from Cow Pen Creek in 2014, but was not detected in the 2013 samples.

    - 1,4-Dioxane was analyzed for in 2015 and 2014 using USEPA Method 522, which yields a lower detection limit (0.02 µg/L) than USEPA Method 8270D (0.47–0.48 µg/L), which was used for the 2013 samples. The 1,4-dioxane concentrations reported for the 2014 samples were less than Method 8270D detection limits (and hence would not be detected), but above the Method 522 detection limit.

- During the June and August 2015 surface water sampling events, no polychlorinated biphenyl (PCB) Aroclors or homologs were detected in any surface water sample collected in Dark Head Cove.

    - On August 13, 2015, 11 locations along the five transects in Dark Head Cove were resampled and analyzed for polychlorinated biphenyl homologs using USEPA Method 680. In June, the laboratory had erroneously analyzed these 11 samples for Aroclors using USEPA Method 8082, instead of using the requested Method 680.

    - Polychlorinated biphenyls in surface water were analyzed by Method 680 for the first time in 2014. Two homologs (pentachlorobiphenyls and tetrachlorobiphenyls) were detected in seven of 11 samples analyzed in 2014. The highest concentrations of tetrachlorobiphenyls were detected near Outfall 005. Pentachlorobiphenyls were detected near Outfalls 006 and 007. All seven detections in 2014 exceeded the Biological Technical Advisory Group ecological criterion and the human health consumption-of-aquatic-organism criterion. A human health risk assessment (HHRA) for polychlorinated biphenyl (only) exposure in Dark Head Cove water was conducted using available Maryland Department of the Environment and United States Environmental Protection Agency risk assessment guidance, similar to previous risk assessments conducted for Dark Head Cove and Cow Pen Creek. The resultant cancer and noncancer risk estimates for polychlorinated biphenyls (only) indicated no

significant risk from exposures to polychlorinated biphenyls due to swimming in Dark Head Cove.

- The exceedance of the Biological Technical Advisory Group ecological criterion does not imply direct toxicity to ecological receptors; instead, it is a value that is expected to protect against adverse effects from bioaccumulation and food-chain uptake. The human health consumption-of-aquatic-organism criterion is a conservative screening level based on food-chain-uptake modeling, assuming organisms (fish) stay within the area of exposure. Actual risk to human populations depends on site-specific factors like whether the water is used for drinking (Dark Head Cove is not a source of drinking water), and what type and how much fish are consumed and how they are prepared.

- The reduction in PCB concentrations from 2014–2015 may be attributed to the sediment removal that was done in the winter of 2014–2015; this removal dredged the sediment in a portion of Dark Head Cove.

- Results from a human health risk assessment in 2014 (before the sediment removal) did not exceed USEPA or Maryland Department of the Environment risk-management benchmarks associated with swimmer exposure in Dark Head Cove. Therefore, no regulatorily unacceptable risks are associated with recreational (swimming) exposure in Dark Head Cove, as the risk assessment was conducted in a very conservative (i.e., health protective) manner.

- The only (and therefore maximum) trichloroethene concentration (0.42*J* µg/L at Outfall 005) detected in 2015 is similar to the maximum TCE concentration detected in 2014 (0.54*J* µg/L at Outfall 008). These concentrations are both approximately one-third that of the maximum detected in 2013 (1.9 µg/L at Outfall 005).

- Similar to the results of the 2015 sampling, the highest trichloroethene concentrations in 2013 were from samples collected near Outfall 005. The location and magnitude of trichloroethene detections in 2014 were generally consistent with those of 2012 (see Table C-2 in Appendix C); in 2012 and 2014, samples with the highest trichloroethene concentrations were collected near Outfalls 006 and 008 (i.e., the eastern trichloroethene plume discharge area). Trichloroethene concentrations (1.5–1.9 µg/L) detected in 2013 were two to three times higher than the highest concentrations detected in 2012 (0.66–0.82 µg/L) and 2014 (0.52–0.54 µg/L).

Section 6
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APPENDIX A—SURFACE-WATER SAMPLING LOG SHEETS

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW5A1 -061015
Sample Location: MRC-SW5A1
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	6/10/2015
Time:	932
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.52**	**3.89**	**24.62**	**8.17**	**5.7**	**2.1**	**170**

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL pH<2	3 - 40 mL glass vials	Yes
PCBs	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 3.7 feet

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW5A1 -081315
Sample Location: MRC-SW5A1
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	8/13/2015
Time:	1448
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.48**	**3.00**	**27.84**	**6.62**	**4.4**	**1.6**	**158**

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
PCBs Method 680	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 3.9 feet

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW5A2 -061015
Sample Location: MRC-SW5A2
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	6/10/2015
Time:	927
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.51**	**3.89**	**24.58**	**6.79**	**5.87**	**2.1**	**168**

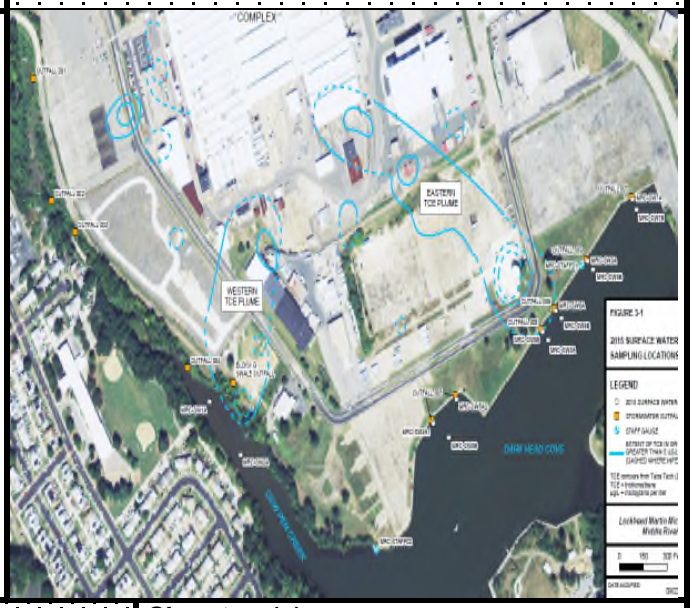
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL pH<2	3 - 40 mL glass vials	Yes
PCBs	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 3.8 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW5A2 -081315
Sample Location: MRC-SW5A2
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	8/13/2015
Time:	1443
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.44**	**3.01**	**27.97**	**6.45**	**4.39**	**1.6**	**158**

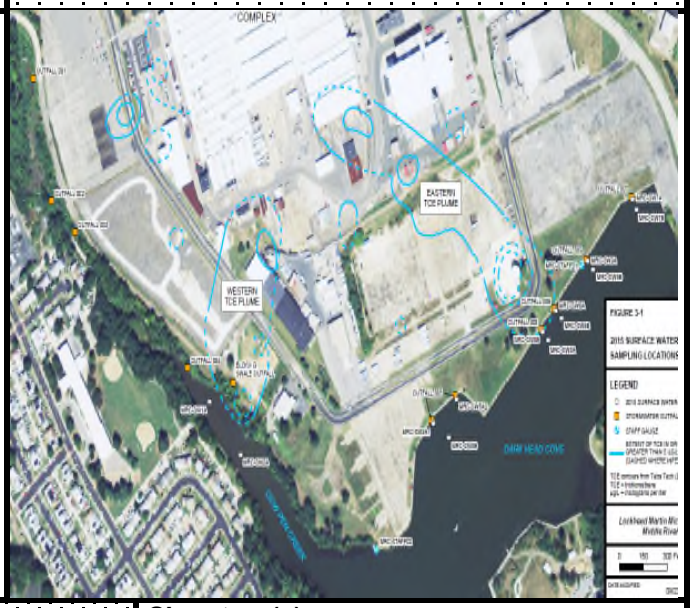
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
PCBs Method 680	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 2.8 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW5B -061015
Sample Location: MRC-SW5B
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	6/10/2015
Time:	936
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.58**	**3.89**	**24.60**	**5.1**	**5.76**	**2.1**	**170**

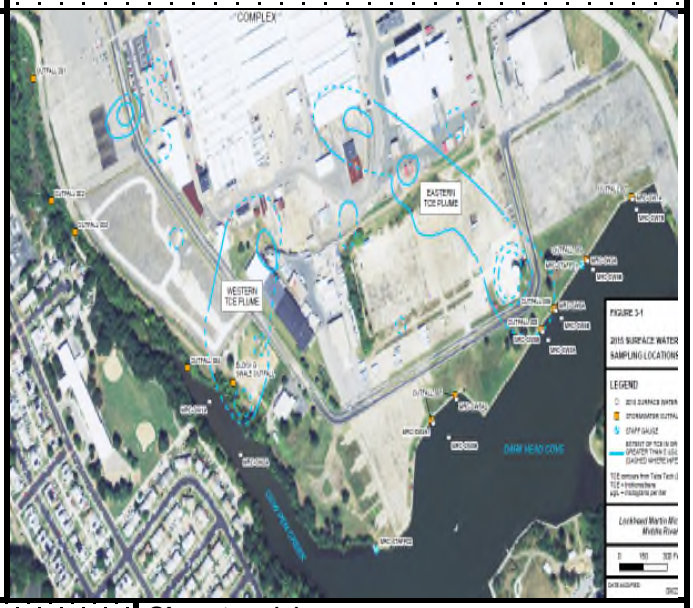
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL pH<2	3 - 40 mL glass vials	Yes
PCBs	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth >4.0 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW5B -081315
Sample Location: MRC-SW5B
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	8/13/2015
Time:	1452
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.57**	**3.00**	**27.30**	**5.12**	**4.52**	**1.6**	**156**

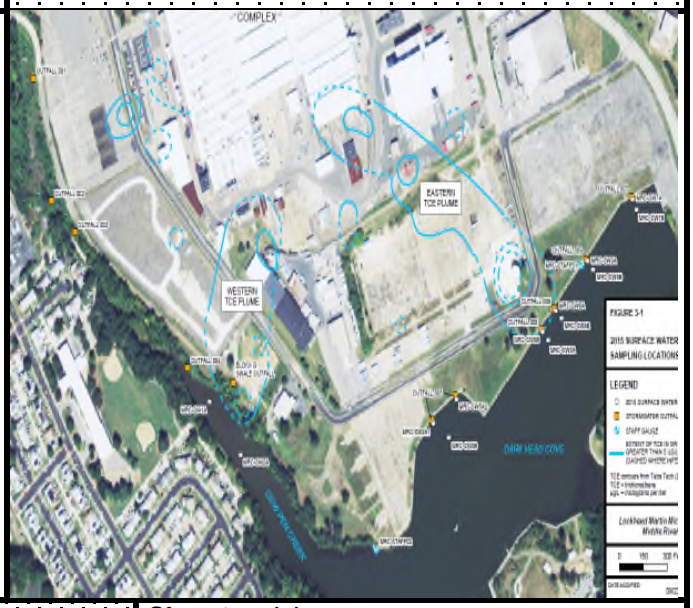
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
PCBs Method 680	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth >4.0 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW6A -061015
Sample Location: MRC-SW6A
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	6/10/2015
Time:	903
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.28**	**3.85**	**24.35**	**5.01**	**6.01**	**2**	**169**

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL pH<2	3 - 40 mL glass vials	Yes
PCBs	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 2.6 feet

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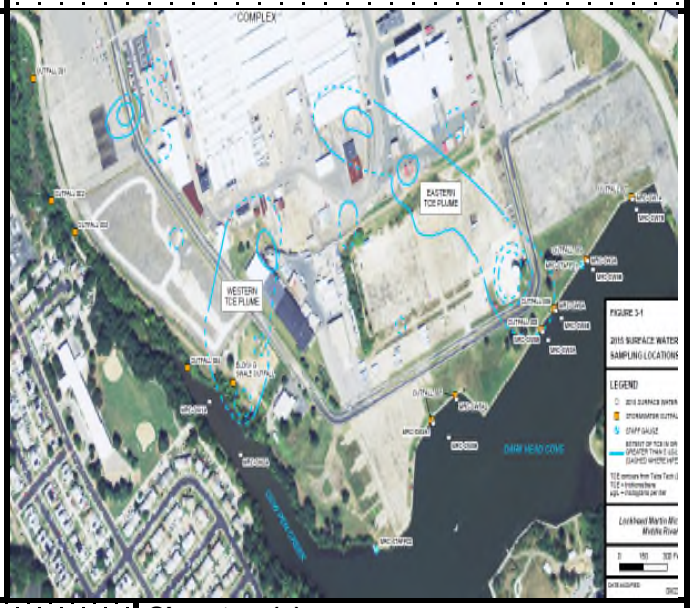

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW6A -081315
Sample Location: MRC-SW6A
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	8/13/2015
Time:	1420
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.39**	**2.98**	**27.66**	**5.01**	**4.63**	**1.6**	**156**

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
PCBs Method 680	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 2.2 feet

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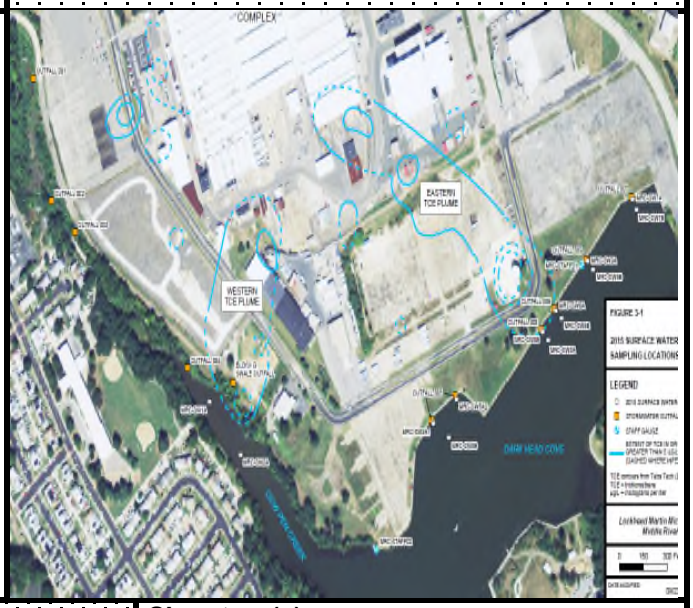


Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW6B -061015
Sample Location: MRC-SW6B
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	6/10/2015
Time:	907
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.31**	**3.86**	**24.35**	**5.83**	**6.3**	**2**	**170**

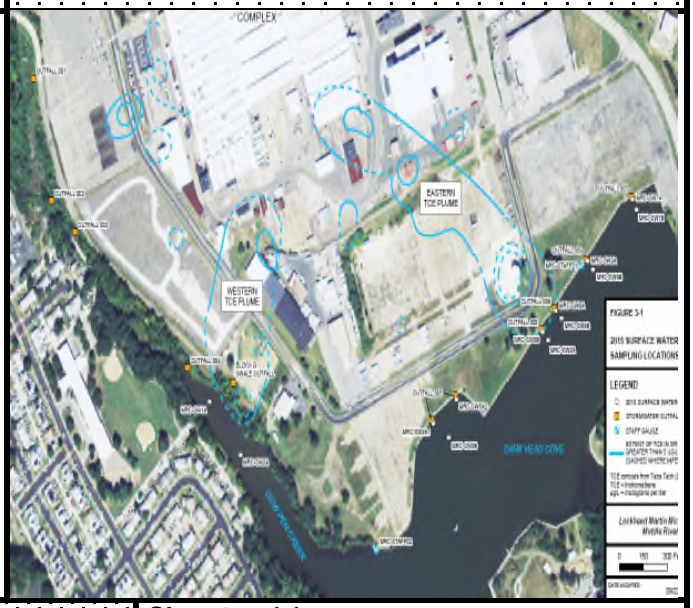
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL pH<2	3 - 40 mL glass vials	Yes
PCBs	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 2.9 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW6B -081315
Sample Location: MRC-SW6B
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	8/13/2015
Time:	1424
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.42**	**3.00**	**27.92**	**5.94**	**4.57**	**1.6**	**157**

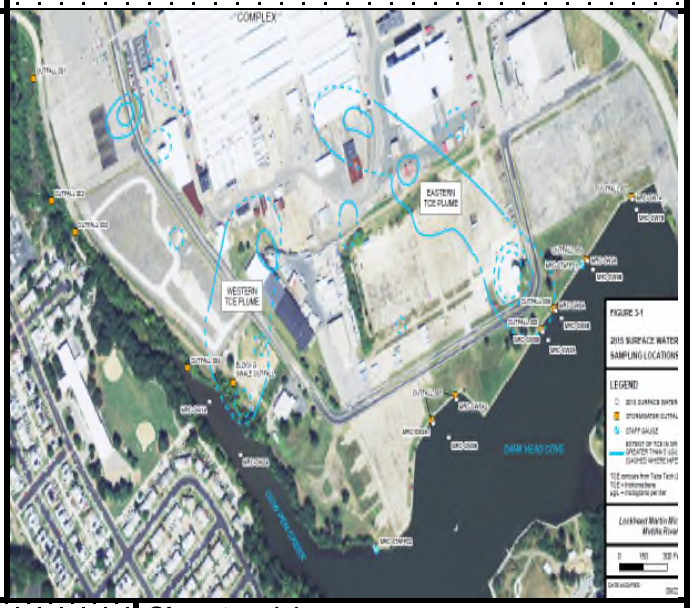
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
PCBs Method 680	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 3 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW7A -061015
Sample Location: MRC-SW7A
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

		Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Date:	6/10/2015								
Time:	840								
Depth:	1 ft below water	**Gr/Br**	**6.86**	**3.5**	**23.78**	**5.86**	**6.59**	**1.9**	**170**
Method:	Grab								

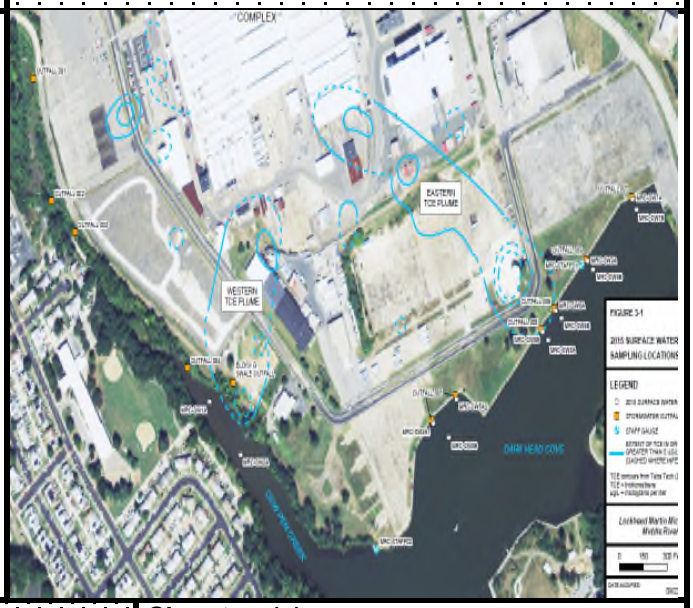
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL pH<2	3 - 40 mL glass vials	Yes
PCBs	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 2.27 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW7A -081315
Sample Location: MRC-SW7A
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	8/13/2015
Time:	1357
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**6.16**	**2.90**	**28.19**	**2.03**	**6.90**	**1.5**	**193**

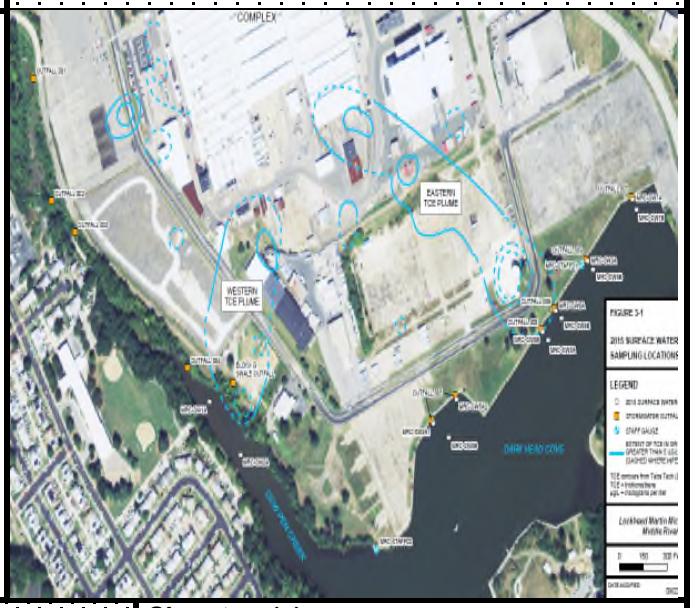
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
PCBs Method 680	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 2.15 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW7B -061015
Sample Location: MRC-SW7B
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

		Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Date:	6/10/2015								
Time:	845								
Depth:	1 ft below water	**Gr/Br**	**6.99**	**3.73**	**24.06**	**6.71**	**6.67**	**1.9**	**167**
Method:	Grab								

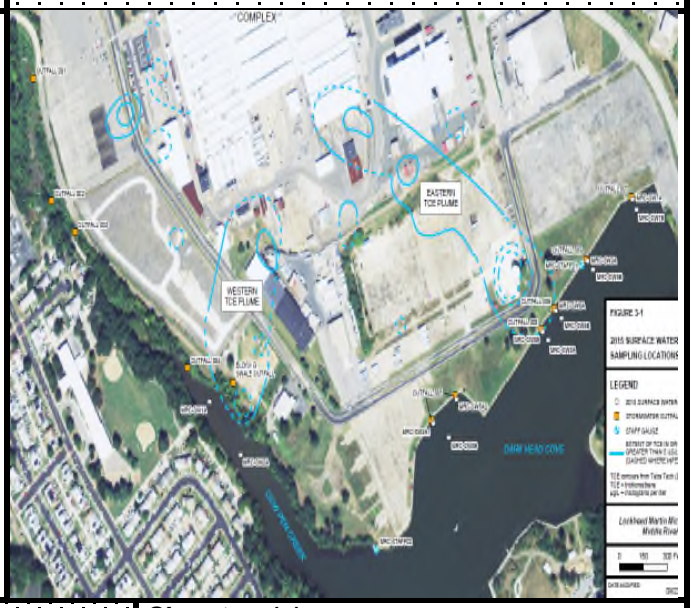
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL pH<2	3 - 40 mL glass vials	Yes
PCBs	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 2.3 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW7B -081315
Sample Location: MRC-SW7B
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

		Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Date:	8/13/2015								
Time:	1402								
Depth:	1 ft below water	**Gr/Br**	**6.79**	**2.99**	**28.44**	**2.78**	**5.79**	**1.6**	**174**
Method:	Grab								

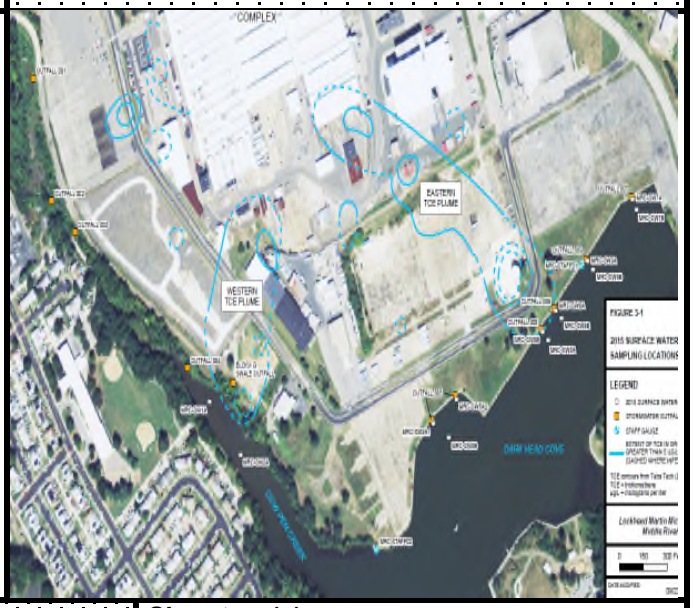
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
PCBs Method 680	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 2.15 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW8A -061015
Sample Location: MRC-SW8A
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	6/10/2015
Time:	915
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.34**	**3.84**	**24.23**	**5.41**	**6.58**	**2**	**171**

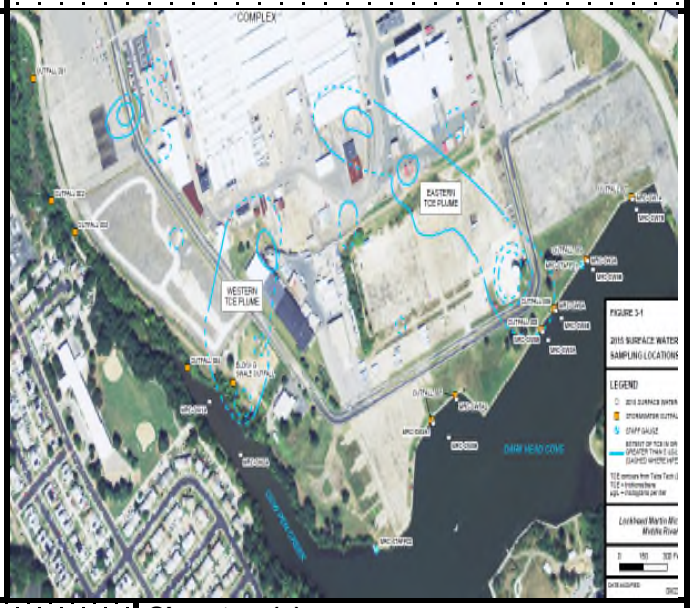
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL pH<2	3 - 40 mL glass vials	Yes
PCBs	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 2.5 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW8A -081315
Sample Location: MRC-SW8A
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	8/13/2015
Time:	1428
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.32**	**2.97**	**27.62**	**5.17**	**6.53**	**1.5**	**161**

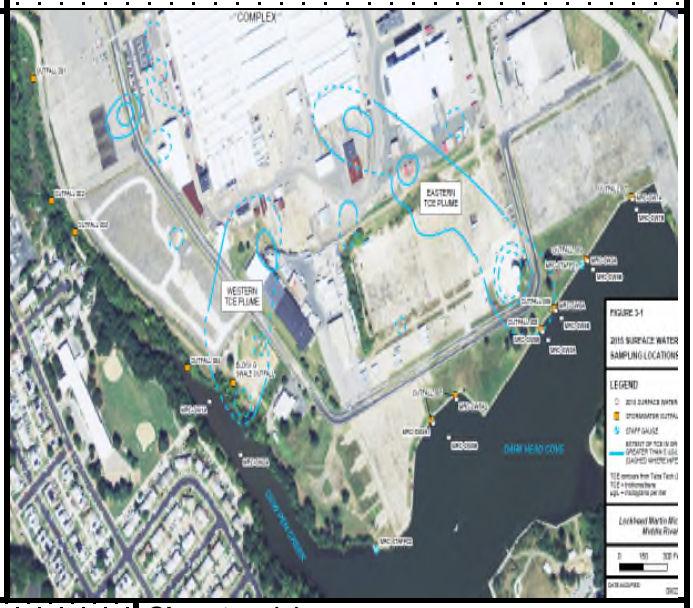
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
PCBs Method 680	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 2.4 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW8B -061015
Sample Location: MRC-SW8B
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

		Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Date:	6/10/2015								
Time:	918								
Depth:	1 ft below water	**Gr/Br**	**7.32**	**3.87**	**24.41**	**3.89**	**5.91**	**2**	**170**
Method:	Grab								

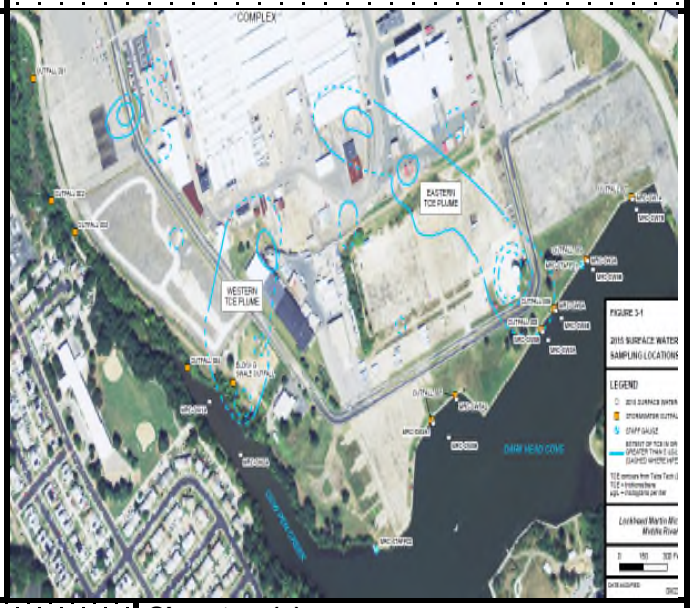
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL pH<2	3 - 40 mL glass vials	Yes
PCBs	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 3 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW8B -081315
Sample Location: MRC-SW8B
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	8/13/2015
Time:	1433
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.41**	**3.00**	**27.91**	**5.72**	**4.74**	**1.6**	**159**

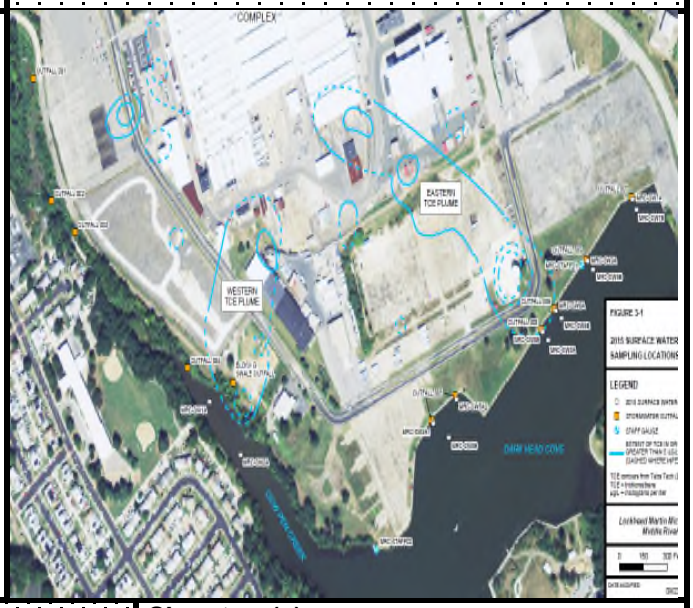
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
PCBs Method 680	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 2.9 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW9A -061015
Sample Location: MRC-SW9A
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

		Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Date:	6/10/2015								
Time:	851								
Depth:	1 ft below water	**Gr/Br**	**7.12**	**3.74**	**24.22**	**5.60**	**6.39**	**2**	**168**
Method:	Grab								

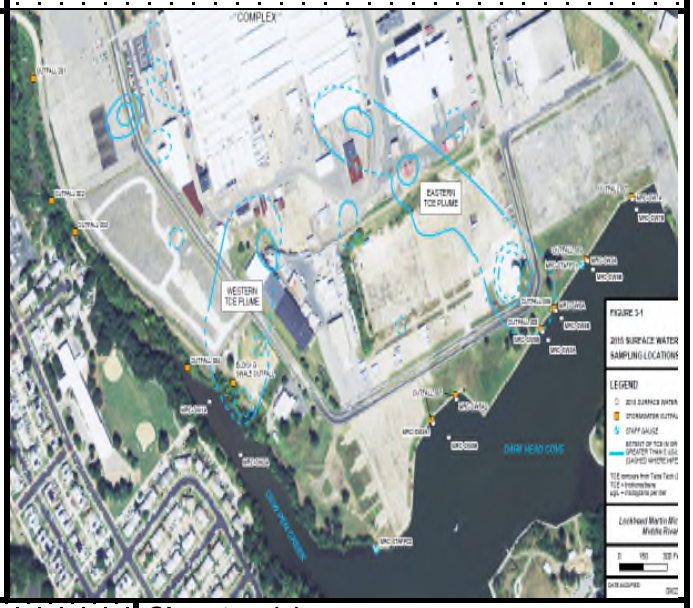
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL pH<2	3 - 40 mL glass vials	Yes
PCBs	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 1.5 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW9A -081315
Sample Location: MRC-SW9A
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	8/13/2015
Time:	1410
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.94**	**2.98**	**27.30**	**2.21**	**4.79**	**1.5**	**132**

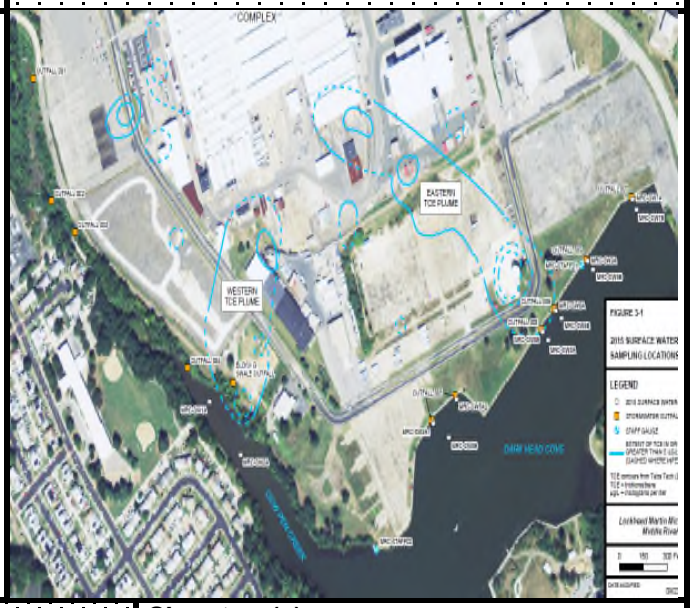
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
PCBs Method 680	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 1.5 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW9B -061015
Sample Location: MRC-SW9B
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	6/10/2015
Time:	855
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.15**	**3.78**	**24.23**	**7.41**	**6.13**	**2**	**167**

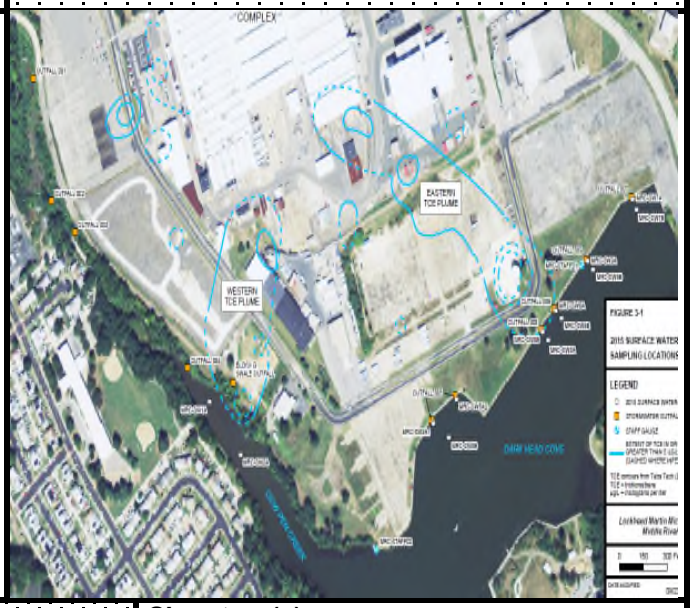
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL pH<2	3 - 40 mL glass vials	Yes
PCBs	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 2.25 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Dark Head Cove, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: MRC-SW9B -081315
Sample Location: MRC-SW9B
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	8/13/2015
Time:	1414
Depth:	1 ft below water
Method:	Grab

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Gr/Br	**7.62**	**3.00**	**28.31**	**4.02**	**4.66**	**1.6**	**144**

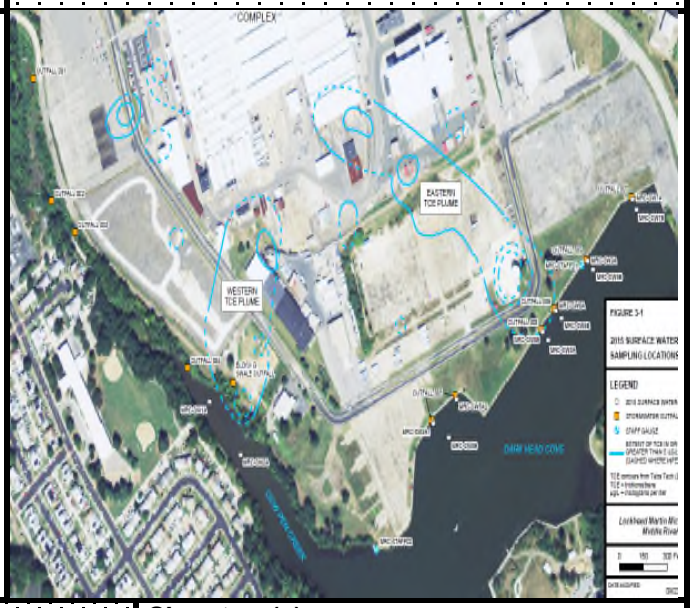
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
PCBs Method 680	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 2.55 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Cow Pen Creek, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: CPC-SW1A -061015
Sample Location: CPC-SW1A
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

		Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Date:	6/10/2015								
Time:	800								
Depth:	1 ft below water	**Gr/Br**	**6.06**	**2.96**	**22.23**	**10.67**	**4.07**	**1.4**	**206**
Method:	Grab								

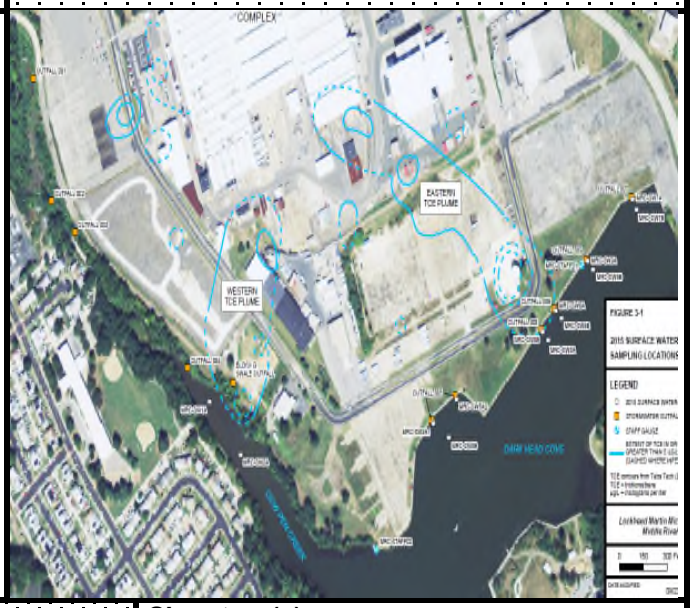
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL pH<2	3 - 40 mL glass vials	Yes
1,4-dioxane	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 0.3 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: Cow Pen Creek, Middle River Complex
Project No.: 112IC06247

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Tidal creek - freshwater
[] QA Sample Type:

Sample ID No.: CPC-SW2A -061015
Sample Location: CPC-SW2A
Sampled By: J. Mullis/W. Pryor
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[] High Concentration

SAMPLING DATA:

		Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/L)	Salinity (%)	ORP mV
Date:	6/10/2015								
Time:	814								
Depth:	1 ft below water	**Gr/Br**	**6.64**	**2.97**	**22.49**	**1.36**	**4.19**	**1.5**	**162**
Method:	Grab								

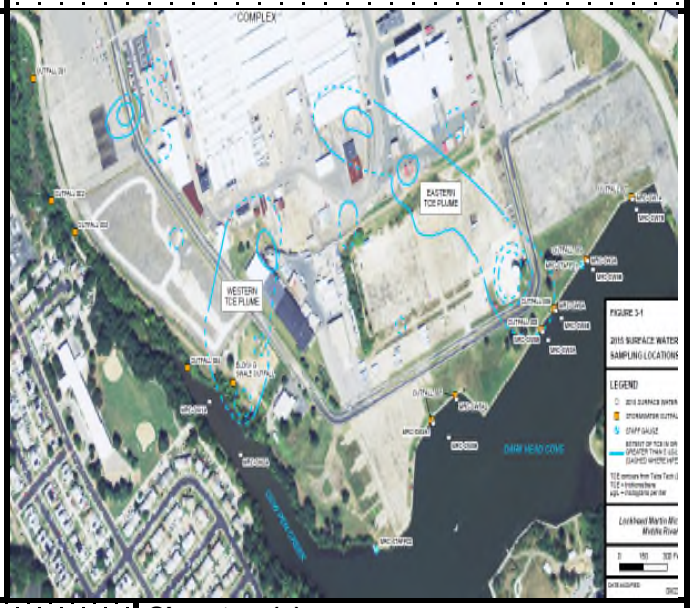
SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCL pH<2	3 - 40 mL glass vials	Yes
1,4-dioxane	4^o C	1 - 1 L amber	Yes

OBSERVATIONS / NOTES:

Water depth 0.5 feet

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

APPENDIX B—DATA-VALIDATION REPORT (ON CD)

TETRA TECH

INTERNAL CORRESPONDENCE

TO: **A. APANAVAGE** **DATE:** **SEPTEMBER 24, 2015**

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

SUBJECT: **ORGANIC DATA VALIDATION – PCB HOMOLOGS**
LOCKHEED MARTIN CORPORATION (LMC) – MIDDLE RIVER COMPLEX (MRC)
SAMPLE DELIVERY GROUP (SDG) 2089500

SAMPLES: 11/Aqueous/PCB Homologs

MRC-SW5A1-081315	MRC-SW5A2-081315	MRC-SW5B-081315
MRC-SW6A-081315	MRC-SW6B-081315	MRC-SW7A-081315
MRC-SW7B-081315	MRC-SW8A-081315	MRC-SW8B-081315
MRC-SW9A-081315	MRC-SW9B-081315	

Overview

The sample set for LMC - MRC, SDG 2089500 consisted of eleven (11) aqueous environmental samples. All eleven (11) samples were analyzed for polychlorinated biphenyls (PCB) homologs. No field duplicate sample pair was included in this SDG.

The samples were collected by Tetra Tech, Inc. on August 13, 2015 and analyzed by ALS Environmental. All analyses were conducted in accordance with EPA Method 680 analytical and reporting protocols.

The data contained in this SDG were validated with regard to the following parameters: data completeness, holding times/sample preservation, GC/MS tuning, initial/continuing calibrations, laboratory method blank results, surrogate spike recoveries, laboratory control sample results, matrix spike results, laboratory duplicate sample results, internal standard areas and recoveries, chromatographic resolution, compound identification, and detection limits. Areas of concern are listed below.

Major

No major issues were identified.

Minor

No minor issues were identified.

Notes

Initial and continuing calibration criteria were met for all PCB homologs.

No contaminants were detected in the laboratory method blank.

All surrogate, Laboratory Control Sample (LCS), and Matrix Spike (MS) recoveries were within the quality control limits.

The internal standard areas were within the upper and lower limits.

No detections were made in sample MRC-SW8B-081315 and its laboratory duplicate sample.

Non-detected results were reported to the Method Detection Limit (MDL).

Executive Summary

Laboratory Performance: None.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Organic Review" (June 2008) and EPA Method 680 analytical and reporting protocols. The text of this report has been formulated to address only those areas affecting data quality.

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

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

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

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate
Z4 = Sample activity is less than the at uncertainty at 3 standard deviations and greater than the MDC
Z5 = Sample activity is less than the at uncertainty at 3 standard deviations and less than the MDC

PROJ_NO: 06247	NSAMPLE	MRC-SW5A1-081315			MRC-SW5A2-081315			MRC-SW5B-081315			MRC-SW6A-081315		
SDG: 2089500	LAB_ID	2089500001			2089500002			2089500003			2089500004		
FRACTION: PCBH	SAMP_DATE	8/13/2015			8/13/2015			8/13/2015			8/13/2015		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DECACHLOROBIPHENYL		0.021	U		0.021	U		0.021	U		0.021	U	
DICHLOROBIPHENYLS		0.0037	U		0.0037	U		0.0037	U		0.0037	U	
HEPTACHLOROBIPHENYLS		0.01	U		0.01	U		0.01	U		0.01	U	
HEXACHLOROBIPHENYLS		0.0084	U		0.0084	U		0.0084	U		0.0084	U	
MONOCHLOROBIPHENYLS		0.0028	U		0.0028	U		0.0028	U		0.0028	U	
NONACHLOROBIPHENYLS		0.019	U		0.019	U		0.019	U		0.019	U	
OCTACHLOROBIPHENYLS		0.0093	U		0.0093	U		0.0093	U		0.0093	U	
PENTACHLOROBIPHENYLS		0.0056	U		0.0056	U		0.0056	U		0.0056	U	
TETRACHLOROBIPHENYLS		0.0065	U		0.0065	U		0.0065	U		0.0065	U	
TRICHLOROBIPHENYLS		0.0037	U		0.0037	U		0.0037	U		0.0037	U	

PROJ_NO: 06247	NSAMPLE	MRC-SW6B-081315			MRC-SW7A-081315			MRC-SW7B-081315			MRC-SW8A-081315		
SDG: 2089500	LAB_ID	2089500005			2089500006			2089500007			2089500008		
FRACTION: PCBH	SAMP_DATE	8/13/2015			8/13/2015			8/13/2015			8/13/2015		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DECACHLOROBIPHENYL		0.021	U		0.021	U		0.021	U		0.021	U	
DICHLOROBIPHENYLS		0.0037	U		0.0037	U		0.0037	U		0.0037	U	
HEPTACHLOROBIPHENYLS		0.01	U		0.01	U		0.01	U		0.01	U	
HEXACHLOROBIPHENYLS		0.0084	U		0.0084	U		0.0084	U		0.0084	U	
MONOCHLOROBIPHENYLS		0.0028	U		0.0028	U		0.0028	U		0.0028	U	
NONACHLOROBIPHENYLS		0.019	U		0.019	U		0.019	U		0.019	U	
OCTACHLOROBIPHENYLS		0.0093	U		0.0093	U		0.0093	U		0.0093	U	
PENTACHLOROBIPHENYLS		0.0056	U		0.0056	U		0.0056	U		0.0056	U	
TETRACHLOROBIPHENYLS		0.0065	U		0.0065	U		0.0065	U		0.0065	U	
TRICHLOROBIPHENYLS		0.0037	U		0.0037	U		0.0037	U		0.0037	U	

PROJ_NO: 06247	NSAMPLE	MRC-SW8B-081315			MRC-SW9A-081315			MRC-SW9B-081315		
SDG: 2089500	LAB_ID	2089500009			2089500010			2089500011		
FRACTION: PCBH	SAMP_DATE	8/13/2015			8/13/2015			8/13/2015		
MEDIA: WATER	QC_TYPE	NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0		
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DECACHLOROBIPHENYL		0.021	U		0.021	U		0.021	U	
DICHLOROBIPHENYLS		0.0037	U		0.0037	U		0.0037	U	
HEPTACHLOROBIPHENYLS		0.01	U		0.01	U		0.01	U	
HEXACHLOROBIPHENYLS		0.0084	U		0.0084	U		0.0084	U	
MONOCHLOROBIPHENYLS		0.0028	U		0.0028	U		0.0028	U	
NONACHLOROBIPHENYLS		0.019	U		0.019	U		0.019	U	
OCTACHLOROBIPHENYLS		0.0093	U		0.0093	U		0.0093	U	
PENTACHLOROBIPHENYLS		0.0056	U		0.0056	U		0.0056	U	
TETRACHLOROBIPHENYLS		0.0065	U		0.0065	U		0.0065	U	
TRICHLOROBIPHENYLS		0.0037	U		0.0037	U		0.0037	U	

Appendix B

Results as Reported by the Laboratory

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ANALYTICAL RESULTS

Workorder: 2089500 MRC Surface Water

Lab ID: **2089500001** Date Collected: 8/13/2015 14:48 Matrix: Water

Sample ID: **MRC-SW5A1-081315** Date Received: 8/14/2015 08:46

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
PCBs											
Decachlorobiphenyls	ND		ug/L	0.047	0.021	EPA 680	8/17/15	PDK	8/18/15 21:03	DHF	A
Dichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/18/15 21:03	DHF	A
Heptachlorobiphenyls	ND		ug/L	0.028	0.010	EPA 680	8/17/15	PDK	8/18/15 21:03	DHF	A
Hexachlorobiphenyls	ND		ug/L	0.019	0.0084	EPA 680	8/17/15	PDK	8/18/15 21:03	DHF	A
Monochlorobiphenyls	ND		ug/L	0.0093	0.0028	EPA 680	8/17/15	PDK	8/18/15 21:03	DHF	A
Nonachlorobiphenyls	ND		ug/L	0.037	0.019	EPA 680	8/17/15	PDK	8/18/15 21:03	DHF	A
Octachlorobiphenyls	ND		ug/L	0.028	0.0093	EPA 680	8/17/15	PDK	8/18/15 21:03	DHF	A
Pentachlorobiphenyls	ND		ug/L	0.019	0.0056	EPA 680	8/17/15	PDK	8/18/15 21:03	DHF	A
Tetrachlorobiphenyls	ND		ug/L	0.019	0.0065	EPA 680	8/17/15	PDK	8/18/15 21:03	DHF	A
Trichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/18/15 21:03	DHF	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Fluorobiphenyl (S)	68.5		%	45 - 105		EPA 680	8/17/15	PDK	8/18/15 21:03	DHF	A
Terphenyl-d14 (S)	91.7		%	38 - 113		EPA 680	8/17/15	PDK	8/18/15 21:03	DHF	A
Tetrachloro-m-xylene (S)	41.7		%	36 - 112		EPA 680	8/17/15	PDK	8/18/15 21:03	DHF	A

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ANALYTICAL RESULTS

Workorder: 2089500 MRC Surface Water

Lab ID: **2089500002** Date Collected: 8/13/2015 14:43 Matrix: Water

Sample ID: **MRC-SW5A2-081315** Date Received: 8/14/2015 08:46

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
PCBs											
Decachlorobiphenyls	ND		ug/L	0.047	0.021	EPA 680	8/17/15	PDK	8/18/15 21:32	DHF	A
Dichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/18/15 21:32	DHF	A
Heptachlorobiphenyls	ND		ug/L	0.028	0.010	EPA 680	8/17/15	PDK	8/18/15 21:32	DHF	A
Hexachlorobiphenyls	ND		ug/L	0.019	0.0084	EPA 680	8/17/15	PDK	8/18/15 21:32	DHF	A
Monochlorobiphenyls	ND		ug/L	0.0093	0.0028	EPA 680	8/17/15	PDK	8/18/15 21:32	DHF	A
Nonachlorobiphenyls	ND		ug/L	0.037	0.019	EPA 680	8/17/15	PDK	8/18/15 21:32	DHF	A
Octachlorobiphenyls	ND		ug/L	0.028	0.0093	EPA 680	8/17/15	PDK	8/18/15 21:32	DHF	A
Pentachlorobiphenyls	ND		ug/L	0.019	0.0056	EPA 680	8/17/15	PDK	8/18/15 21:32	DHF	A
Tetrachlorobiphenyls	ND		ug/L	0.019	0.0065	EPA 680	8/17/15	PDK	8/18/15 21:32	DHF	A
Trichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/18/15 21:32	DHF	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Fluorobiphenyl (S)	71.7		%	45 - 105		EPA 680	8/17/15	PDK	8/18/15 21:32	DHF	A
Terphenyl-d14 (S)	97.3		%	38 - 113		EPA 680	8/17/15	PDK	8/18/15 21:32	DHF	A
Tetrachloro-m-xylene (S)	43.9		%	36 - 112		EPA 680	8/17/15	PDK	8/18/15 21:32	DHF	A

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ANALYTICAL RESULTS

Workorder: 2089500 MRC Surface Water

Lab ID: **2089500003** Date Collected: 8/13/2015 14:52 Matrix: Water

Sample ID: **MRC-SW5B-081315** Date Received: 8/14/2015 08:46

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
PCBs											
Decachlorobiphenyls	ND		ug/L	0.047	0.021	EPA 680	8/17/15	PDK	8/18/15 22:02	DHF	A
Dichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/18/15 22:02	DHF	A
Heptachlorobiphenyls	ND		ug/L	0.028	0.010	EPA 680	8/17/15	PDK	8/18/15 22:02	DHF	A
Hexachlorobiphenyls	ND		ug/L	0.019	0.0084	EPA 680	8/17/15	PDK	8/18/15 22:02	DHF	A
Monochlorobiphenyls	ND		ug/L	0.0093	0.0028	EPA 680	8/17/15	PDK	8/18/15 22:02	DHF	A
Nonachlorobiphenyls	ND		ug/L	0.037	0.019	EPA 680	8/17/15	PDK	8/18/15 22:02	DHF	A
Octachlorobiphenyls	ND		ug/L	0.028	0.0093	EPA 680	8/17/15	PDK	8/18/15 22:02	DHF	A
Pentachlorobiphenyls	ND		ug/L	0.019	0.0056	EPA 680	8/17/15	PDK	8/18/15 22:02	DHF	A
Tetrachlorobiphenyls	ND		ug/L	0.019	0.0065	EPA 680	8/17/15	PDK	8/18/15 22:02	DHF	A
Trichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/18/15 22:02	DHF	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Fluorobiphenyl (S)	62.2		%	45 - 105		EPA 680	8/17/15	PDK	8/18/15 22:02	DHF	A
Terphenyl-d14 (S)	72.4		%	38 - 113		EPA 680	8/17/15	PDK	8/18/15 22:02	DHF	A
Tetrachloro-m-xylene (S)	38		%	36 - 112		EPA 680	8/17/15	PDK	8/18/15 22:02	DHF	A

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ANALYTICAL RESULTS

Workorder: 2089500 MRC Surface Water

Lab ID: **2089500004** Date Collected: 8/13/2015 14:20 Matrix: Water

Sample ID: **MRC-SW6A-081315** Date Received: 8/14/2015 08:46

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
PCBs											
Decachlorobiphenyls	ND		ug/L	0.047	0.021	EPA 680	8/17/15	PDK	8/18/15 22:31	DHF	A
Dichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/18/15 22:31	DHF	A
Heptachlorobiphenyls	ND		ug/L	0.028	0.010	EPA 680	8/17/15	PDK	8/18/15 22:31	DHF	A
Hexachlorobiphenyls	ND		ug/L	0.019	0.0084	EPA 680	8/17/15	PDK	8/18/15 22:31	DHF	A
Monochlorobiphenyls	ND		ug/L	0.0093	0.0028	EPA 680	8/17/15	PDK	8/18/15 22:31	DHF	A
Nonachlorobiphenyls	ND		ug/L	0.037	0.019	EPA 680	8/17/15	PDK	8/18/15 22:31	DHF	A
Octachlorobiphenyls	ND		ug/L	0.028	0.0093	EPA 680	8/17/15	PDK	8/18/15 22:31	DHF	A
Pentachlorobiphenyls	ND		ug/L	0.019	0.0056	EPA 680	8/17/15	PDK	8/18/15 22:31	DHF	A
Tetrachlorobiphenyls	ND		ug/L	0.019	0.0065	EPA 680	8/17/15	PDK	8/18/15 22:31	DHF	A
Trichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/18/15 22:31	DHF	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Fluorobiphenyl (S)	68.3		%	45 - 105		EPA 680	8/17/15	PDK	8/18/15 22:31	DHF	A
Terphenyl-d14 (S)	82.3		%	38 - 113		EPA 680	8/17/15	PDK	8/18/15 22:31	DHF	A
Tetrachloro-m-xylene (S)	39.5		%	36 - 112		EPA 680	8/17/15	PDK	8/18/15 22:31	DHF	A

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ANALYTICAL RESULTS

Workorder: 2089500 MRC Surface Water

Lab ID: **2089500005** Date Collected: 8/13/2015 14:24 Matrix: Water

Sample ID: **MRC-SW6B-081315** Date Received: 8/14/2015 08:46

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
PCBs											
Decachlorobiphenyls	ND		ug/L	0.047	0.021	EPA 680	8/17/15	PDK	8/18/15 23:30	DHF	A
Dichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/18/15 23:30	DHF	A
Heptachlorobiphenyls	ND		ug/L	0.028	0.010	EPA 680	8/17/15	PDK	8/18/15 23:30	DHF	A
Hexachlorobiphenyls	ND		ug/L	0.019	0.0084	EPA 680	8/17/15	PDK	8/18/15 23:30	DHF	A
Monochlorobiphenyls	ND		ug/L	0.0093	0.0028	EPA 680	8/17/15	PDK	8/18/15 23:30	DHF	A
Nonachlorobiphenyls	ND		ug/L	0.037	0.019	EPA 680	8/17/15	PDK	8/18/15 23:30	DHF	A
Octachlorobiphenyls	ND		ug/L	0.028	0.0093	EPA 680	8/17/15	PDK	8/18/15 23:30	DHF	A
Pentachlorobiphenyls	ND		ug/L	0.019	0.0056	EPA 680	8/17/15	PDK	8/18/15 23:30	DHF	A
Tetrachlorobiphenyls	ND		ug/L	0.019	0.0065	EPA 680	8/17/15	PDK	8/18/15 23:30	DHF	A
Trichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/18/15 23:30	DHF	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Fluorobiphenyl (S)	68.1		%	45 - 105		EPA 680	8/17/15	PDK	8/18/15 23:30	DHF	A
Terphenyl-d14 (S)	81.8		%	38 - 113		EPA 680	8/17/15	PDK	8/18/15 23:30	DHF	A
Tetrachloro-m-xylene (S)	40.6		%	36 - 112		EPA 680	8/17/15	PDK	8/18/15 23:30	DHF	A

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ANALYTICAL RESULTS

Workorder: 2089500 MRC Surface Water

Lab ID: **2089500006** Date Collected: 8/13/2015 13:57 Matrix: Water

Sample ID: **MRC-SW7A-081315** Date Received: 8/14/2015 08:46

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
PCBs											
Decachlorobiphenyls	ND		ug/L	0.047	0.021	EPA 680	8/17/15	PDK	8/19/15 00:00	DHF	A
Dichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/19/15 00:00	DHF	A
Heptachlorobiphenyls	ND		ug/L	0.028	0.010	EPA 680	8/17/15	PDK	8/19/15 00:00	DHF	A
Hexachlorobiphenyls	ND		ug/L	0.019	0.0084	EPA 680	8/17/15	PDK	8/19/15 00:00	DHF	A
Monochlorobiphenyls	ND		ug/L	0.0093	0.0028	EPA 680	8/17/15	PDK	8/19/15 00:00	DHF	A
Nonachlorobiphenyls	ND		ug/L	0.037	0.019	EPA 680	8/17/15	PDK	8/19/15 00:00	DHF	A
Octachlorobiphenyls	ND		ug/L	0.028	0.0093	EPA 680	8/17/15	PDK	8/19/15 00:00	DHF	A
Pentachlorobiphenyls	ND		ug/L	0.019	0.0056	EPA 680	8/17/15	PDK	8/19/15 00:00	DHF	A
Tetrachlorobiphenyls	ND		ug/L	0.019	0.0065	EPA 680	8/17/15	PDK	8/19/15 00:00	DHF	A
Trichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/19/15 00:00	DHF	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Fluorobiphenyl (S)	67.7		%	45 - 105		EPA 680	8/17/15	PDK	8/19/15 00:00	DHF	A
Terphenyl-d14 (S)	75.8		%	38 - 113		EPA 680	8/17/15	PDK	8/19/15 00:00	DHF	A
Tetrachloro-m-xylene (S)	41.4		%	36 - 112		EPA 680	8/17/15	PDK	8/19/15 00:00	DHF	A

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ANALYTICAL RESULTS

Workorder: 2089500 MRC Surface Water

Lab ID: **2089500007** Date Collected: 8/13/2015 14:02 Matrix: Water

Sample ID: **MRC-SW7B-081315** Date Received: 8/14/2015 08:46

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
PCBs											
Decachlorobiphenyls	ND		ug/L	0.047	0.021	EPA 680	8/17/15	PDK	8/19/15 00:29	DHF	A
Dichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/19/15 00:29	DHF	A
Heptachlorobiphenyls	ND		ug/L	0.028	0.010	EPA 680	8/17/15	PDK	8/19/15 00:29	DHF	A
Hexachlorobiphenyls	ND		ug/L	0.019	0.0084	EPA 680	8/17/15	PDK	8/19/15 00:29	DHF	A
Monochlorobiphenyls	ND		ug/L	0.0093	0.0028	EPA 680	8/17/15	PDK	8/19/15 00:29	DHF	A
Nonachlorobiphenyls	ND		ug/L	0.037	0.019	EPA 680	8/17/15	PDK	8/19/15 00:29	DHF	A
Octachlorobiphenyls	ND		ug/L	0.028	0.0093	EPA 680	8/17/15	PDK	8/19/15 00:29	DHF	A
Pentachlorobiphenyls	ND		ug/L	0.019	0.0056	EPA 680	8/17/15	PDK	8/19/15 00:29	DHF	A
Tetrachlorobiphenyls	ND		ug/L	0.019	0.0065	EPA 680	8/17/15	PDK	8/19/15 00:29	DHF	A
Trichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/19/15 00:29	DHF	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Fluorobiphenyl (S)	73		%	45 - 105		EPA 680	8/17/15	PDK	8/19/15 00:29	DHF	A
Terphenyl-d14 (S)	86		%	38 - 113		EPA 680	8/17/15	PDK	8/19/15 00:29	DHF	A
Tetrachloro-m-xylene (S)	43.3		%	36 - 112		EPA 680	8/17/15	PDK	8/19/15 00:29	DHF	A

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2089500 MRC Surface Water

Lab ID: **2089500008** Date Collected: 8/13/2015 14:28 Matrix: Water

Sample ID: **MRC-SW8A-081315** Date Received: 8/14/2015 08:46

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
PCBs											
Decachlorobiphenyls	ND		ug/L	0.047	0.021	EPA 680	8/17/15	PDK	8/19/15 00:59	DHF	A
Dichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/19/15 00:59	DHF	A
Heptachlorobiphenyls	ND		ug/L	0.028	0.010	EPA 680	8/17/15	PDK	8/19/15 00:59	DHF	A
Hexachlorobiphenyls	ND		ug/L	0.019	0.0084	EPA 680	8/17/15	PDK	8/19/15 00:59	DHF	A
Monochlorobiphenyls	ND		ug/L	0.0093	0.0028	EPA 680	8/17/15	PDK	8/19/15 00:59	DHF	A
Nonachlorobiphenyls	ND		ug/L	0.037	0.019	EPA 680	8/17/15	PDK	8/19/15 00:59	DHF	A
Octachlorobiphenyls	ND		ug/L	0.028	0.0093	EPA 680	8/17/15	PDK	8/19/15 00:59	DHF	A
Pentachlorobiphenyls	ND		ug/L	0.019	0.0056	EPA 680	8/17/15	PDK	8/19/15 00:59	DHF	A
Tetrachlorobiphenyls	ND		ug/L	0.019	0.0065	EPA 680	8/17/15	PDK	8/19/15 00:59	DHF	A
Trichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/19/15 00:59	DHF	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Fluorobiphenyl (S)	71.4		%	45 - 105		EPA 680	8/17/15	PDK	8/19/15 00:59	DHF	A
Terphenyl-d14 (S)	83.4		%	38 - 113		EPA 680	8/17/15	PDK	8/19/15 00:59	DHF	A
Tetrachloro-m-xylene (S)	44.3		%	36 - 112		EPA 680	8/17/15	PDK	8/19/15 00:59	DHF	A

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2089500 MRC Surface Water

Lab ID: **2089500009** Date Collected: 8/13/2015 14:33 Matrix: Water

Sample ID: **MRC-SW8B-081315** Date Received: 8/14/2015 08:46

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
PCBs											
Decachlorobiphenyls	ND		ug/L	0.047	0.021	EPA 680	8/17/15	PDK	8/19/15 01:28	DHF	A
Dichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/19/15 01:28	DHF	A
Heptachlorobiphenyls	ND		ug/L	0.028	0.010	EPA 680	8/17/15	PDK	8/19/15 01:28	DHF	A
Hexachlorobiphenyls	ND		ug/L	0.019	0.0084	EPA 680	8/17/15	PDK	8/19/15 01:28	DHF	A
Monochlorobiphenyls	ND		ug/L	0.0093	0.0028	EPA 680	8/17/15	PDK	8/19/15 01:28	DHF	A
Nonachlorobiphenyls	ND		ug/L	0.037	0.019	EPA 680	8/17/15	PDK	8/19/15 01:28	DHF	A
Octachlorobiphenyls	ND		ug/L	0.028	0.0093	EPA 680	8/17/15	PDK	8/19/15 01:28	DHF	A
Pentachlorobiphenyls	ND		ug/L	0.019	0.0056	EPA 680	8/17/15	PDK	8/19/15 01:28	DHF	A
Tetrachlorobiphenyls	ND		ug/L	0.019	0.0065	EPA 680	8/17/15	PDK	8/19/15 01:28	DHF	A
Trichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/19/15 01:28	DHF	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Fluorobiphenyl (S)	70.4		%	45 - 105		EPA 680	8/17/15	PDK	8/19/15 01:28	DHF	A
Terphenyl-d14 (S)	77.4		%	38 - 113		EPA 680	8/17/15	PDK	8/19/15 01:28	DHF	A
Tetrachloro-m-xylene (S)	43.7		%	36 - 112		EPA 680	8/17/15	PDK	8/19/15 01:28	DHF	A

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ANALYTICAL RESULTS

Workorder: 2089500 MRC Surface Water

Lab ID: **2089500010** Date Collected: 8/13/2015 14:10 Matrix: Water

Sample ID: **MRC-SW9A-081315** Date Received: 8/14/2015 08:46

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
PCBs											
Decachlorobiphenyls	ND		ug/L	0.047	0.021	EPA 680	8/17/15	PDK	8/19/15 02:27	DHF	A
Dichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/19/15 02:27	DHF	A
Heptachlorobiphenyls	ND		ug/L	0.028	0.010	EPA 680	8/17/15	PDK	8/19/15 02:27	DHF	A
Hexachlorobiphenyls	ND		ug/L	0.019	0.0084	EPA 680	8/17/15	PDK	8/19/15 02:27	DHF	A
Monochlorobiphenyls	ND		ug/L	0.0093	0.0028	EPA 680	8/17/15	PDK	8/19/15 02:27	DHF	A
Nonachlorobiphenyls	ND		ug/L	0.037	0.019	EPA 680	8/17/15	PDK	8/19/15 02:27	DHF	A
Octachlorobiphenyls	ND		ug/L	0.028	0.0093	EPA 680	8/17/15	PDK	8/19/15 02:27	DHF	A
Pentachlorobiphenyls	ND		ug/L	0.019	0.0056	EPA 680	8/17/15	PDK	8/19/15 02:27	DHF	A
Tetrachlorobiphenyls	ND		ug/L	0.019	0.0065	EPA 680	8/17/15	PDK	8/19/15 02:27	DHF	A
Trichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/19/15 02:27	DHF	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Fluorobiphenyl (S)	74.5		%	45 - 105		EPA 680	8/17/15	PDK	8/19/15 02:27	DHF	A
Terphenyl-d14 (S)	89.8		%	38 - 113		EPA 680	8/17/15	PDK	8/19/15 02:27	DHF	A
Tetrachloro-m-xylene (S)	47.8		%	36 - 112		EPA 680	8/17/15	PDK	8/19/15 02:27	DHF	A

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ANALYTICAL RESULTS

Workorder: 2089500 MRC Surface Water

Lab ID: **2089500011** Date Collected: 8/13/2015 14:14 Matrix: Water

Sample ID: **MRC-SW9B-081315** Date Received: 8/14/2015 08:46

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
PCBs											
Decachlorobiphenyls	ND		ug/L	0.047	0.021	EPA 680	8/17/15	PDK	8/19/15 02:57	DHF	A
Dichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/19/15 02:57	DHF	A
Heptachlorobiphenyls	ND		ug/L	0.028	0.010	EPA 680	8/17/15	PDK	8/19/15 02:57	DHF	A
Hexachlorobiphenyls	ND		ug/L	0.019	0.0084	EPA 680	8/17/15	PDK	8/19/15 02:57	DHF	A
Monochlorobiphenyls	ND		ug/L	0.0093	0.0028	EPA 680	8/17/15	PDK	8/19/15 02:57	DHF	A
Nonachlorobiphenyls	ND		ug/L	0.037	0.019	EPA 680	8/17/15	PDK	8/19/15 02:57	DHF	A
Octachlorobiphenyls	ND		ug/L	0.028	0.0093	EPA 680	8/17/15	PDK	8/19/15 02:57	DHF	A
Pentachlorobiphenyls	ND		ug/L	0.019	0.0056	EPA 680	8/17/15	PDK	8/19/15 02:57	DHF	A
Tetrachlorobiphenyls	ND		ug/L	0.019	0.0065	EPA 680	8/17/15	PDK	8/19/15 02:57	DHF	A
Trichlorobiphenyls	ND		ug/L	0.0093	0.0037	EPA 680	8/17/15	PDK	8/19/15 02:57	DHF	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Fluorobiphenyl (S)	76.8		%	45 - 105		EPA 680	8/17/15	PDK	8/19/15 02:57	DHF	A
Terphenyl-d14 (S)	85.1		%	38 - 113		EPA 680	8/17/15	PDK	8/19/15 02:57	DHF	A
Tetrachloro-m-xylene (S)	48.2		%	36 - 112		EPA 680	8/17/15	PDK	8/19/15 02:57	DHF	A

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Project Coordinator

Appendix C

Support Documentation

ALS Environmental

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

MIDDLETOWN, PA LAB

~~1565 Jefferson Road, Building 300, Suite 360 • Rochester, NY 14623~~ | +1 585 288 5380 +1 585 288 8475 (fax) PAGE

* 2089500 *

Project Name: MRC SURFACE WATER	Project Number: 112IC06247
Project Manager: TONY APANAVAGE	Report CC:
Company/Address: 20251 CENTURY BLVD. STE. 200 GERMANTOWN, MD, 20874	
Phone #: 301-233-8230	Email: tony.apanavage@tetratech.com
Sampler's Signature:	Sampler's Printed Name: JOSH MULLIS

ANALYSIS REQUESTED (Include Method Number and Conta...

PRESERVATIVE

CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	GC/MS VOAs • 8260 • 624 Group	GC/MS SVOAs • 8270 • 625	GC VOAs • 8021 • 601/602	PESTICIDES • 8081 • 608	PCBs • 8082 • 608	METALS TOTAL (List in comments below)	METALS DISSOLVED (List in comments below)	PCBs (680)	
MRC-SW5A1-081315		8/13/15	1448	AQ	2	X								
MRC-SW5A2-081315			1443			X								
MRC-SW5B-081315			1452			X								
MRC-SW6A-081315			1420			X								
MRC-SW6B-081315			1424			X								
MRC-SW7A-081315			1357			X								
MRC-SW7B-081315			1402			X								
MRC-SW8A-081315			1428			X								
MRC-SW8B-081315			1433			X								
MRC-SW9A-081315			1410			X								
MRC-SW9B-081315			1414			X								

Preservative Key
0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other

	Y	N	Initials	Cooler Temp:
Custody Seals Present?				3 °C
(if present) Seals Intact?			AN	
Received on Ice?				Cooler #: 1
COC/Lbls Complete				
Cont in Good Cond?				Therm ID: TH309
Correct Containers?				
Correct Samp Vol?				Ship Carrier
Correct Preservation?				FedEx UPS
Headspace/Volatiles?				DHL
Tracking #: 8070755463 20				

	Y	N	Initials	Cooler Temp:
Custody Seals Present?				4 °C
(if present) Seals Intact?			AN	
Received on Ice?				Cooler #: 2
COC/Lbls Complete				
Cont in Good Cond?				Therm ID: TH309
Correct Containers?				
Correct Samp Vol?				Ship Carrier
Correct Preservation?				FedEx UPS
Headspace/Volatiles?				DHL
Tracking #: 8070755463 2C				

SPECIAL INSTRUCTIONS/COMMENTS

~~Metals~~

* PCBs TO BE ANALYZED BY METHOD 680 *

* MIDDLETOWN, PA LAB

* MRC SURFACE WATER PCB RESAMPLE *

* STANDARD TAT, CHECK HOLD TIME (MAY BE 7DAYS)

See QAPP ☐

TURNAROUND REQUIREMENTS

____ RUSH (SURCHARGES APPLY)

____ 1 day ____ 2 day ____ 3 day

____ 4 day ____ 5 day

STANDARD

REQUESTED REPORT DATE

REPORT F

____ I. Results Onl

____ II. Results + (LCS, DUP, M

____ III. Results + Summaries

____ IV. Data Val

Edata ____ Yes ____ No

STATE WHERE SAMPLES WERE COLLECTED MARYLAND

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Printed Name: JOSH MULLIS	Printed Name: Adam Younger	Printed Name	Printed Name	Printed Name	Printed Name
Firm: TETRA TECH	Firm: ALS	Firm	Firm	Firm	Firm
Date/Time: 8/13/15 1700	Date/Time: 8/14/15 0846	Date/Time	Date/Time	Date/Time	Date/Time

Distribution: White - Lab Copy; Yellow - Return to Originator

LMG 08/14/15 2342

Tetra Tech, Inc.
MRC-GW 2015 Sampling

ALS-Middletown
Case Narrative
TMM-055

Sample Management

This report contains the results of the analysis of eleven (11) water samples collected on August 13, 2015. Analytical results and quality control information are summarized in this data package.

Sample Receipt

Samples arrived at ALS via courier on August 14, 2015. Upon receipt, the samples were inspected and compared to the Chain of Custody. Sample temperature was documented on the enclosed Chain of Custody. Samples were received intact and properly preserved, unless noted on the enclosed Certificate of Analysis and/or Chain of Custody.

PCB Homolog Compounds

Sample Handling. Eleven (11) water samples were extracted by SW-846 Method 3510 and analyzed by Method 680 for PCB homolog compounds. The extraction and analysis were performed within the holding time.

Initial Calibrations. Initial calibrations were properly analyzed and met method criteria for all target analytes.

Initial Calibration Verification Check. Initial calibration verification standards (ICV) were properly analyzed and all results were within method criteria; except as follows:

- On April 9, 2015 (01:49), decachlorobiphenyl was recovered below the method criteria.

Continuing Calibration Verification. Continuing calibration standards were properly analyzed and met method criteria.

Blanks. Target analytes were not detected in the blank.

Surrogates. Recoveries were within control limits.

Laboratory control samples. Target analytes were recovered within control limits.

Matrix Spikes. A matrix spike, identified as 2219194, was extracted and analyzed from project sample MRC-SW6A-081315 (2089500004). Target analytes were within control limits.

Duplicate Samples. A duplicate sample, identified as 2219195, was extracted and analyzed from project sample MRC-SW8B-081315 (2089500009). No target analytes were detected above the reporting limit.

Internal Standards. Internal standard results met method criteria.

I Jennifer M. Lamoreux, as the designated Quality Assurance Officer, hereby attest that all electronic deliverables have been thoroughly reviewed and are in agreement with the associated hardcopy data. The enclosed electronic files have been reviewed for accuracy (including significant figures), completeness and format. The laboratory will be responsible for any labor time necessary to correct enclosed electronic deliverables that have been found to be in error. I can be reached at (717) 944-5541 if there are any questions or problems with the enclosed electronic deliverables.

Signature:  Title: Reporting Manager Date: 9/22/2015

ALS Environmental

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2089500 MRC Surface Water

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2089500001	MRC-SW5A1-081315	Water	8/13/2015 14:48	8/14/2015 08:46	Collected by Client
2089500002	MRC-SW5A2-081315	Water	8/13/2015 14:43	8/14/2015 08:46	Collected by Client
2089500003	MRC-SW5B-081315	Water	8/13/2015 14:52	8/14/2015 08:46	Collected by Client
2089500004	MRC-SW6A-081315	Water	8/13/2015 14:20	8/14/2015 08:46	Collected by Client
2089500005	MRC-SW6B-081315	Water	8/13/2015 14:24	8/14/2015 08:46	Collected by Client
2089500006	MRC-SW7A-081315	Water	8/13/2015 13:57	8/14/2015 08:46	Collected by Client
2089500007	MRC-SW7B-081315	Water	8/13/2015 14:02	8/14/2015 08:46	Collected by Client
2089500008	MRC-SW8A-081315	Water	8/13/2015 14:28	8/14/2015 08:46	Collected by Client
2089500009	MRC-SW8B-081315	Water	8/13/2015 14:33	8/14/2015 08:46	Collected by Client
2089500010	MRC-SW9A-081315	Water	8/13/2015 14:10	8/14/2015 08:46	Collected by Client
2089500011	MRC-SW9B-081315	Water	8/13/2015 14:14	8/14/2015 08:46	Collected by Client

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2089500 MRC Surface Water

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

FORM 2

WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM055

	SAMPLE NO.	S1 (FBP)#	S2 (TCX)#	S3 (TPH)#	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	2219192	72	46	83						0
02	2219193LCS	68	43	81						0
03	MRC-SW5A1-08	68	42	92						0
04	MRC-SW5A2-08	72	44	97						0
05	MRC-SW5B-081	62	38	72						0
06	MRC-SW6A-081	68	40	82						0
07	MRC-SW6A-081	71	42	89						0
08	MRC-SW6B-081	68	41	82						0
09	MRC-SW7A-081	68	41	76						0
10	MRC-SW7B-081	73	43	86						0
11	MRC-SW8A-081	71	44	83						0
12	MRC-SW8B-081	70	44	77						0
13	MRC-SW8B-081	68	44	78						0
14	MRC-SW9A-081	74	48	90						0
15	MRC-SW9B-081	77	48	85						0
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

	QC LIMITS
S1 (FBP) = 2-Fluorobiphenyl	(45-105)
S2 (TCX) = Tetrachloro-m-xylene	(36-112)
S3 (TPH) = Terphenyl-d14	(38-113)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM055

EPA Sample No. (SSTD050##): 680-0.2 Date Analyzed: 04/08/15

Lab File ID (Standard): 6040805 Time Analyzed: 2123

Instrument ID: MS06 GC Column: ZB-5 ID:0.25(mm)

	IS1(PHN)		IS2(CRY)			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12 HOUR STD	106741	12.18	82199	18.41		
UPPER LIMIT	160112	12.34	123299	18.58		
LOWER LIMIT	74719	12.01	57539	18.24		
SAMPLE NO.						
01 680-PCB-2ND	109366	12.18	79603	18.41		
02 680-SUR-2ND	98947	12.18	75731	18.41		
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (PHN) = Phenanthrene-d10
IS2 (CRY) = Chrysene-d12

AREA UPPER LIMIT = + 50% of internal standard area
AREA LOWER LIMIT = - 30% of internal standard area
RT UPPER LIMIT = + 0.17 minutes of internal standard RT
RT LOWER LIMIT = - 0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM055

EPA Sample No. (SSTD050##): 680-2B Date Analyzed: 08/18/15

Lab File ID (Standard): 6081812 Time Analyzed: 1752

Instrument ID: MS06 GC Column: ZB-5 ID:0.25(mm)

	IS1(PHN)		IS2(CRY)			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12 HOUR STD	108090	12.24	87459	18.50		
UPPER LIMIT	162135	12.41	131189	18.66		
LOWER LIMIT	75663	12.08	61221	18.33		
SAMPLE NO.						
01 2219192	112732	12.24	89743	18.50		
02 2219193LCS	111440	12.24	88566	18.50		
03 MRC-SW5A1-08	109801	12.24	86910	18.50		
04 MRC-SW5A2-08	110619	12.24	88336	18.50		
05 MRC-SW5B-081	108399	12.24	87258	18.50		
06 MRC-SW6A-081	108395	12.24	86692	18.50		
07 MRC-SW6A-081	105280	12.24	86596	18.50		
08 MRC-SW6B-081	111056	12.24	88107	18.50		
09 MRC-SW7A-081	111495	12.24	89822	18.50		
10 MRC-SW7B-081	106897	12.24	86845	18.50		
11 MRC-SW8A-081	110567	12.24	89731	18.50		
12 MRC-SW8B-081	110906	12.24	89352	18.50		
13 MRC-SW8B-081	110403	12.24	91476	18.50		
14 MRC-SW9A-081	111063	12.24	89380	18.50		
15 MRC-SW9B-081	108656	12.24	88637	18.50		
16						
17						
18						
19						
20						
21						
22						

IS1 (PHN) = Phenanthrene-d10
IS2 (CRY) = Chrysene-d12

AREA UPPER LIMIT = + 50% of internal standard area
AREA LOWER LIMIT = - 30% of internal standard area
RT UPPER LIMIT = + 0.17 minutes of internal standard RT
RT LOWER LIMIT = - 0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

SAMPLE NO.
2219192

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM055

Lab File ID: 6081815 Lab Sample ID: 2219192

Instrument ID: MS06 Date Extracted: 08/17/15

Matrix: (soil/water) WATER Date Analyzed: 08/18/15

Level:(low/med) LOW Time Analyzed: 2004

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	2219193LCS	2219193	6081816	08/18/15
02	MRC-SW5A1-08	2089500001	6081817	08/18/15
03	MRC-SW5A2-08	2089500002	6081818	08/18/15
04	MRC-SW5B-081	2089500003	6081819	08/18/15
05	MRC-SW6A-081	2089500004	6081820	08/18/15
06	MRC-SW6A-081	2219194	6081821	08/18/15
07	MRC-SW6B-081	2089500005	6081822	08/18/15
08	MRC-SW7A-081	2089500006	6081823	08/19/15
09	MRC-SW7B-081	2089500007	6081824	08/19/15
10	MRC-SW8A-081	2089500008	6081825	08/19/15
11	MRC-SW8B-081	2089500009	6081826	08/19/15
12	MRC-SW8B-081	2219195	6081827	08/19/15
13	MRC-SW9A-081	2089500010	6081828	08/19/15
14	MRC-SW9B-081	2089500011	6081829	08/19/15
15				
16				
17				
18				
19				
20				
21				
22				
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COMMENTS:

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
2219192

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM055

Matrix: (soil/water) WATER Lab Sample ID: 2219192

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 6081815

Level: (low/med) LOW Date Received: 08/17/15

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 08/17/15

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/18/15

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
27323-18-8	Monochlorobiphenyls	0.010	U
25512-42-9	Dichlorobiphenyls	0.010	U
25323-68-6	Trichlorobiphenyls	0.010	U
26914-33-0	Tetrachlorobiphenyls	0.020	U
25429-29-2	Pentachlorobiphenyls	0.020	U
26601-64-9	Hexachlorobiphenyls	0.020	U
28655-71-2	Heptachlorobiphenyls	0.030	U
31472-83-0	Octachlorobiphenyls	0.030	U
53742-07-7	Nonachlorobiphenyls	0.040	U
2051-24-3	Decachlorobiphenyl	0.050	U

FORM 3
WATER SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM055

Matrix Spike - Sample No.: 680-PCB-2ND

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Monochlorobiphenyls	0.500000	0.00	0.503959	101	50-150
Dichlorobiphenyls	0.500000	0.00	0.456943	91	50-150
Trichlorobiphenyls	0.500000	0.00	0.537079	107	50-150
Tetrachlorobiphenyls	1.00000	0.00	1.03949	104	50-150
Pentachlorobiphenyls	1.00000	0.00	0.994813	99	50-150
Hexachlorobiphenyls	1.00000	0.00	1.01683	102	50-150
Heptachlorobiphenyls	1.50000	0.00	1.54139	103	50-150
Octachlorobiphenyls	1.50000	0.00	1.52112	101	50-150
Nonachlorobiphenyls	2.00000	0.00	2.11498	106	50-150
Decachlorobiphenyl	2.50000	0.00	2.55382	102	50-150

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 10 outside limits

COMMENTS: _____ZB-5_____

FORM 3
WATER SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM055

Matrix Spike - Sample No.: 680-SUR-2ND

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Decachlorobiphenyl	12.5000	0.00	1.01927	8*	40-140

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 1 out of 1 outside limits

COMMENTS: _____ZB-5_____

FORM 3
WATER SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM055

Matrix Spike - Sample No.: 2219193LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Monochlorobiphenyls	0.500000	0.00	0.340848	68	40-140
Dichlorobiphenyls	0.500000	0.00	0.348289	70	40-140
Trichlorobiphenyls	0.500000	0.00	0.353347	71	40-140
Tetrachlorobiphenyls	1.00000	0.00	0.673395	67	40-140
Pentachlorobiphenyls	1.00000	0.00	0.733756	73	40-140
Hexachlorobiphenyls	1.00000	0.00	0.712448	71	40-140
Heptachlorobiphenyls	1.50000	0.00	1.04673	70	40-140
Octachlorobiphenyls	1.50000	0.00	1.05400	70	40-140
Nonachlorobiphenyls	2.00000	0.00	1.46372	73	40-140
Decachlorobiphenyl	2.50000	0.00	1.89063	76	40-140

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 10 outside limits

COMMENTS: _____ZB-5_____

FORM 3
WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM055

Matrix Spike - 2219194 Sample No.: MRC-SW6A-081315(2089500004)

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
Monochlorobiphenyls	0.465116	0.000000	0.286632	62	40-140
Dichlorobiphenyls	0.465116	0.000000	0.296109	64	40-140
Trichlorobiphenyls	0.465116	0.000000	0.305048	66	40-140
Tetrachlorobiphenyls	0.930233	0.000000	0.548472	59	40-140
Pentachlorobiphenyls	0.930233	0.000000	0.768131	83	40-140
Hexachlorobiphenyls	0.930233	0.000000	0.750335	81	40-140
Heptachlorobiphenyls	1.39535	0.000000	1.14567	82	40-140
Octachlorobiphenyls	1.39535	0.000000	1.17693	84	40-140
Nonachlorobiphenyls	1.86047	0.000000	1.67614	90	40-140
Decachlorobiphenyl	2.32558	0.000000	2.18972	94	40-140

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 10 outside limits

COMMENTS: _____ZB-5_____

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
MRC-SW8B-
081315 DUP

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM055

Matrix: (soil/water) WATER Lab Sample ID: 2219195

Sample wt/vol: 1075 (g/mL) ML Lab File ID: 6081827

Level: (low/med) LOW Date Received: 08/14/15

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 08/17/15

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/19/15

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
27323-18-8	Monochlorobiphenyls	0.0093	U
25512-42-9	Dichlorobiphenyls	0.0093	U
25323-68-6	Trichlorobiphenyls	0.0093	U
26914-33-0	Tetrachlorobiphenyls	0.019	U
25429-29-2	Pentachlorobiphenyls	0.019	U
26601-64-9	Hexachlorobiphenyls	0.019	U
28655-71-2	Heptachlorobiphenyls	0.028	U
31472-83-0	Octachlorobiphenyls	0.028	U
53742-07-7	Nonachlorobiphenyls	0.037	U
2051-24-3	Decachlorobiphenyl	0.047	U

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM055

Lab File ID: 6040801 DFTPP Injection Date: 04/08/15

Instrument ID: MS06 DFTPP Injection Time: 1849

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	Less than 150.0% of mass 198	22.1
68	Less than 100.0% of mass 69	0.5 (1.7)1
69	Mass 69 relative abundance	26.6
70	Less than 100.0% of mass 69	0.1 (0.4)1
127	40.0 - 60.0% of mass 198	46.1
197	Less than 1.0% of mass 198	0.3
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.4
275	10.0 - 30.0% of mass 198	26.1
365	Greater than 1.0% of mass 198	2.86
441	0.0 - 100.0% of mass 443	10.4 (89.4)2
442	40.0 - 150.0% of mass 198	60.8
443	17.0 - 23.0% of mass 442	11.6 (19.1)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	680-0.1	680-0.1	6040804	04/08/15	2053
02	680-0.2	680-0.2	6040805	04/08/15	2123
03	680-0.5	680-0.5	6040806	04/08/15	2152
04	680-1	680-1	6040807	04/08/15	2222
05	680-1.5	680-1.5	6040808	04/08/15	2252
06	680-2A	680-2A	6040809	04/08/15	2321
07	680-3	680-3	6040810	04/08/15	2351
08	680-4	680-4	6040811	04/09/15	0020
09	680-5	680-5	6040812	04/09/15	0050
10	680-PCB-2ND	680-PCB-2ND	6040813	04/09/15	0120
11	680-SUR-2ND	680-SUR-2ND	6040814	04/09/15	0149
12					
13					
14					
15					
16					
17					
18					
19					
20					

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM055

Instrument ID: MS06 Calibration Date(s): 04/08/15 04/09/15

Column: ZB-5 ID: 0.25 (mm) Calibration Time(s): 2053 0050

LAB FILE ID: RF2: 6040810 RF4: 6040811 RF10: 6040812

COMPOUND	RF2	RF4	RF10	CURVE	COEFFICENT A1	%RSD OR R^2	MAX %RSD OR R^2
Monochlorobiphenyls	0.831	0.809	0.827	AVRG	0.81147720	2.110	20.000
CL1-1Q	0.831	0.809	0.827	AVRG	0.81147720	2.110	20.000
Dichlorobiphenyls	0.626	0.624	0.636	AVRG	0.62280052	2.180	20.000
CL2-Q	0.626	0.624	0.636	AVRG	0.62280052	2.180	20.000
2,2,4,6,6-Pentachlorobipheny	0.282	0.280	0.282	AVRG	0.27941149	1.500	20.000
Trichlorobiphenyls	0.438	0.432	0.440	AVRG	0.42426763	3.249	20.000
CL3-Q	0.438	0.432	0.440	AVRG	0.42426763	3.249	20.000
Tetrachlorobiphenyls	0.259	0.259	0.258	AVRG	0.25482942	2.352	20.000
CL4-Q	0.259	0.259	0.258	AVRG	0.25482942	2.352	20.000
Pentachlorobiphenyls	0.203	0.205	0.208	AVRG	0.19969348	3.025	20.000
CL5-Q	0.203	0.205	0.208	AVRG	0.19969348	3.025	20.000
Hexachlorobiphenyls	0.169	0.168	0.168	AVRG	0.16543138	3.519	20.000
CL6-Q	0.169	0.168	0.168	AVRG	0.16543138	3.519	20.000
Heptachlorobiphenyls	0.144	0.145	0.146	AVRG	0.14062430	3.302	20.000
CL7-1Q	0.144	0.145	0.146	AVRG	0.14062430	3.302	20.000
Octachlorobiphenyls	0.100	0.102	0.103	AVRG	0.10061465	2.148	20.000
CL8-Q	0.100	0.102	0.103	AVRG	0.10061465	2.148	20.000
Nonachlorobiphenyls	0.080	0.082	0.083	AVRG	7.813e-002	4.007	20.000
CL9-1Q	0.080	0.082	0.083	AVRG	7.813e-002	4.007	20.000
Decachlorobiphenyl	0.068	0.069	0.071	AVRG	6.67e-002	4.011	20.000
3,3,4,4-Tetrachlorobiphenyl_	0.477	0.472	0.474	AVRG	0.46613437	3.266	20.000
2-Fluorobiphenyl	1.090	1.064	1.072	AVRG	1.06550797	2.084	20.000
Tetrachloro-m-xylene	0.254	0.250	0.253	AVRG	0.25035906	2.005	20.000
Terphenyl-d14	0.997	0.997	1.006	AVRG	0.96760232	3.902	20.000

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM055

Lab File ID: 6081811 DFTPP Injection Date: 08/18/15

Instrument ID: MS06 DFTPP Injection Time: 1721

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	Less than 150.0% of mass 198	23.6
68	Less than 100.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	27.2
70	Less than 100.0% of mass 69	0.1 (0.4)1
127	40.0 - 60.0% of mass 198	46.9
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.8
275	10.0 - 30.0% of mass 198	26.0
365	Greater than 1.0% of mass 198	2.74
441	0.0 - 100.0% of mass 443	10.9 (88.6)2
442	40.0 - 150.0% of mass 198	62.0
443	17.0 - 23.0% of mass 442	12.3 (19.8)3

1-Value is % mass 69 2-Value is % mass 443
3-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	680-2B	680-2B	6081812	08/18/15	1752
02	2219192	2219192	6081815	08/18/15	2004
03	2219193LCS	2219193	6081816	08/18/15	2033
04	MRC-SW5A1-08	2089500001	6081817	08/18/15	2103
05	MRC-SW5A2-08	2089500002	6081818	08/18/15	2132
06	MRC-SW5B-081	2089500003	6081819	08/18/15	2202
07	MRC-SW6A-081	2089500004	6081820	08/18/15	2231
08	MRC-SW6A-081	2219194	6081821	08/18/15	2301
09	MRC-SW6B-081	2089500005	6081822	08/18/15	2330
10	MRC-SW7A-081	2089500006	6081823	08/19/15	0000
11	MRC-SW7B-081	2089500007	6081824	08/19/15	0029
12	MRC-SW8A-081	2089500008	6081825	08/19/15	0059
13	MRC-SW8B-081	2089500009	6081826	08/19/15	0128
14	MRC-SW8B-081	2219195	6081827	08/19/15	0157
15	MRC-SW9A-081	2089500010	6081828	08/19/15	0227
16	MRC-SW9B-081	2089500011	6081829	08/19/15	0257
17					
18					
19					
20					

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM055

Instrument ID: MS06 Calibration Date: 08/18/15 Time: 1752

Lab File ID: 6081812 Init. Calib. Date(s): 04/08/15 04/09/15

Init. Calib. Times: 2053 0050

GC Column: ZB-5 ID: 0.25 (mm)

COMPOUND	RRF OR AMOUNT	RRF1.0000 OR AMOUNT	MIN RRF	%D OR %DRIFT	MAX %D OR %DRIFT	CURV TYPE
Monochlorobiphenyls	0.8110000	0.8085103	0.05	-0.31	20.00	AVRG
CL1-1Q	0.8110000	0.8085000	0.05	-0.31	20.00	AVRG
Dichlorobiphenyls	0.6230000	0.6334854	0.05	1.68	20.00	AVRG
CL2-Q	0.6230000	0.6335000	0.05	1.68	20.00	AVRG
2,2,4,6,6-Pentachlorobipheny	0.2790000	0.2790000	0.05	0.00	50.00	AVRG
Trichlorobiphenyls	0.4240000	0.4460000	0.05	5.19	20.00	AVRG
CL3-Q	0.4240000	0.4460000	0.05	5.19	20.00	AVRG
Tetrachlorobiphenyls	0.2550000	0.2582000	0.05	1.25	20.00	AVRG
CL4-Q	0.2550000	0.2582000	0.05	1.25	20.00	AVRG
Pentachlorobiphenyls	0.2000000	0.2054000	0.05	2.70	20.00	AVRG
CL5-Q	0.2000000	0.2054000	0.05	2.70	20.00	AVRG
Hexachlorobiphenyls	0.1660000	0.1652000	0.05	-0.48	20.00	AVRG
CL6-Q	0.1660000	0.1652000	0.05	-0.48	20.00	AVRG
Heptachlorobiphenyls	0.1410000	0.1394000	0.05	-1.13	20.00	AVRG
CL7-1Q	0.1410000	0.1394000	0.05	-1.13	20.00	AVRG
Octachlorobiphenyls	0.1000000	9.89e-002	0.05	-1.10	20.00	AVRG
CL8-Q	0.1000000	9.89e-002	0.05	-1.10	20.00	AVRG
Nonachlorobiphenyls	7.8e-002	7.94e-002	0.05	1.79	20.00	AVRG
CL9-1Q	7.8e-002	7.94e-002	0.05	1.79	20.00	AVRG
Decachlorobiphenyl	6.7e-002	7.1e-002	0.05	5.97	20.00	AVRG
3,3,4,4-Tetrachlorobiphenyl_	0.4660000	0.4888000	0.05	4.89	20.00	AVRG
2-Fluorobiphenyl	1.0660000	1.0596594	0.05	-0.59	20.00	AVRG
Tetrachloro-m-xylene	0.2500000	0.2520924	0.05	0.84	20.00	AVRG
Terphenyl-d14	0.9670000	1.0320000	0.05	6.72	20.00	AVRG

Work continued from page:____

40440

GENERAL ORGANIC EXTRACTION

Work continued to page:____

EPA Method: 680
Rule: GP0WX
HBN: 91770
Extraction Apparatus Name: Floor Shaker
Extraction Apparatus ID#: 481720 + 481701

Surrogate Amount: 1000 ul
Surrogate Lot #: op19622
Tech: PDK

Steam Bath ID#: 2c7290 23650
Initial Temp. of Bath: 94°c 93°c
Final Temp. of Bath: 94°c 93°c
Thermometer ID#: TH-255 TH-255

		Date	Time	Tech
Extraction:		8/17/15	1340	PDK
Concentration:		8/17/15	2000	PDK

Soxhlet: Time On: ____ Time Off: ____ Total Hours: ____
Acid: Time On: ____ Time Off: ____ Total Hours: ____
Base: Time On: ____ Time Off: ____ Total Hours: ____

N-EVAP ID#:: 52731
Initial Temp. : 45°c
Final Temp. : 45°c
Thermometer ID: TH-255

Line #	Sample #	pH (1)	Start/Stop Time (2)	Sample Amount	Final Volume	QC Spike lot#	QC Spike Amount	Cleanup Required	Cleanup Method	QC Type	Sample Specific Comments
1.)	2219192	7		1000ml	1ml	—	—	—	—	—	
2.)	2219193	7		1000ml	1ml	SV0403	100ul PDK	—	—	MB	
3.)	20895000001-A	7		1075ml	1ml	—	—	—	—	LCS	
4.)	20895000002-A	7		1075ml	1ml	—	—	—	—	—	
5.)	20895000003-A	7		1075ml	1ml	—	—	—	—	—	
6.)	20895000004-A	7		1075ml	1ml	—	—	—	—	—	
7.)	2219194	7		1075ml	1ml	—	—	—	—	—	
8.)	20895000005-A	7		1075ml	1ml	SV0403	100ul PDK	—	—	MS	20895000004-A
9.)	20895000006-A	7		1075ml	1ml	—	—	—	—	—	
10.)	20895000007-A	7		1075ml	1ml	—	—	—	—	—	
11.)	20895000008-A	7		1075ml	1ml	—	—	—	—	—	
12.)	20895000009-A	7		1075ml	1ml	—	—	—	—	—	
13.)	2219195	7		1075ml	1ml	—	—	—	—	—	
14.)	20895000010-A	7		1075ml	1ml	—	—	—	—	Dup	20895000009-A
15.)	20895000011-A	7		1075ml	1ml	—	—	—	—	—	

Comments:

1.) Reagent Buffer op19611 CH3CO2(Buffer)106567 Na2SO4 op18979
2.) Reagent: Hexane/Acetone 111387
3.) Reagent:
4.)
5.)
6.) (1) pH adjustments for all extraction steps. (2) Start/Stop Time for SPE extractions.

	Volume Aliquoted	I.S. Volume Added	I.S. ID#	Date	Time	Tech
1.)						
2.)						
3.)						
4.)						
5.)						

Approved by: MV
Date Approved: 8/17/15
Revision 10/11

Batched by: PDK

Reviewed by: MV
Date Reviewed: 8/18/15

TETRA TECH

INTERNAL CORRESPONDENCE

TO: **A. APANAVAGE** **DATE:** **AUGUST 26, 2015**

FROM: **L. CIOFANI** **COPIES:** **DV FILE**

SUBJECT: **DATA VALIDATION – VOC/1,4-DIOXANE/PCB**
LOCKHEED MARTIN CORPORATION (LMC) – MIDDLE RIVER COMPLEX (MRC)
SDG 2076215

SAMPLES:

15/Aqueous/VOC

MRC-SW1A-061015	MRC-SW2A-061015	MRC-SW5A1-061015	MRC-SW5A2-061015
MRC-SW5B-061015	MRC-SW6A-061015	MRC-SW6B-061015	MRC-SW7A-061015
MRC-SW7B-061015	MRC-SW8A-061015	MRC-SW8B-061015	MRC-SW9A-061015
MRC-SW9B-061015	MRC-SWDUP-061015	TB-061015	

2/Aqueous/1,4-Dioxane

MRC-SW1A-061015	MRC-SW2A-061015

11/Aqueous/PCBs

MRC-SW5A1-061015	MRC-SW5A2-061015	MRC-SW5B-061015	MRC-SW6A-061015
MRC-SW6B-061015	MRC-SW7A-061015	MRC-SW7B-061015	MRC-SW8A-061015
MRC-SW8B-061015	MRC-SW9A-061015	MRC-SW9B-061015	

Overview

The sample set for LMC-MRC, SDG 2076215 consisted of fourteen (14) aqueous environmental samples and one (1) trip blank. Samples were analyzed for volatile organic compounds (VOCs), 1,4-dioxane, and/or polychlorinated biphenyls (PCB). One field duplicate pair was included in this SDG. MRC-SWDUP-061015/ MRC-SW9A-061015.

The samples were collected by Tetra Tech, Inc. on June 10, 2015 and analyzed by ALS Environmental. All analyses were conducted in accordance with SW-846 Methods 8260C and 8082 and EPA Method 522 analytical and reporting protocols.

The data contained in this SDG were validated with regard to the following parameters: data completeness, holding times, GC/MS tuning, ICP/MS tuning, initial/continuing calibrations, laboratory method/preparation blanks, trip blank results, Interference Check Sample (ICS), surrogate spike recoveries, laboratory control sample/laboratory control sample duplicate results, internal standard areas and recoveries, ICP serial dilution results, chromatographic resolution, analyte identification, analyte quantitation, detection limits and field duplicate precision. Areas of concern are listed below.

Major

- The VOC initial calibration performed on 06/17/15 on instrument ms15.i had an average relative response factor (RRF) for 1,4-dioxane that was less than the 0.005 quality control minimum. All samples were associated with this initial calibration. Non-detected results for 1,4-dioxane were rejected (UR) in all samples in the VOC fraction only.

Minor

- The following VOC contaminants were detected in the method/trip blanks at the following maximum concentrations:

Contaminant	Maximum Concentration (ug/L)	Action Level (ug/L)
Carbon disulfide(1)	0.39	1.95
1,3-Dichlorobenzene(1)	0.25	1.25
1,4-Dichlorobenzene(1)	0.32	1.6
Bromomethane(2)	0.41	2.05
Carbon disulfide(2)	0.26	1.3

(1) Maximum concentration detected in method blank 2192630 (MB) associated with batch 79528 affecting all samples.
(2) Maximum concentration detected in trip blank TB-061015 affecting all environmental samples.

Action levels of 5x the concentrations of all contaminants were used to evaluate sample data for blank contamination. Sample aliquot and dilution factors, if applicable, were considered in evaluating for blank contamination. Detected results less than action levels were qualified as non-detected (U) due to blank contamination. Trip blank results were not qualified due to laboratory blank contamination.

- The PCB continuing calibrations performed on 06/17/15 at 17:45 and 21:47 had percent difference (%D) results for Aroclor-1016 and Aroclor-1260 that exceeded the 20% quality control limit. All samples were affected. Non-detected results for these analytes were qualified as estimated (UJ) in all samples.

- The laboratory control sample (LCS) 2192537LCS associated with batch 79493 analyzed in the PCB fraction had a percent recovery (%R) less than the laboratory quality control minimum for Aroclor-1260. All samples were associated with this LCS. Non-detected results for Aroclor-1260 were qualified as estimated (UJ) in all samples.

- The PCB matrix spike (MS) analysis performed on sample MRC-SW5A2-061015 associated with batch 79493 had a %R for Aroclor-1260 that was less than the laboratory quality control limit. As noted above, the LCS %R for Aroclor-1260 was also less than the quality control limit. Therefore, the non-detected result for Aroclor-1260 was qualified as estimated (UJ) in sample MRC-SW5A2-061015.

- Detected results reported below the Reporting Limit (RL) limit but above the Method Detection Limit (MDL) were qualified as estimated (J).

Notes

Non-detected results were reported to the MDL.

The laboratory data package did not contain a Form 5 (instrument tune) for the 1,4-dioxane analysis by EPA Method 522. The raw data included the instrument tune, and this raw data form was included in the validation report (Appendix C).

PCBs were analyzed by the lab following SW846 method 8082; however, the chain of custody indicated that the samples should have been analyzed by EPA method 680 for PCB homologs.

The PCB analytical sequence for analysis date 06/17/15 has retention times values flagged for all samples.

However, it appears that although this form is labelled as “GC Column: RTX-CLPEST”, the retention times represent GC Column RTC-CLPEST2 and are within the limits for that column. No validation action was taken.

Executive Summary

Laboratory Performance: Non-detected results for one VOC analyte were rejected due to calibration noncompliance. Some VOC results were qualified due to laboratory blank contamination. Non-detected results for two PCB analytes were qualified due to calibration noncompliance. Results for one PCB analyte were qualified due to LCS recovery noncompliance.

Other Factors Affecting Data Quality: One PCB result was qualified due to MS recovery noncompliance. Detected results between the RL and the MDL were qualified as estimated.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Organic Review" (June 2008) and the "National Functional Guidelines for Inorganic Review" (January 2010). The text of this report has been formulated to address only those areas affecting data quality.

Tetra Tech, Inc.
Leigh A. Ciofani
for Environmental Scientist/Data Validator

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

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

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's r < 0.995
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient r < 0.995
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate
Z4 = Sample activity is less than the at uncertainty at 3 standard deviations and greater than the MDC
Z5 = Sample activity is less than the at uncertainty at 3 standard deviations and less than the MDC

PROJ_NO: 06247	NSAMPLE	MRC-SW1A-061015			MRC-SW2A-061015			MRC-SW5A1-061015			MRC-SW5A2-061015		
SDG: 2076215	LAB_ID	2076215001			2076215002			2076215003			2076215004		
FRACTION: OV	SAMP_DATE	6/10/2015			6/10/2015			6/10/2015			6/10/2015		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		0.22	U		0.22	U		0.22	U		0.22	U	
1,1,2,2-TETRACHLOROETHANE		0.34	U		0.34	U		0.34	U		0.34	U	
1,1,2-TRICHLOROETHANE		0.33	U		0.33	U		0.33	U		0.33	U	
1,1,2-TRICHLOROTRIFLUOROETHANE		0.26	U		0.26	U		0.26	U		0.26	U	
1,1-DICHLOROETHANE		0.28	U		0.28	U		0.28	U		0.28	U	
1,1-DICHLOROETHENE		0.29	U		0.29	U		0.29	U		0.29	U	
1,2,3-TRICHLOROBENZENE		0.93	U		0.93	U		0.93	U		0.93	U	
1,2,4-TRICHLOROBENZENE		0.82	U		0.82	U		0.82	U		0.82	U	
1,2-DIBROMO-3-CHLOROPROPANE		1.5	U		1.5	U		1.5	U		1.5	U	
1,2-DIBROMOETHANE		0.28	U		0.28	U		0.28	U		0.28	U	
1,2-DICHLOROBENZENE		0.38	U		0.38	U		0.38	U		0.38	U	
1,2-DICHLOROETHANE		0.32	U		0.32	U		0.32	U		0.32	U	
1,2-DICHLOROPROPANE		0.24	U		0.24	U		0.24	U		0.24	U	
1,3-DICHLOROBENZENE		0.25	U		0.25	U		0.25	U		0.25	U	
1,4-DICHLOROBENZENE		0.27	U		0.27	U		0.27	U		0.27	U	
1,4-DIOXANE		58.9	UR	C	58.9	UR	C	58.9	UR	C	58.9	UR	C
2-BUTANONE		1.8	U		1.8	U		1.8	U		1.8	U	
2-HEXANONE		1.3	U		1.3	U		1.3	U		1.3	U	
4-METHYL-2-PENTANONE		1.5	U		1.5	U		1.5	U		1.5	U	
ACETONE		6	J	P	6.1	J	P	5.5	J	P	5.6	J	P
BENZENE		0.23	U		0.23	U		0.23	U		0.23	U	
BROMOCHLOROMETHANE		0.32	U		0.32	U		0.32	U		0.32	U	
BROMODICHLOROMETHANE		0.27	U		0.27	U		0.27	U		0.27	U	
BROMOFORM		0.4	U		0.4	U		0.4	U		0.4	U	
BROMOMETHANE		0.39	U		0.39	U		0.39	U		0.39	U	
CARBON DISULFIDE		0.27	U	A	0.45	U	A	0.23	U		0.23	U	
CARBON TETRACHLORIDE		0.31	U		0.31	U		0.31	U		0.31	U	
CHLOROBENZENE		0.19	U		0.19	U		0.19	U		0.19	U	
CHLORODIBROMOMETHANE		0.45	U		0.45	U		0.45	U		0.45	U	
CHLOROETHANE		0.33	U		0.33	U		0.33	U		0.33	U	
CHLOROFORM		0.21	U		0.21	U		0.21	U		0.21	U	
CHLOROMETHANE		0.31	U		0.31	U		0.31	U		0.31	U	
CIS-1,2-DICHLOROETHENE		0.32	U		0.32	U		0.32	U		0.32	U	
CIS-1,3-DICHLOROPROPENE		0.31	U		0.31	U		0.31	U		0.31	U	
CYCLOHEXANE		0.29	U		0.29	U		0.29	U		0.29	U	

PROJ_NO: 06247	NSAMPLE	MRC-SW5B-061015			MRC-SW6A-061015			MRC-SW6B-061015			MRC-SW7A-061015		
SDG: 2076215	LAB_ID	2076215005			2076215006			2076215007			2076215008		
FRACTION: OV	SAMP_DATE	6/10/2015			6/10/2015			6/10/2015			6/10/2015		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		0.22	U		0.22	U		0.22	U		0.22	U	
1,1,2,2-TETRACHLOROETHANE		0.34	U		0.34	U		0.34	U		0.34	U	
1,1,2-TRICHLOROETHANE		0.33	U		0.33	U		0.33	U		0.33	U	
1,1,2-TRICHLOROTRIFLUOROETHANE		0.26	U		0.26	U		0.26	U		0.26	U	
1,1-DICHLOROETHANE		0.28	U		0.28	U		0.28	U		0.28	U	
1,1-DICHLOROETHENE		0.29	U		0.29	U		0.29	U		0.29	U	
1,2,3-TRICHLOROBENZENE		0.93	U		0.93	U		0.93	U		0.93	U	
1,2,4-TRICHLOROBENZENE		0.82	U		0.82	U		0.82	U		0.82	U	
1,2-DIBROMO-3-CHLOROPROPANE		1.5	U		1.5	U		1.5	U		1.5	U	
1,2-DIBROMOETHANE		0.28	U		0.28	U		0.28	U		0.28	U	
1,2-DICHLOROBENZENE		0.38	U		0.38	U		0.38	U		0.38	U	
1,2-DICHLOROETHANE		0.32	U		0.32	U		0.32	U		0.32	U	
1,2-DICHLOROPROPANE		0.24	U		0.24	U		0.24	U		0.24	U	
1,3-DICHLOROBENZENE		0.25	U		0.25	U		0.25	U		0.25	U	
1,4-DICHLOROBENZENE		0.27	U		0.27	U		0.27	U		0.27	U	
1,4-DIOXANE		58.9	UR	C	58.9	UR	C	58.9	UR	C	58.9	UR	C
2-BUTANONE		1.8	U		1.8	U		1.8	U		1.8	U	
2-HEXANONE		1.3	U		1.3	U		1.3	U		1.3	U	
4-METHYL-2-PENTANONE		1.5	U		1.5	U		1.5	U		1.5	U	
ACETONE		4.1	J	P	5.8	J	P	4.7	J	P	3.1	U	
BENZENE		0.23	U		0.23	U		0.23	U		0.23	U	
BROMOCHLOROMETHANE		0.32	U		0.32	U		0.32	U		0.32	U	
BROMODICHLOROMETHANE		0.27	U		0.27	U		0.27	U		0.27	U	
BROMOFORM		0.4	U		0.4	U		0.4	U		0.4	U	
BROMOMETHANE		0.43	U	B	0.39	U		0.48	U	B	0.39	U	
CARBON DISULFIDE		0.23	U		0.23	U		0.23	U		0.23	U	
CARBON TETRACHLORIDE		0.31	U		0.31	U		0.31	U		0.31	U	
CHLOROBENZENE		0.19	U		0.19	U		0.19	U		0.19	U	
CHLORODIBROMOMETHANE		0.45	U		0.45	U		0.45	U		0.45	U	
CHLOROETHANE		0.33	U		0.33	U		0.33	U		0.33	U	
CHLOROFORM		0.21	U		0.21	U		0.21	U		0.68	J	P
CHLOROMETHANE		0.31	U		0.31	U		0.31	U		0.31	U	
CIS-1,2-DICHLOROETHENE		0.32	U		0.32	U		0.32	U		0.32	U	
CIS-1,3-DICHLOROPROPENE		0.31	U		0.31	U		0.31	U		0.31	U	
CYCLOHEXANE		0.29	U		0.29	U		0.29	U		0.29	U	

PROJ_NO: 06247	NSAMPLE	MRC-SW7B-061015			MRC-SW8A-061015			MRC-SW8B-061015			MRC-SW9A-061015		
SDG: 2076215	LAB_ID	2076215009			2076215010			2076215011			2076215012		
FRACTION: OV	SAMP_DATE	6/10/2015			6/10/2015			6/10/2015			6/10/2015		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE		0.22	U		0.22	U		0.22	U		0.22	U	
1,1,2,2-TETRACHLOROETHANE		0.34	U		0.34	U		0.34	U		0.34	U	
1,1,2-TRICHLOROETHANE		0.33	U		0.33	U		0.33	U		0.33	U	
1,1,2-TRICHLOROTRIFLUOROETHANE		0.26	U		0.26	U		0.26	U		0.26	U	
1,1-DICHLOROETHANE		0.28	U		0.28	U		0.28	U		0.28	U	
1,1-DICHLOROETHENE		0.29	U		0.29	U		0.29	U		0.29	U	
1,2,3-TRICHLOROBENZENE		0.93	U		0.93	U		0.93	U		0.93	U	
1,2,4-TRICHLOROBENZENE		0.82	U		0.82	U		0.82	U		0.82	U	
1,2-DIBROMO-3-CHLOROPROPANE		1.5	U		1.5	U		1.5	U		1.5	U	
1,2-DIBROMOETHANE		0.28	U		0.28	U		0.28	U		0.28	U	
1,2-DICHLOROBENZENE		0.38	U		0.38	U		0.38	U		0.38	U	
1,2-DICHLOROETHANE		0.32	U		0.32	U		0.32	U		0.32	U	
1,2-DICHLOROPROPANE		0.24	U		0.24	U		0.24	U		0.24	U	
1,3-DICHLOROBENZENE		0.25	U		0.25	U		0.25	U		0.25	U	
1,4-DICHLOROBENZENE		0.27	U		0.27	U		0.27	U		0.27	U	
1,4-DIOXANE		58.9	UR	C	58.9	UR	C	58.9	UR	C	58.9	UR	C
2-BUTANONE		1.8	U		1.8	U		1.8	U		1.8	U	
2-HEXANONE		1.3	U		1.3	U		1.3	U		1.3	U	
4-METHYL-2-PENTANONE		1.5	U		1.5	U		1.5	U		1.5	U	
ACETONE		4.3	J	P	8.2	J	P	3.1	U		4	J	P
BENZENE		0.23	U		0.23	U		0.23	U		0.23	U	
BROMOCHLOROMETHANE		0.32	U		0.32	U		0.32	U		0.32	U	
BROMODICHLOROMETHANE		0.27	U		0.27	U		0.27	U		0.27	U	
BROMOFORM		0.4	U		0.4	U		0.4	U		0.4	U	
BROMOMETHANE		0.39	U		0.39	U		0.39	U		0.39	U	
CARBON DISULFIDE		0.23	U		0.23	U		0.23	U		0.23	U	
CARBON TETRACHLORIDE		0.31	U		0.31	U		0.31	U		0.31	U	
CHLOROBENZENE		0.19	U		0.19	U		0.19	U		0.19	U	
CHLORODIBROMOMETHANE		0.45	U		0.45	U		0.45	U		0.45	U	
CHLOROETHANE		0.33	U		0.33	U		0.33	U		0.33	U	
CHLOROFORM		0.42	J	P	0.21	U		0.21	U		0.21	U	
CHLOROMETHANE		0.31	U		0.31	U		0.31	U		0.31	U	
CIS-1,2-DICHLOROETHENE		0.32	U		0.32	U		0.32	U		0.32	U	
CIS-1,3-DICHLOROPROPENE		0.31	U		0.31	U		0.31	U		0.31	U	
CYCLOHEXANE		0.29	U		0.29	U		0.29	U		0.29	U	

PROJ_NO: 06247	NSAMPLE	MRC-SW9B-061015			MRC-SWDUP-061015			TB-061015		
SDG: 2076215	LAB_ID	2076215013			2076215014			2076215015		
FRACTION: OV	SAMP_DATE	6/10/2015			6/10/2015			6/11/2015		
MEDIA: WATER	QC_TYPE	NM			NM			TB		
	UNITS	UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0		
	DUP_OF									

PARAMETER	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,1,1-TRICHLOROETHANE	0.22	U		0.22	U		0.22	U	
1,1,2,2-TETRACHLOROETHANE	0.34	U		0.34	U		0.34	U	
1,1,2-TRICHLOROETHANE	0.33	U		0.33	U		0.33	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	0.26	U		0.26	U		0.26	U	
1,1-DICHLOROETHANE	0.28	U		0.28	U		0.28	U	
1,1-DICHLOROETHENE	0.29	U		0.29	U		0.29	U	
1,2,3-TRICHLOROBENZENE	0.93	U		0.93	U		0.93	U	
1,2,4-TRICHLOROBENZENE	0.82	U		0.82	U		0.82	U	
1,2-DIBROMO-3-CHLOROPROPANE	1.5	U		1.5	U		1.5	U	
1,2-DIBROMOETHANE	0.28	U		0.28	U		0.28	U	
1,2-DICHLOROBENZENE	0.38	U		0.38	U		0.38	U	
1,2-DICHLOROETHANE	0.32	U		0.32	U		0.32	U	
1,2-DICHLOROPROPANE	0.24	U		0.24	U		0.24	U	
1,3-DICHLOROBENZENE	0.25	U		0.25	U		0.25	U	
1,4-DICHLOROBENZENE	0.27	U		0.27	U		0.27	U	
1,4-DIOXANE	58.9	UR	C	58.9	UR	C	58.9	UR	C
2-BUTANONE	1.8	U		1.8	U		1.8	U	
2-HEXANONE	1.3	U		1.3	U		1.3	U	
4-METHYL-2-PENTANONE	1.5	U		1.5	U		1.5	U	
ACETONE	8.2	J	P	5.1	J	P	3.1	U	
BENZENE	0.23	U		0.23	U		0.23	U	
BROMOCHLOROMETHANE	0.32	U		0.32	U		0.32	U	
BROMODICHLOROMETHANE	0.27	U		0.27	U		0.27	U	
BROMOFORM	0.4	U		0.4	U		0.4	U	
BROMOMETHANE	0.39	U		0.39	U		0.41	J	P
CARBON DISULFIDE	0.23	U		0.23	U		0.26	J	P
CARBON TETRACHLORIDE	0.31	U		0.31	U		0.31	U	
CHLOROBENZENE	0.19	U		0.19	U		0.19	U	
CHLORODIBROMOMETHANE	0.45	U		0.45	U		0.45	U	
CHLOROETHANE	0.33	U		0.33	U		0.33	U	
CHLOROFORM	0.21	U		0.21	U		0.21	U	
CHLOROMETHANE	0.31	U		0.31	U		0.31	U	
CIS-1,2-DICHLOROETHENE	0.32	U		0.32	U		0.32	U	
CIS-1,3-DICHLOROPROPENE	0.31	U		0.31	U		0.31	U	
CYCLOHEXANE	0.29	U		0.29	U		0.29	U	

PROJ_NO: 06247	NSAMPLE	MRC-SW1A-061015			MRC-SW2A-061015			MRC-SW5A1-061015			MRC-SW5A2-061015		
SDG: 2076215	LAB_ID	2076215001			2076215002			2076215003			2076215004		
FRACTION: OV	SAMP_DATE	6/10/2015			6/10/2015			6/10/2015			6/10/2015		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DICHLORODIFLUOROMETHANE		0.33	U		0.33	U		0.33	U		0.33	U	
ETHYLBENZENE		0.34	U		0.34	U		0.34	U		0.34	U	
ISOPROPYLBENZENE		0.22	U		0.22	U		0.22	U		0.22	U	
M+P-XYLENES		0.52	U		0.52	U		0.52	U		0.52	U	
METHYL ACETATE		0.32	U		0.32	U		0.32	U		0.32	U	
METHYL CYCLOHEXANE		0.3	U		0.3	U		0.3	U		0.3	U	
METHYL TERT-BUTYL ETHER		0.33	U		0.33	U		0.33	U		0.33	U	
METHYLENE CHLORIDE		0.45	U		0.45	U		0.45	U		0.45	U	
O-XYLENE		0.33	U		0.33	U		0.33	U		0.33	U	
STYRENE		0.24	U		0.24	U		0.24	U		0.24	U	
TETRACHLOROETHENE		0.35	U		0.35	U		0.35	U		0.35	U	
TOLUENE		0.23	U		0.25	J	P	0.23	U		0.24	J	P
TRANS-1,2-DICHLOROETHENE		0.26	U		0.26	U		0.26	U		0.26	U	
TRANS-1,3-DICHLOROPROPENE		0.29	U		0.29	U		0.29	U		0.29	U	
TRICHLOROETHENE		0.33	U		0.33	U		0.33	U		0.42	J	P
TRICHLOROFLUOROMETHANE		0.24	U		0.24	U		0.24	U		0.24	U	
VINYL CHLORIDE		0.3	U		0.3	U		0.3	U		0.3	U	

PROJ_NO: 06247	NSAMPLE	MRC-SW5B-061015			MRC-SW6A-061015			MRC-SW6B-061015			MRC-SW7A-061015		
SDG: 2076215	LAB_ID	2076215005			2076215006			2076215007			2076215008		
FRACTION: OV	SAMP_DATE	6/10/2015			6/10/2015			6/10/2015			6/10/2015		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DICHLORODIFLUOROMETHANE		0.33	U		0.33	U		0.33	U		0.33	U	
ETHYLBENZENE		0.34	U		0.34	U		0.34	U		0.34	U	
ISOPROPYLBENZENE		0.22	U		0.22	U		0.22	U		0.22	U	
M+P-XYLENES		0.52	U		0.52	U		0.52	U		0.52	U	
METHYL ACETATE		0.32	U		0.32	U		0.32	U		0.32	U	
METHYL CYCLOHEXANE		0.3	U		0.3	U		0.3	U		0.3	U	
METHYL TERT-BUTYL ETHER		0.33	U		0.33	U		0.33	U		0.33	U	
METHYLENE CHLORIDE		0.45	U		0.45	U		0.45	U		0.45	U	
O-XYLENE		0.33	U		0.33	U		0.33	U		0.33	U	
STYRENE		0.24	U		0.24	U		0.24	U		0.24	U	
TETRACHLOROETHENE		0.35	U		0.35	U		0.35	U		0.35	U	
TOLUENE		0.23	U		0.23	U		0.23	U		0.23	U	
TRANS-1,2-DICHLOROETHENE		0.26	U		0.26	U		0.26	U		0.26	U	
TRANS-1,3-DICHLOROPROPENE		0.29	U		0.29	U		0.29	U		0.29	U	
TRICHLOROETHENE		0.33	U		0.33	U		0.33	U		0.33	U	
TRICHLOROFLUOROMETHANE		0.24	U		0.24	U		0.24	U		0.24	U	
VINYL CHLORIDE		0.3	U		0.3	U		0.3	U		0.3	U	

PROJ_NO: 06247	NSAMPLE	MRC-SW7B-061015			MRC-SW8A-061015			MRC-SW8B-061015			MRC-SW9A-061015		
SDG: 2076215	LAB_ID	2076215009			2076215010			2076215011			2076215012		
FRACTION: OV	SAMP_DATE	6/10/2015			6/10/2015			6/10/2015			6/10/2015		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DICHLORODIFLUOROMETHANE		0.33	U		0.33	U		0.33	U		0.33	U	
ETHYLBENZENE		0.34	U		0.34	U		0.34	U		0.34	U	
ISOPROPYLBENZENE		0.22	U		0.22	U		0.22	U		0.22	U	
M+P-XYLENES		0.52	U		0.52	U		0.52	U		0.52	U	
METHYL ACETATE		0.32	U		0.32	U		0.32	U		0.32	U	
METHYL CYCLOHEXANE		0.3	U		0.3	U		0.3	U		0.3	U	
METHYL TERT-BUTYL ETHER		0.33	U		0.33	U		0.33	U		0.33	U	
METHYLENE CHLORIDE		0.45	U		0.45	U		0.45	U		0.45	U	
O-XYLENE		0.33	U		0.33	U		0.33	U		0.33	U	
STYRENE		0.24	U		0.24	U		0.24	U		0.24	U	
TETRACHLOROETHENE		0.35	U		0.35	U		0.35	U		0.35	U	
TOLUENE		0.23	U		0.23	U		0.23	U		0.23	U	
TRANS-1,2-DICHLOROETHENE		0.26	U		0.26	U		0.26	U		0.26	U	
TRANS-1,3-DICHLOROPROPENE		0.29	U		0.29	U		0.29	U		0.29	U	
TRICHLOROETHENE		0.33	U		0.33	U		0.33	U		0.33	U	
TRICHLOROFLUOROMETHANE		0.24	U		0.24	U		0.24	U		0.24	U	
VINYL CHLORIDE		0.3	U		0.3	U		0.3	U		0.3	U	

PROJ_NO: 06247	NSAMPLE	MRC-SW9B-061015			MRC-SWDUP-061015			TB-061015		
SDG: 2076215	LAB_ID	2076215013			2076215014			2076215015		
FRACTION: OV	SAMP_DATE	6/10/2015			6/10/2015			6/11/2015		
MEDIA: WATER	QC_TYPE	NM			NM			TB		
	UNITS	UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0		
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
DICHLORODIFLUOROMETHANE		0.33	U		0.33	U		0.33	U	
ETHYLBENZENE		0.34	U		0.34	U		0.34	U	
ISOPROPYLBENZENE		0.22	U		0.22	U		0.22	U	
M+P-XYLENES		0.52	U		0.52	U		0.52	U	
METHYL ACETATE		0.32	U		0.32	U		0.32	U	
METHYL CYCLOHEXANE		0.3	U		0.3	U		0.3	U	
METHYL TERT-BUTYL ETHER		0.33	U		0.33	U		0.33	U	
METHYLENE CHLORIDE		0.45	U		0.45	U		0.45	U	
O-XYLENE		0.33	U		0.33	U		0.33	U	
STYRENE		0.24	U		0.24	U		0.24	U	
TETRACHLOROETHENE		0.35	U		0.35	U		0.35	U	
TOLUENE		0.23	U		0.23	U		0.23	U	
TRANS-1,2-DICHLOROETHENE		0.26	U		0.26	U		0.26	U	
TRANS-1,3-DICHLOROPROPENE		0.29	U		0.29	U		0.29	U	
TRICHLOROETHENE		0.33	U		0.33	U		0.33	U	
TRICHLOROFLUOROMETHANE		0.24	U		0.24	U		0.24	U	
VINYL CHLORIDE		0.3	U		0.3	U		0.3	U	

PROJ_NO: 06247	NSAMPLE	MRC-SW5A1-061015			MRC-SW5A2-061015			MRC-SW5B-061015			MRC-SW6A-061015		
SDG: 2076215	LAB_ID	2076215003			2076215004			2076215005			2076215006		
FRACTION: PCB	SAMP_DATE	6/10/2015			6/10/2015			6/10/2015			6/10/2015		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
AROCLOR-1016		0.056	UJ	C	0.056	UJ	C	0.056	UJ	C	0.056	UJ	C
AROCLOR-1221		0.065	UJ	C	0.065	UJ	C	0.065	UJ	C	0.065	UJ	C
AROCLOR-1232		0.18	UJ	C	0.18	UJ	C	0.18	UJ	C	0.18	UJ	C
AROCLOR-1242		0.22	UJ	C	0.22	UJ	C	0.22	UJ	C	0.22	UJ	C
AROCLOR-1248		0.13	UJ	C	0.13	UJ	C	0.13	UJ	C	0.13	UJ	C
AROCLOR-1254		0.093	UJ	C	0.093	UJ	C	0.093	UJ	C	0.093	UJ	C
AROCLOR-1260		0.065	UJ	CE	0.065	UJ	CDE	0.065	UJ	CE	0.065	UJ	CE
AROCLOR-1262		0.093	UJ	C	0.093	UJ	C	0.093	UJ	C	0.093	UJ	C
AROCLOR-1268		0.16	UJ	C	0.16	UJ	C	0.16	UJ	C	0.16	UJ	C
TOTAL AROCLOR		0.47	UJ	C	0.46	UJ	C	0.46	UJ	C	0.47	UJ	C

PROJ_NO: 06247	NSAMPLE	MRC-SW6B-061015			MRC-SW7A-061015			MRC-SW7B-061015			MRC-SW8A-061015		
SDG: 2076215	LAB_ID	2076215007			2076215008			2076215009			2076215010		
FRACTION: PCB	SAMP_DATE	6/10/2015			6/10/2015			6/10/2015			6/10/2015		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
AROCLOR-1016		0.056	UJ	C	0.056	UJ	C	0.056	UJ	C	0.056	UJ	C
AROCLOR-1221		0.065	UJ	C	0.065	UJ	C	0.065	UJ	C	0.065	UJ	C
AROCLOR-1232		0.18	UJ	C	0.18	UJ	C	0.18	UJ	C	0.18	UJ	C
AROCLOR-1242		0.22	UJ	C	0.22	UJ	C	0.22	UJ	C	0.22	UJ	C
AROCLOR-1248		0.13	UJ	C	0.13	UJ	C	0.13	UJ	C	0.13	UJ	C
AROCLOR-1254		0.093	UJ	C	0.093	UJ	C	0.093	UJ	C	0.093	UJ	C
AROCLOR-1260		0.065	UJ	CE	0.065	UJ	CE	0.065	UJ	CE	0.065	UJ	CE
AROCLOR-1262		0.093	UJ	C	0.093	UJ	C	0.093	UJ	C	0.093	UJ	C
AROCLOR-1268		0.16	UJ	C	0.16	UJ	C	0.16	UJ	C	0.16	UJ	C
TOTAL AROCLOR		0.47	UJ	C	0.46	UJ	C	0.46	UJ	C	0.46	UJ	C

PROJ_NO: 06247	NSAMPLE	MRC-SW8B-061015			MRC-SW9A-061015			MRC-SW9B-061015		
SDG: 2076215	LAB_ID	2076215011			2076215012			2076215013		
FRACTION: PCB	SAMP_DATE	6/10/2015			6/10/2015			6/10/2015		
MEDIA: WATER	QC_TYPE	NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0		
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
AROCLOR-1016		0.056	UJ	C	0.056	UJ	C	0.056	UJ	C
AROCLOR-1221		0.065	UJ	C	0.065	UJ	C	0.065	UJ	C
AROCLOR-1232		0.18	UJ	C	0.18	UJ	C	0.18	UJ	C
AROCLOR-1242		0.22	UJ	C	0.22	UJ	C	0.22	UJ	C
AROCLOR-1248		0.13	UJ	C	0.13	UJ	C	0.13	UJ	C
AROCLOR-1254		0.093	UJ	C	0.093	UJ	C	0.093	UJ	C
AROCLOR-1260		0.065	UJ	CE	0.065	UJ	CE	0.065	UJ	CE
AROCLOR-1262		0.093	UJ	C	0.093	UJ	C	0.093	UJ	C
AROCLOR-1268		0.16	UJ	C	0.16	UJ	C	0.16	UJ	C
TOTAL AROCLOR		0.46	UJ	C	0.46	UJ	C	0.46	UJ	C

Appendix B

Results as Reported by the Laboratory

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215001** Date Collected: 6/10/2015 08:00 Matrix: Water

Sample ID: **MRC-SW1A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	6.0J	J	ug/L	10.0	3.1	SW846 8260C		6/17/15 05:45	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 05:45	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 05:45	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 05:45	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 05:45	JPA	A
Bromomethane	ND		ug/L	1.0	0.39	SW846 8260C		6/17/15 05:45	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 05:45	JPA	A
Carbon Disulfide	0.27J	J	ug/L	1.0	0.23	SW846 8260C		6/17/15 05:45	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 05:45	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 05:45	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 05:45	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 05:45	JPA	A
Chloroform	ND		ug/L	1.0	0.21	SW846 8260C		6/17/15 05:45	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 05:45	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 05:45	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 05:45	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 05:45	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 05:45	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 05:45	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 05:45	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 05:45	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 05:45	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 05:45	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 05:45	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 05:45	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 05:45	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 05:45	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 05:45	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 05:45	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 05:45	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 05:45	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 05:45	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 05:45	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 05:45	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 05:45	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 05:45	JPA	A

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215001** Date Collected: 6/10/2015 08:00 Matrix: Water

Sample ID: **MRC-SW1A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 05:45	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C			6/17/15 05:45	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C			6/17/15 05:45	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 05:45	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C			6/17/15 05:45	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C			6/17/15 05:45	JPA	A
Toluene	ND		ug/L	1.0	0.23	SW846 8260C			6/17/15 05:45	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C			6/17/15 05:45	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C			6/17/15 05:45	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C			6/17/15 05:45	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 05:45	JPA	A
Trichloroethene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 05:45	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 05:45	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C			6/17/15 05:45	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 05:45	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C			6/17/15 05:45	JPA	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	89.4		%	62 - 133	SW846 8260C			6/17/15 05:45	JPA	A
4-Bromofluorobenzene (S)	101		%	79 - 114	SW846 8260C			6/17/15 05:45	JPA	A
Dibromofluoromethane (S)	89.3		%	78 - 116	SW846 8260C			6/17/15 05:45	JPA	A
Toluene-d8 (S)	99.3		%	76 - 127	SW846 8260C			6/17/15 05:45	JPA	A

SEMIVOLATILES

1,4-Dioxane	0.13		ug/L	0.070	0.014	EPA 522	6/19/15	JEK	6/22/15 01:12	DHF	D

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,4-Dioxane-d8 (S)	82.3		%	70 - 130	EPA 522	6/19/15	JEK	6/22/15 01:12	DHF	D

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215002** Date Collected: 6/10/2015 08:14 Matrix: Water

Sample ID: **MRC-SW2A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	6.1J	J	ug/L	10.0	3.1	SW846 8260C		6/17/15 06:02	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 06:02	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 06:02	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 06:02	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 06:02	JPA	A
Bromomethane	ND		ug/L	1.0	0.39	SW846 8260C		6/17/15 06:02	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 06:02	JPA	A
Carbon Disulfide	0.45J	J	ug/L	1.0	0.23	SW846 8260C		6/17/15 06:02	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 06:02	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 06:02	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 06:02	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 06:02	JPA	A
Chloroform	ND		ug/L	1.0	0.21	SW846 8260C		6/17/15 06:02	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 06:02	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 06:02	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 06:02	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 06:02	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 06:02	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 06:02	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 06:02	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 06:02	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 06:02	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 06:02	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 06:02	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 06:02	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 06:02	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 06:02	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 06:02	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 06:02	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 06:02	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 06:02	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 06:02	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 06:02	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 06:02	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 06:02	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 06:02	JPA	A

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215002** Date Collected: 6/10/2015 08:14 Matrix: Water

Sample ID: **MRC-SW2A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:02	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C			6/17/15 06:02	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C			6/17/15 06:02	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 06:02	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C			6/17/15 06:02	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C			6/17/15 06:02	JPA	A
Toluene	0.25J	J	ug/L	1.0	0.23	SW846 8260C			6/17/15 06:02	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C			6/17/15 06:02	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C			6/17/15 06:02	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C			6/17/15 06:02	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:02	JPA	A
Trichloroethene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:02	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 06:02	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C			6/17/15 06:02	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:02	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C			6/17/15 06:02	JPA	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	90.5		%	62 - 133		SW846 8260C			6/17/15 06:02	JPA	A
4-Bromofluorobenzene (S)	100		%	79 - 114		SW846 8260C			6/17/15 06:02	JPA	A
Dibromofluoromethane (S)	90.7		%	78 - 116		SW846 8260C			6/17/15 06:02	JPA	A
Toluene-d8 (S)	99.6		%	76 - 127		SW846 8260C			6/17/15 06:02	JPA	A
SEMIVOLATILES											
1,4-Dioxane	0.13		ug/L	0.070	0.014	EPA 522	6/19/15	JEK	6/22/15 02:03	DHF	D
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,4-Dioxane-d8 (S)	82.2		%	70 - 130		EPA 522	6/19/15	JEK	6/22/15 02:03	DHF	D

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215003** Date Collected: 6/10/2015 09:32 Matrix: Water

Sample ID: **MRC-SW5A1-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	5.5J	J	ug/L	10.0	3.1	SW846 8260C		6/17/15 06:20	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 06:20	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 06:20	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 06:20	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 06:20	JPA	A
Bromomethane	ND		ug/L	1.0	0.39	SW846 8260C		6/17/15 06:20	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 06:20	JPA	A
Carbon Disulfide	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 06:20	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 06:20	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 06:20	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 06:20	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 06:20	JPA	A
Chloroform	ND		ug/L	1.0	0.21	SW846 8260C		6/17/15 06:20	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 06:20	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 06:20	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 06:20	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 06:20	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 06:20	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 06:20	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 06:20	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 06:20	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 06:20	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 06:20	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 06:20	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 06:20	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 06:20	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 06:20	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 06:20	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 06:20	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 06:20	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 06:20	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 06:20	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 06:20	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 06:20	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 06:20	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 06:20	JPA	A

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215003** Date Collected: 6/10/2015 09:32 Matrix: Water

Sample ID: **MRC-SW5A1-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:20	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C			6/17/15 06:20	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C			6/17/15 06:20	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 06:20	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C			6/17/15 06:20	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C			6/17/15 06:20	JPA	A
Toluene	ND		ug/L	1.0	0.23	SW846 8260C			6/17/15 06:20	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C			6/17/15 06:20	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C			6/17/15 06:20	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C			6/17/15 06:20	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:20	JPA	A
Trichloroethene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:20	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 06:20	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C			6/17/15 06:20	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:20	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C			6/17/15 06:20	JPA	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	89.3		%	62 - 133	SW846 8260C			6/17/15 06:20	JPA	A
4-Bromofluorobenzene (S)	98.8		%	79 - 114	SW846 8260C			6/17/15 06:20	JPA	A
Dibromofluoromethane (S)	89.6		%	78 - 116	SW846 8260C			6/17/15 06:20	JPA	A
Toluene-d8 (S)	100		%	76 - 127	SW846 8260C			6/17/15 06:20	JPA	A

PCBs

Total Polychlorinated Biphenyl	ND		ug/L	0.47	0.47	SW846 8082A	6/16/15	PDK	6/17/15 20:38	EGO	D
Aroclor-1016	ND		ug/L	0.47	0.056	SW846 8082A	6/16/15	PDK	6/17/15 20:38	EGO	D
Aroclor-1221	ND		ug/L	0.47	0.065	SW846 8082A	6/16/15	PDK	6/17/15 20:38	EGO	D
Aroclor-1232	ND		ug/L	0.47	0.18	SW846 8082A	6/16/15	PDK	6/17/15 20:38	EGO	D
Aroclor-1242	ND		ug/L	0.47	0.22	SW846 8082A	6/16/15	PDK	6/17/15 20:38	EGO	D
Aroclor-1248	ND		ug/L	0.47	0.13	SW846 8082A	6/16/15	PDK	6/17/15 20:38	EGO	D
Aroclor-1254	ND		ug/L	0.47	0.093	SW846 8082A	6/16/15	PDK	6/17/15 20:38	EGO	D
Aroclor-1260	ND		ug/L	0.47	0.065	SW846 8082A	6/16/15	PDK	6/17/15 20:38	EGO	D
Aroclor-1262	ND		ug/L	0.47	0.093	SW846 8082A	6/16/15	PDK	6/17/15 20:38	EGO	D
Aroclor-1268	ND		ug/L	0.47	0.16	SW846 8082A	6/16/15	PDK	6/17/15 20:38	EGO	D

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	83.4		%	30 - 150	SW846 8082A	6/16/15	PDK	6/17/15 20:38	EGO	D
Tetrachloro-m-xylene (S)	77		%	36 - 112	SW846 8082A	6/16/15	PDK	6/17/15 20:38	EGO	D

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215003** Date Collected: 6/10/2015 09:32 Matrix: Water
Sample ID: **MRC-SW5A1-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	*Cntr*

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215004** Date Collected: 6/10/2015 09:27 Matrix: Water

Sample ID: **MRC-SW5A2-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	5.6J	J	ug/L	10.0	3.1	SW846 8260C		6/17/15 06:37	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 06:37	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 06:37	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 06:37	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 06:37	JPA	A
Bromomethane	ND		ug/L	1.0	0.39	SW846 8260C		6/17/15 06:37	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 06:37	JPA	A
Carbon Disulfide	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 06:37	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 06:37	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 06:37	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 06:37	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 06:37	JPA	A
Chloroform	ND		ug/L	1.0	0.21	SW846 8260C		6/17/15 06:37	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 06:37	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 06:37	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 06:37	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 06:37	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 06:37	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 06:37	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 06:37	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 06:37	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 06:37	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 06:37	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 06:37	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 06:37	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 06:37	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 06:37	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 06:37	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 06:37	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 06:37	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 06:37	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 06:37	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 06:37	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 06:37	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 06:37	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 06:37	JPA	A

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215004** Date Collected: 6/10/2015 09:27 Matrix: Water

Sample ID: **MRC-SW5A2-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:37	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C			6/17/15 06:37	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C			6/17/15 06:37	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 06:37	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C			6/17/15 06:37	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C			6/17/15 06:37	JPA	A
Toluene	0.24J	J	ug/L	1.0	0.23	SW846 8260C			6/17/15 06:37	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C			6/17/15 06:37	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C			6/17/15 06:37	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C			6/17/15 06:37	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:37	JPA	A
Trichloroethene	0.42J	J	ug/L	1.0	0.33	SW846 8260C			6/17/15 06:37	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 06:37	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C			6/17/15 06:37	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:37	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C			6/17/15 06:37	JPA	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	89.8		%	62 - 133		SW846 8260C			6/17/15 06:37	JPA	A
4-Bromofluorobenzene (S)	95.2		%	79 - 114		SW846 8260C			6/17/15 06:37	JPA	A
Dibromofluoromethane (S)	91.3		%	78 - 116		SW846 8260C			6/17/15 06:37	JPA	A
Toluene-d8 (S)	96.9		%	76 - 127		SW846 8260C			6/17/15 06:37	JPA	A
PCBs											
Total Polychlorinated Biphenyl	ND		ug/L	0.46	0.46	SW846 8082A	6/16/15	PDK	6/17/15 20:15	EGO	D
Aroclor-1016	ND		ug/L	0.46	0.056	SW846 8082A	6/16/15	PDK	6/17/15 20:15	EGO	D
Aroclor-1221	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 20:15	EGO	D
Aroclor-1232	ND		ug/L	0.46	0.18	SW846 8082A	6/16/15	PDK	6/17/15 20:15	EGO	D
Aroclor-1242	ND		ug/L	0.46	0.22	SW846 8082A	6/16/15	PDK	6/17/15 20:15	EGO	D
Aroclor-1248	ND		ug/L	0.46	0.13	SW846 8082A	6/16/15	PDK	6/17/15 20:15	EGO	D
Aroclor-1254	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 20:15	EGO	D
Aroclor-1260	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 20:15	EGO	D
Aroclor-1262	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 20:15	EGO	D
Aroclor-1268	ND		ug/L	0.46	0.16	SW846 8082A	6/16/15	PDK	6/17/15 20:15	EGO	D
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*		*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	80		%	30 - 150		SW846 8082A	6/16/15	PDK	6/17/15 20:15	EGO	D
Tetrachloro-m-xylene (S)	80.9		%	36 - 112		SW846 8082A	6/16/15	PDK	6/17/15 20:15	EGO	D

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215004** Date Collected: 6/10/2015 09:27 Matrix: Water

Sample ID: **MRC-SW5A2-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	*Cntr*

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215005** Date Collected: 6/10/2015 09:36 Matrix: Water

Sample ID: **MRC-SW5B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	4.1J	J	ug/L	10.0	3.1	SW846 8260C		6/17/15 06:54	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 06:54	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 06:54	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 06:54	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 06:54	JPA	A
Bromomethane	0.43J	J	ug/L	1.0	0.39	SW846 8260C		6/17/15 06:54	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 06:54	JPA	A
Carbon Disulfide	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 06:54	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 06:54	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 06:54	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 06:54	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 06:54	JPA	A
Chloroform	ND		ug/L	1.0	0.21	SW846 8260C		6/17/15 06:54	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 06:54	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 06:54	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 06:54	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 06:54	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 06:54	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 06:54	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 06:54	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 06:54	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 06:54	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 06:54	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 06:54	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 06:54	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 06:54	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 06:54	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 06:54	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 06:54	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 06:54	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 06:54	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 06:54	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 06:54	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 06:54	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 06:54	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 06:54	JPA	A

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215005** Date Collected: 6/10/2015 09:36 Matrix: Water

Sample ID: **MRC-SW5B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:54	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C			6/17/15 06:54	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C			6/17/15 06:54	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 06:54	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C			6/17/15 06:54	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C			6/17/15 06:54	JPA	A
Toluene	ND		ug/L	1.0	0.23	SW846 8260C			6/17/15 06:54	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C			6/17/15 06:54	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C			6/17/15 06:54	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C			6/17/15 06:54	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:54	JPA	A
Trichloroethene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:54	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 06:54	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C			6/17/15 06:54	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 06:54	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C			6/17/15 06:54	JPA	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	92.8		%	62 - 133	SW846 8260C			6/17/15 06:54	JPA	A
4-Bromofluorobenzene (S)	96		%	79 - 114	SW846 8260C			6/17/15 06:54	JPA	A
Dibromofluoromethane (S)	93		%	78 - 116	SW846 8260C			6/17/15 06:54	JPA	A
Toluene-d8 (S)	98.5		%	76 - 127	SW846 8260C			6/17/15 06:54	JPA	A

PCBs

Total Polychlorinated Biphenyl	ND		ug/L	0.46	0.46	SW846 8082A	6/16/15	PDK	6/17/15 20:50	EGO	D
Aroclor-1016	ND		ug/L	0.46	0.056	SW846 8082A	6/16/15	PDK	6/17/15 20:50	EGO	D
Aroclor-1221	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 20:50	EGO	D
Aroclor-1232	ND		ug/L	0.46	0.18	SW846 8082A	6/16/15	PDK	6/17/15 20:50	EGO	D
Aroclor-1242	ND		ug/L	0.46	0.22	SW846 8082A	6/16/15	PDK	6/17/15 20:50	EGO	D
Aroclor-1248	ND		ug/L	0.46	0.13	SW846 8082A	6/16/15	PDK	6/17/15 20:50	EGO	D
Aroclor-1254	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 20:50	EGO	D
Aroclor-1260	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 20:50	EGO	D
Aroclor-1262	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 20:50	EGO	D
Aroclor-1268	ND		ug/L	0.46	0.16	SW846 8082A	6/16/15	PDK	6/17/15 20:50	EGO	D

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	70.9		%	30 - 150	SW846 8082A	6/16/15	PDK	6/17/15 20:50	EGO	D
Tetrachloro-m-xylene (S)	68.9		%	36 - 112	SW846 8082A	6/16/15	PDK	6/17/15 20:50	EGO	D

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215005** Date Collected: 6/10/2015 09:36 Matrix: Water
Sample ID: **MRC-SW5B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	*Cntr*

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215006** Date Collected: 6/10/2015 09:03 Matrix: Water

Sample ID: **MRC-SW6A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	5.8J	J	ug/L	10.0	3.1	SW846 8260C		6/17/15 07:11	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 07:11	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 07:11	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 07:11	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 07:11	JPA	A
Bromomethane	ND		ug/L	1.0	0.39	SW846 8260C		6/17/15 07:11	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 07:11	JPA	A
Carbon Disulfide	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 07:11	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 07:11	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 07:11	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 07:11	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 07:11	JPA	A
Chloroform	ND		ug/L	1.0	0.21	SW846 8260C		6/17/15 07:11	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 07:11	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 07:11	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 07:11	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 07:11	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 07:11	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 07:11	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 07:11	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 07:11	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 07:11	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 07:11	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 07:11	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 07:11	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 07:11	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 07:11	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 07:11	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 07:11	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 07:11	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 07:11	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 07:11	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 07:11	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 07:11	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 07:11	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 07:11	JPA	A

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215006** Date Collected: 6/10/2015 09:03 Matrix: Water

Sample ID: **MRC-SW6A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 07:11	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C			6/17/15 07:11	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C			6/17/15 07:11	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 07:11	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C			6/17/15 07:11	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C			6/17/15 07:11	JPA	A
Toluene	ND		ug/L	1.0	0.23	SW846 8260C			6/17/15 07:11	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C			6/17/15 07:11	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C			6/17/15 07:11	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C			6/17/15 07:11	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 07:11	JPA	A
Trichloroethene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 07:11	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 07:11	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C			6/17/15 07:11	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 07:11	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C			6/17/15 07:11	JPA	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	91.3		%	62 - 133	SW846 8260C			6/17/15 07:11	JPA	A
4-Bromofluorobenzene (S)	98.9		%	79 - 114	SW846 8260C			6/17/15 07:11	JPA	A
Dibromofluoromethane (S)	92.4		%	78 - 116	SW846 8260C			6/17/15 07:11	JPA	A
Toluene-d8 (S)	99.7		%	76 - 127	SW846 8260C			6/17/15 07:11	JPA	A

PCBs

Total Polychlorinated Biphenyl	ND		ug/L	0.47	0.47	SW846 8082A	6/16/15	PDK	6/17/15 19:29	EGO	D
Aroclor-1016	ND		ug/L	0.47	0.056	SW846 8082A	6/16/15	PDK	6/17/15 19:29	EGO	D
Aroclor-1221	ND		ug/L	0.47	0.065	SW846 8082A	6/16/15	PDK	6/17/15 19:29	EGO	D
Aroclor-1232	ND		ug/L	0.47	0.18	SW846 8082A	6/16/15	PDK	6/17/15 19:29	EGO	D
Aroclor-1242	ND		ug/L	0.47	0.22	SW846 8082A	6/16/15	PDK	6/17/15 19:29	EGO	D
Aroclor-1248	ND		ug/L	0.47	0.13	SW846 8082A	6/16/15	PDK	6/17/15 19:29	EGO	D
Aroclor-1254	ND		ug/L	0.47	0.093	SW846 8082A	6/16/15	PDK	6/17/15 19:29	EGO	D
Aroclor-1260	ND		ug/L	0.47	0.065	SW846 8082A	6/16/15	PDK	6/17/15 19:29	EGO	D
Aroclor-1262	ND		ug/L	0.47	0.093	SW846 8082A	6/16/15	PDK	6/17/15 19:29	EGO	D
Aroclor-1268	ND		ug/L	0.47	0.16	SW846 8082A	6/16/15	PDK	6/17/15 19:29	EGO	D

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	84.9		%	30 - 150	SW846 8082A	6/16/15	PDK	6/17/15 19:29	EGO	D
Tetrachloro-m-xylene (S)	79.3		%	36 - 112	SW846 8082A	6/16/15	PDK	6/17/15 19:29	EGO	D

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215006** Date Collected: 6/10/2015 09:03 Matrix: Water
Sample ID: **MRC-SW6A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	*Cntr*

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215007** Date Collected: 6/10/2015 09:07 Matrix: Water

Sample ID: **MRC-SW6B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	4.7J	J	ug/L	10.0	3.1	SW846 8260C		6/17/15 07:28	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 07:28	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 07:28	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 07:28	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 07:28	JPA	A
Bromomethane	0.48J	J	ug/L	1.0	0.39	SW846 8260C		6/17/15 07:28	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 07:28	JPA	A
Carbon Disulfide	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 07:28	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 07:28	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 07:28	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 07:28	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 07:28	JPA	A
Chloroform	ND		ug/L	1.0	0.21	SW846 8260C		6/17/15 07:28	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 07:28	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 07:28	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 07:28	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 07:28	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 07:28	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 07:28	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 07:28	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 07:28	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 07:28	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 07:28	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 07:28	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 07:28	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 07:28	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 07:28	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 07:28	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 07:28	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 07:28	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 07:28	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 07:28	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 07:28	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 07:28	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 07:28	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 07:28	JPA	A

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215007** Date Collected: 6/10/2015 09:07 Matrix: Water

Sample ID: **MRC-SW6B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 07:28	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C			6/17/15 07:28	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C			6/17/15 07:28	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 07:28	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C			6/17/15 07:28	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C			6/17/15 07:28	JPA	A
Toluene	ND		ug/L	1.0	0.23	SW846 8260C			6/17/15 07:28	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C			6/17/15 07:28	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C			6/17/15 07:28	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C			6/17/15 07:28	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 07:28	JPA	A
Trichloroethene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 07:28	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 07:28	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C			6/17/15 07:28	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 07:28	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C			6/17/15 07:28	JPA	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	91.6		%	62 - 133	SW846 8260C			6/17/15 07:28	JPA	A
4-Bromofluorobenzene (S)	99.1		%	79 - 114	SW846 8260C			6/17/15 07:28	JPA	A
Dibromofluoromethane (S)	90.8		%	78 - 116	SW846 8260C			6/17/15 07:28	JPA	A
Toluene-d8 (S)	98.6		%	76 - 127	SW846 8260C			6/17/15 07:28	JPA	A

PCBs

Total Polychlorinated Biphenyl	ND		ug/L	0.47	0.47	SW846 8082A	6/16/15	PDK	6/17/15 19:41	EGO	D
Aroclor-1016	ND		ug/L	0.47	0.056	SW846 8082A	6/16/15	PDK	6/17/15 19:41	EGO	D
Aroclor-1221	ND		ug/L	0.47	0.065	SW846 8082A	6/16/15	PDK	6/17/15 19:41	EGO	D
Aroclor-1232	ND		ug/L	0.47	0.18	SW846 8082A	6/16/15	PDK	6/17/15 19:41	EGO	D
Aroclor-1242	ND		ug/L	0.47	0.22	SW846 8082A	6/16/15	PDK	6/17/15 19:41	EGO	D
Aroclor-1248	ND		ug/L	0.47	0.13	SW846 8082A	6/16/15	PDK	6/17/15 19:41	EGO	D
Aroclor-1254	ND		ug/L	0.47	0.093	SW846 8082A	6/16/15	PDK	6/17/15 19:41	EGO	D
Aroclor-1260	ND		ug/L	0.47	0.065	SW846 8082A	6/16/15	PDK	6/17/15 19:41	EGO	D
Aroclor-1262	ND		ug/L	0.47	0.093	SW846 8082A	6/16/15	PDK	6/17/15 19:41	EGO	D
Aroclor-1268	ND		ug/L	0.47	0.16	SW846 8082A	6/16/15	PDK	6/17/15 19:41	EGO	D

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	70.8		%	30 - 150	SW846 8082A	6/16/15	PDK	6/17/15 19:41	EGO	D
Tetrachloro-m-xylene (S)	75.7		%	36 - 112	SW846 8082A	6/16/15	PDK	6/17/15 19:41	EGO	D

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215007** Date Collected: 6/10/2015 09:07 Matrix: Water
Sample ID: **MRC-SW6B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	*Cntr*

Debra J Musser

Ms. Debra J. Musser
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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215008** Date Collected: 6/10/2015 08:40 Matrix: Water

Sample ID: **MRC-SW7A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	3.1	SW846 8260C		6/17/15 07:45	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 07:45	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 07:45	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 07:45	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 07:45	JPA	A
Bromomethane	ND		ug/L	1.0	0.39	SW846 8260C		6/17/15 07:45	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 07:45	JPA	A
Carbon Disulfide	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 07:45	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 07:45	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 07:45	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 07:45	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 07:45	JPA	A
Chloroform	0.68J	J	ug/L	1.0	0.21	SW846 8260C		6/17/15 07:45	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 07:45	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 07:45	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 07:45	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 07:45	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 07:45	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 07:45	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 07:45	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 07:45	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 07:45	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 07:45	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 07:45	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 07:45	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 07:45	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 07:45	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 07:45	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 07:45	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 07:45	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 07:45	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 07:45	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 07:45	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 07:45	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 07:45	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 07:45	JPA	A

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215008** Date Collected: 6/10/2015 08:40 Matrix: Water

Sample ID: **MRC-SW7A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 07:45	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C			6/17/15 07:45	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C			6/17/15 07:45	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 07:45	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C			6/17/15 07:45	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C			6/17/15 07:45	JPA	A
Toluene	ND		ug/L	1.0	0.23	SW846 8260C			6/17/15 07:45	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C			6/17/15 07:45	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C			6/17/15 07:45	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C			6/17/15 07:45	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 07:45	JPA	A
Trichloroethene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 07:45	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 07:45	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C			6/17/15 07:45	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 07:45	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C			6/17/15 07:45	JPA	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	92.6		%	62 - 133	SW846 8260C			6/17/15 07:45	JPA	A
4-Bromofluorobenzene (S)	100		%	79 - 114	SW846 8260C			6/17/15 07:45	JPA	A
Dibromofluoromethane (S)	93.2		%	78 - 116	SW846 8260C			6/17/15 07:45	JPA	A
Toluene-d8 (S)	99.8		%	76 - 127	SW846 8260C			6/17/15 07:45	JPA	A

PCBs

Total Polychlorinated Biphenyl	ND		ug/L	0.46	0.46	SW846 8082A	6/16/15	PDK	6/17/15 18:43	EGO	D
Aroclor-1016	ND		ug/L	0.46	0.056	SW846 8082A	6/16/15	PDK	6/17/15 18:43	EGO	D
Aroclor-1221	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 18:43	EGO	D
Aroclor-1232	ND		ug/L	0.46	0.18	SW846 8082A	6/16/15	PDK	6/17/15 18:43	EGO	D
Aroclor-1242	ND		ug/L	0.46	0.22	SW846 8082A	6/16/15	PDK	6/17/15 18:43	EGO	D
Aroclor-1248	ND		ug/L	0.46	0.13	SW846 8082A	6/16/15	PDK	6/17/15 18:43	EGO	D
Aroclor-1254	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 18:43	EGO	D
Aroclor-1260	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 18:43	EGO	D
Aroclor-1262	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 18:43	EGO	D
Aroclor-1268	ND		ug/L	0.46	0.16	SW846 8082A	6/16/15	PDK	6/17/15 18:43	EGO	D

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	80.4		%	30 - 150	SW846 8082A	6/16/15	PDK	6/17/15 18:43	EGO	D
Tetrachloro-m-xylene (S)	84.5		%	36 - 112	SW846 8082A	6/16/15	PDK	6/17/15 18:43	EGO	D

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215008** Date Collected: 6/10/2015 08:40 Matrix: Water
Sample ID: **MRC-SW7A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	*Cntr*

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215009** Date Collected: 6/10/2015 08:45 Matrix: Water

Sample ID: **MRC-SW7B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	4.3J	J	ug/L	10.0	3.1	SW846 8260C		6/17/15 08:02	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 08:02	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 08:02	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 08:02	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 08:02	JPA	A
Bromomethane	ND		ug/L	1.0	0.39	SW846 8260C		6/17/15 08:02	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 08:02	JPA	A
Carbon Disulfide	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 08:02	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 08:02	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 08:02	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 08:02	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 08:02	JPA	A
Chloroform	0.42J	J	ug/L	1.0	0.21	SW846 8260C		6/17/15 08:02	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 08:02	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 08:02	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 08:02	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 08:02	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 08:02	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 08:02	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 08:02	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 08:02	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 08:02	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 08:02	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 08:02	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 08:02	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 08:02	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 08:02	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 08:02	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 08:02	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 08:02	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 08:02	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 08:02	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 08:02	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 08:02	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 08:02	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 08:02	JPA	A

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215009** Date Collected: 6/10/2015 08:45 Matrix: Water

Sample ID: **MRC-SW7B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:02	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C			6/17/15 08:02	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C			6/17/15 08:02	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 08:02	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C			6/17/15 08:02	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C			6/17/15 08:02	JPA	A
Toluene	ND		ug/L	1.0	0.23	SW846 8260C			6/17/15 08:02	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C			6/17/15 08:02	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C			6/17/15 08:02	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C			6/17/15 08:02	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:02	JPA	A
Trichloroethene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:02	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 08:02	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C			6/17/15 08:02	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:02	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C			6/17/15 08:02	JPA	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	94.7		%	62 - 133	SW846 8260C			6/17/15 08:02	JPA	A
4-Bromofluorobenzene (S)	99.5		%	79 - 114	SW846 8260C			6/17/15 08:02	JPA	A
Dibromofluoromethane (S)	94.3		%	78 - 116	SW846 8260C			6/17/15 08:02	JPA	A
Toluene-d8 (S)	99.9		%	76 - 127	SW846 8260C			6/17/15 08:02	JPA	A

PCBs

Total Polychlorinated Biphenyl	ND		ug/L	0.46	0.46	SW846 8082A	6/16/15	PDK	6/17/15 18:54	EGO	D
Aroclor-1016	ND		ug/L	0.46	0.056	SW846 8082A	6/16/15	PDK	6/17/15 18:54	EGO	D
Aroclor-1221	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 18:54	EGO	D
Aroclor-1232	ND		ug/L	0.46	0.18	SW846 8082A	6/16/15	PDK	6/17/15 18:54	EGO	D
Aroclor-1242	ND		ug/L	0.46	0.22	SW846 8082A	6/16/15	PDK	6/17/15 18:54	EGO	D
Aroclor-1248	ND		ug/L	0.46	0.13	SW846 8082A	6/16/15	PDK	6/17/15 18:54	EGO	D
Aroclor-1254	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 18:54	EGO	D
Aroclor-1260	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 18:54	EGO	D
Aroclor-1262	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 18:54	EGO	D
Aroclor-1268	ND		ug/L	0.46	0.16	SW846 8082A	6/16/15	PDK	6/17/15 18:54	EGO	D

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	70.1		%	30 - 150	SW846 8082A	6/16/15	PDK	6/17/15 18:54	EGO	D
Tetrachloro-m-xylene (S)	79.6		%	36 - 112	SW846 8082A	6/16/15	PDK	6/17/15 18:54	EGO	D

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215009** Date Collected: 6/10/2015 08:45 Matrix: Water

Sample ID: **MRC-SW7B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	*Cntr*

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215010** Date Collected: 6/10/2015 09:15 Matrix: Water

Sample ID: **MRC-SW8A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	8.2J	J	ug/L	10.0	3.1	SW846 8260C		6/17/15 08:20	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 08:20	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 08:20	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 08:20	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 08:20	JPA	A
Bromomethane	ND		ug/L	1.0	0.39	SW846 8260C		6/17/15 08:20	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 08:20	JPA	A
Carbon Disulfide	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 08:20	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 08:20	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 08:20	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 08:20	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 08:20	JPA	A
Chloroform	ND		ug/L	1.0	0.21	SW846 8260C		6/17/15 08:20	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 08:20	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 08:20	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 08:20	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 08:20	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 08:20	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 08:20	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 08:20	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 08:20	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 08:20	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 08:20	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 08:20	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 08:20	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 08:20	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 08:20	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 08:20	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 08:20	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 08:20	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 08:20	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 08:20	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 08:20	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 08:20	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 08:20	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 08:20	JPA	A

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215010** Date Collected: 6/10/2015 09:15 Matrix: Water

Sample ID: **MRC-SW8A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:20	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C			6/17/15 08:20	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C			6/17/15 08:20	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 08:20	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C			6/17/15 08:20	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C			6/17/15 08:20	JPA	A
Toluene	ND		ug/L	1.0	0.23	SW846 8260C			6/17/15 08:20	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C			6/17/15 08:20	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C			6/17/15 08:20	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C			6/17/15 08:20	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:20	JPA	A
Trichloroethene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:20	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 08:20	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C			6/17/15 08:20	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:20	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C			6/17/15 08:20	JPA	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	91.5		%	62 - 133	SW846 8260C			6/17/15 08:20	JPA	A
4-Bromofluorobenzene (S)	97.2		%	79 - 114	SW846 8260C			6/17/15 08:20	JPA	A
Dibromofluoromethane (S)	92.4		%	78 - 116	SW846 8260C			6/17/15 08:20	JPA	A
Toluene-d8 (S)	98.8		%	76 - 127	SW846 8260C			6/17/15 08:20	JPA	A

PCBs

Total Polychlorinated Biphenyl	ND		ug/L	0.46	0.46	SW846 8082A	6/16/15	PDK	6/17/15 19:52	EGO	D
Aroclor-1016	ND		ug/L	0.46	0.056	SW846 8082A	6/16/15	PDK	6/17/15 19:52	EGO	D
Aroclor-1221	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 19:52	EGO	D
Aroclor-1232	ND		ug/L	0.46	0.18	SW846 8082A	6/16/15	PDK	6/17/15 19:52	EGO	D
Aroclor-1242	ND		ug/L	0.46	0.22	SW846 8082A	6/16/15	PDK	6/17/15 19:52	EGO	D
Aroclor-1248	ND		ug/L	0.46	0.13	SW846 8082A	6/16/15	PDK	6/17/15 19:52	EGO	D
Aroclor-1254	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 19:52	EGO	D
Aroclor-1260	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 19:52	EGO	D
Aroclor-1262	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 19:52	EGO	D
Aroclor-1268	ND		ug/L	0.46	0.16	SW846 8082A	6/16/15	PDK	6/17/15 19:52	EGO	D

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	52.5		%	30 - 150	SW846 8082A	6/16/15	PDK	6/17/15 19:52	EGO	D
Tetrachloro-m-xylene (S)	55.8		%	36 - 112	SW846 8082A	6/16/15	PDK	6/17/15 19:52	EGO	D

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215010** Date Collected: 6/10/2015 09:15 Matrix: Water

Sample ID: **MRC-SW8A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	*Cntr*

Debra J Musser

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215011** Date Collected: 6/10/2015 09:18 Matrix: Water

Sample ID: **MRC-SW8B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	3.1	SW846 8260C		6/17/15 08:37	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 08:37	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 08:37	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 08:37	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 08:37	JPA	A
Bromomethane	ND		ug/L	1.0	0.39	SW846 8260C		6/17/15 08:37	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 08:37	JPA	A
Carbon Disulfide	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 08:37	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 08:37	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 08:37	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 08:37	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 08:37	JPA	A
Chloroform	ND		ug/L	1.0	0.21	SW846 8260C		6/17/15 08:37	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 08:37	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 08:37	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 08:37	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 08:37	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 08:37	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 08:37	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 08:37	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 08:37	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 08:37	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 08:37	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 08:37	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 08:37	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 08:37	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 08:37	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 08:37	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 08:37	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 08:37	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 08:37	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 08:37	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 08:37	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 08:37	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 08:37	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 08:37	JPA	A

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215011** Date Collected: 6/10/2015 09:18 Matrix: Water

Sample ID: **MRC-SW8B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:37	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C			6/17/15 08:37	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C			6/17/15 08:37	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 08:37	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C			6/17/15 08:37	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C			6/17/15 08:37	JPA	A
Toluene	ND		ug/L	1.0	0.23	SW846 8260C			6/17/15 08:37	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C			6/17/15 08:37	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C			6/17/15 08:37	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C			6/17/15 08:37	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:37	JPA	A
Trichloroethene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:37	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 08:37	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C			6/17/15 08:37	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:37	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C			6/17/15 08:37	JPA	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	92.4		%	62 - 133	SW846 8260C			6/17/15 08:37	JPA	A
4-Bromofluorobenzene (S)	97.6		%	79 - 114	SW846 8260C			6/17/15 08:37	JPA	A
Dibromofluoromethane (S)	92.6		%	78 - 116	SW846 8260C			6/17/15 08:37	JPA	A
Toluene-d8 (S)	99.3		%	76 - 127	SW846 8260C			6/17/15 08:37	JPA	A

PCBs

Total Polychlorinated Biphenyl	ND		ug/L	0.46	0.46	SW846 8082A	6/16/15	PDK	6/17/15 20:04	EGO	D
Aroclor-1016	ND		ug/L	0.46	0.056	SW846 8082A	6/16/15	PDK	6/17/15 20:04	EGO	D
Aroclor-1221	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 20:04	EGO	D
Aroclor-1232	ND		ug/L	0.46	0.18	SW846 8082A	6/16/15	PDK	6/17/15 20:04	EGO	D
Aroclor-1242	ND		ug/L	0.46	0.22	SW846 8082A	6/16/15	PDK	6/17/15 20:04	EGO	D
Aroclor-1248	ND		ug/L	0.46	0.13	SW846 8082A	6/16/15	PDK	6/17/15 20:04	EGO	D
Aroclor-1254	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 20:04	EGO	D
Aroclor-1260	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 20:04	EGO	D
Aroclor-1262	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 20:04	EGO	D
Aroclor-1268	ND		ug/L	0.46	0.16	SW846 8082A	6/16/15	PDK	6/17/15 20:04	EGO	D

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	69.5		%	30 - 150	SW846 8082A	6/16/15	PDK	6/17/15 20:04	EGO	D
Tetrachloro-m-xylene (S)	73.6		%	36 - 112	SW846 8082A	6/16/15	PDK	6/17/15 20:04	EGO	D

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215011** Date Collected: 6/10/2015 09:18 Matrix: Water

Sample ID: **MRC-SW8B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	*Cntr*

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215012** Date Collected: 6/10/2015 08:51 Matrix: Water

Sample ID: **MRC-SW9A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	4.0J	J	ug/L	10.0	3.1	SW846 8260C		6/17/15 08:54	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 08:54	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 08:54	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 08:54	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 08:54	JPA	A
Bromomethane	ND		ug/L	1.0	0.39	SW846 8260C		6/17/15 08:54	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 08:54	JPA	A
Carbon Disulfide	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 08:54	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 08:54	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 08:54	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 08:54	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 08:54	JPA	A
Chloroform	ND		ug/L	1.0	0.21	SW846 8260C		6/17/15 08:54	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 08:54	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 08:54	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 08:54	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 08:54	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 08:54	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 08:54	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 08:54	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 08:54	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 08:54	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 08:54	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 08:54	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 08:54	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 08:54	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 08:54	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 08:54	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 08:54	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 08:54	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 08:54	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 08:54	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 08:54	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 08:54	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 08:54	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 08:54	JPA	A

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215012** Date Collected: 6/10/2015 08:51 Matrix: Water

Sample ID: **MRC-SW9A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:54	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C			6/17/15 08:54	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C			6/17/15 08:54	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 08:54	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C			6/17/15 08:54	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C			6/17/15 08:54	JPA	A
Toluene	ND		ug/L	1.0	0.23	SW846 8260C			6/17/15 08:54	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C			6/17/15 08:54	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C			6/17/15 08:54	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C			6/17/15 08:54	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:54	JPA	A
Trichloroethene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:54	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 08:54	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C			6/17/15 08:54	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 08:54	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C			6/17/15 08:54	JPA	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	93.2		%	62 - 133	SW846 8260C			6/17/15 08:54	JPA	A
4-Bromofluorobenzene (S)	98.7		%	79 - 114	SW846 8260C			6/17/15 08:54	JPA	A
Dibromofluoromethane (S)	94.1		%	78 - 116	SW846 8260C			6/17/15 08:54	JPA	A
Toluene-d8 (S)	99.4		%	76 - 127	SW846 8260C			6/17/15 08:54	JPA	A

PCBs

Total Polychlorinated Biphenyl	ND		ug/L	0.46	0.46	SW846 8082A	6/16/15	PDK	6/17/15 19:06	EGO	D
Aroclor-1016	ND		ug/L	0.46	0.056	SW846 8082A	6/16/15	PDK	6/17/15 19:06	EGO	D
Aroclor-1221	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 19:06	EGO	D
Aroclor-1232	ND		ug/L	0.46	0.18	SW846 8082A	6/16/15	PDK	6/17/15 19:06	EGO	D
Aroclor-1242	ND		ug/L	0.46	0.22	SW846 8082A	6/16/15	PDK	6/17/15 19:06	EGO	D
Aroclor-1248	ND		ug/L	0.46	0.13	SW846 8082A	6/16/15	PDK	6/17/15 19:06	EGO	D
Aroclor-1254	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 19:06	EGO	D
Aroclor-1260	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 19:06	EGO	D
Aroclor-1262	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 19:06	EGO	D
Aroclor-1268	ND		ug/L	0.46	0.16	SW846 8082A	6/16/15	PDK	6/17/15 19:06	EGO	D

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	67.8		%	30 - 150	SW846 8082A	6/16/15	PDK	6/17/15 19:06	EGO	D
Tetrachloro-m-xylene (S)	76.2		%	36 - 112	SW846 8082A	6/16/15	PDK	6/17/15 19:06	EGO	D

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215012** Date Collected: 6/10/2015 08:51 Matrix: Water

Sample ID: **MRC-SW9A-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	*Cntr*

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215013** Date Collected: 6/10/2015 08:55 Matrix: Water

Sample ID: **MRC-SW9B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	8.2J	J	ug/L	10.0	3.1	SW846 8260C		6/17/15 09:11	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 09:11	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 09:11	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 09:11	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 09:11	JPA	A
Bromomethane	ND		ug/L	1.0	0.39	SW846 8260C		6/17/15 09:11	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 09:11	JPA	A
Carbon Disulfide	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 09:11	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 09:11	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 09:11	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 09:11	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 09:11	JPA	A
Chloroform	ND		ug/L	1.0	0.21	SW846 8260C		6/17/15 09:11	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 09:11	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 09:11	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 09:11	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 09:11	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 09:11	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 09:11	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 09:11	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 09:11	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 09:11	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 09:11	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 09:11	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 09:11	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 09:11	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 09:11	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 09:11	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 09:11	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 09:11	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 09:11	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 09:11	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 09:11	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 09:11	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 09:11	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 09:11	JPA	A

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215013** Date Collected: 6/10/2015 08:55 Matrix: Water

Sample ID: **MRC-SW9B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 09:11	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C			6/17/15 09:11	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C			6/17/15 09:11	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 09:11	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C			6/17/15 09:11	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C			6/17/15 09:11	JPA	A
Toluene	ND		ug/L	1.0	0.23	SW846 8260C			6/17/15 09:11	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C			6/17/15 09:11	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C			6/17/15 09:11	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C			6/17/15 09:11	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 09:11	JPA	A
Trichloroethene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 09:11	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 09:11	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C			6/17/15 09:11	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 09:11	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C			6/17/15 09:11	JPA	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	92.2		%	62 - 133	SW846 8260C			6/17/15 09:11	JPA	A
4-Bromofluorobenzene (S)	99		%	79 - 114	SW846 8260C			6/17/15 09:11	JPA	A
Dibromofluoromethane (S)	92.4		%	78 - 116	SW846 8260C			6/17/15 09:11	JPA	A
Toluene-d8 (S)	98		%	76 - 127	SW846 8260C			6/17/15 09:11	JPA	A

PCBs

Total Polychlorinated Biphenyl	ND		ug/L	0.46	0.46	SW846 8082A	6/16/15	PDK	6/17/15 19:17	EGO	D
Aroclor-1016	ND		ug/L	0.46	0.056	SW846 8082A	6/16/15	PDK	6/17/15 19:17	EGO	D
Aroclor-1221	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 19:17	EGO	D
Aroclor-1232	ND		ug/L	0.46	0.18	SW846 8082A	6/16/15	PDK	6/17/15 19:17	EGO	D
Aroclor-1242	ND		ug/L	0.46	0.22	SW846 8082A	6/16/15	PDK	6/17/15 19:17	EGO	D
Aroclor-1248	ND		ug/L	0.46	0.13	SW846 8082A	6/16/15	PDK	6/17/15 19:17	EGO	D
Aroclor-1254	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 19:17	EGO	D
Aroclor-1260	ND		ug/L	0.46	0.065	SW846 8082A	6/16/15	PDK	6/17/15 19:17	EGO	D
Aroclor-1262	ND		ug/L	0.46	0.093	SW846 8082A	6/16/15	PDK	6/17/15 19:17	EGO	D
Aroclor-1268	ND		ug/L	0.46	0.16	SW846 8082A	6/16/15	PDK	6/17/15 19:17	EGO	D

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
Decachlorobiphenyls (S)	65.7		%	30 - 150	SW846 8082A	6/16/15	PDK	6/17/15 19:17	EGO	D
Tetrachloro-m-xylene (S)	71.5		%	36 - 112	SW846 8082A	6/16/15	PDK	6/17/15 19:17	EGO	D

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215013** Date Collected: 6/10/2015 08:55 Matrix: Water
Sample ID: **MRC-SW9B-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	*Cntr*

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

ALS Environmental

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215014** Date Collected: 6/10/2015 00:00 Matrix: Water

Sample ID: **MRC-SWDUP-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	5.1J	J	ug/L	10.0	3.1	SW846 8260C		6/17/15 09:28	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 09:28	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 09:28	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 09:28	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 09:28	JPA	A
Bromomethane	ND		ug/L	1.0	0.39	SW846 8260C		6/17/15 09:28	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 09:28	JPA	A
Carbon Disulfide	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 09:28	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 09:28	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 09:28	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 09:28	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 09:28	JPA	A
Chloroform	ND		ug/L	1.0	0.21	SW846 8260C		6/17/15 09:28	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 09:28	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 09:28	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 09:28	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 09:28	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 09:28	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 09:28	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 09:28	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 09:28	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 09:28	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 09:28	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 09:28	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 09:28	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 09:28	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 09:28	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 09:28	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 09:28	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 09:28	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 09:28	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 09:28	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 09:28	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 09:28	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 09:28	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 09:28	JPA	A

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215014** Date Collected: 6/10/2015 00:00 Matrix: Water

Sample ID: **MRC-SWDUP-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared	By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 09:28	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C			6/17/15 09:28	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C			6/17/15 09:28	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 09:28	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C			6/17/15 09:28	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C			6/17/15 09:28	JPA	A
Toluene	ND		ug/L	1.0	0.23	SW846 8260C			6/17/15 09:28	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C			6/17/15 09:28	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C			6/17/15 09:28	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C			6/17/15 09:28	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 09:28	JPA	A
Trichloroethene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 09:28	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C			6/17/15 09:28	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C			6/17/15 09:28	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C			6/17/15 09:28	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C			6/17/15 09:28	JPA	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	92.4		%	62 - 133	SW846 8260C			6/17/15 09:28	JPA	A
4-Bromofluorobenzene (S)	99.5		%	79 - 114	SW846 8260C			6/17/15 09:28	JPA	A
Dibromofluoromethane (S)	93		%	78 - 116	SW846 8260C			6/17/15 09:28	JPA	A
Toluene-d8 (S)	99.2		%	76 - 127	SW846 8260C			6/17/15 09:28	JPA	A

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

ALS Environmental

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215015** Date Collected: 6/11/2015 09:02 Matrix: Water

Sample ID: **TB-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	3.1	SW846 8260C		6/17/15 05:28	JPA	A
Benzene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 05:28	JPA	A
Bromochloromethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 05:28	JPA	A
Bromodichloromethane	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 05:28	JPA	A
Bromoform	ND		ug/L	1.0	0.40	SW846 8260C		6/17/15 05:28	JPA	A
Bromomethane	0.41J	J	ug/L	1.0	0.39	SW846 8260C		6/17/15 05:28	JPA	A
2-Butanone	ND		ug/L	10.0	1.8	SW846 8260C		6/17/15 05:28	JPA	A
Carbon Disulfide	0.26J	J	ug/L	1.0	0.23	SW846 8260C		6/17/15 05:28	JPA	A
Carbon Tetrachloride	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 05:28	JPA	A
Chlorobenzene	ND		ug/L	1.0	0.19	SW846 8260C		6/17/15 05:28	JPA	A
Chlorodibromomethane	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 05:28	JPA	A
Chloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 05:28	JPA	A
Chloroform	ND		ug/L	1.0	0.21	SW846 8260C		6/17/15 05:28	JPA	A
Chloromethane	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 05:28	JPA	A
Cyclohexane	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 05:28	JPA	A
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	1.5	SW846 8260C		6/17/15 05:28	JPA	A
1,2-Dibromoethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 05:28	JPA	A
1,2-Dichlorobenzene	ND		ug/L	1.0	0.38	SW846 8260C		6/17/15 05:28	JPA	A
1,3-Dichlorobenzene	ND		ug/L	1.0	0.25	SW846 8260C		6/17/15 05:28	JPA	A
1,4-Dichlorobenzene	ND		ug/L	1.0	0.27	SW846 8260C		6/17/15 05:28	JPA	A
Dichlorodifluoromethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 05:28	JPA	A
1,1-Dichloroethane	ND		ug/L	1.0	0.28	SW846 8260C		6/17/15 05:28	JPA	A
1,2-Dichloroethane	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 05:28	JPA	A
1,1-Dichloroethene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 05:28	JPA	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	0.32	SW846 8260C		6/17/15 05:28	JPA	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 05:28	JPA	A
1,2-Dichloropropane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 05:28	JPA	A
cis-1,3-Dichloropropene	ND		ug/L	1.0	0.31	SW846 8260C		6/17/15 05:28	JPA	A
trans-1,3-Dichloropropene	ND		ug/L	1.0	0.29	SW846 8260C		6/17/15 05:28	JPA	A
1,4-Dioxane	ND		ug/L	320	58.9	SW846 8260C		6/17/15 05:28	JPA	A
Ethylbenzene	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 05:28	JPA	A
Freon 113	ND		ug/L	1.0	0.26	SW846 8260C		6/17/15 05:28	JPA	A
2-Hexanone	ND		ug/L	5.0	1.3	SW846 8260C		6/17/15 05:28	JPA	A
Isopropylbenzene	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 05:28	JPA	A
Methyl acetate	ND		ug/L	2.0	0.32	SW846 8260C		6/17/15 05:28	JPA	A
Methyl cyclohexane	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 05:28	JPA	A

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ANALYTICAL RESULTS

Workorder: 2076215 TMM039|112IC06247

Lab ID: **2076215015** Date Collected: 6/11/2015 09:02 Matrix: Water

Sample ID: **TB-061015** Date Received: 6/11/2015 09:02

Parameters	Results	Flag	Units	RDL	MDL	Method	Prepared By	Analyzed	By	Cntr
Methyl t-Butyl Ether	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 05:28	JPA	A
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	1.5	SW846 8260C		6/17/15 05:28	JPA	A
Methylene Chloride	ND		ug/L	1.0	0.45	SW846 8260C		6/17/15 05:28	JPA	A
Styrene	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 05:28	JPA	A
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	0.34	SW846 8260C		6/17/15 05:28	JPA	A
Tetrachloroethene	ND		ug/L	1.0	0.35	SW846 8260C		6/17/15 05:28	JPA	A
Toluene	ND		ug/L	1.0	0.23	SW846 8260C		6/17/15 05:28	JPA	A
1,2,3-Trichlorobenzene	ND		ug/L	2.0	0.93	SW846 8260C		6/17/15 05:28	JPA	A
1,2,4-Trichlorobenzene	ND		ug/L	2.0	0.82	SW846 8260C		6/17/15 05:28	JPA	A
1,1,1-Trichloroethane	ND		ug/L	1.0	0.22	SW846 8260C		6/17/15 05:28	JPA	A
1,1,2-Trichloroethane	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 05:28	JPA	A
Trichloroethene	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 05:28	JPA	A
Trichlorofluoromethane	ND		ug/L	1.0	0.24	SW846 8260C		6/17/15 05:28	JPA	A
Vinyl Chloride	ND		ug/L	1.0	0.30	SW846 8260C		6/17/15 05:28	JPA	A
o-Xylene	ND		ug/L	1.0	0.33	SW846 8260C		6/17/15 05:28	JPA	A
mp-Xylene	ND		ug/L	2.0	0.52	SW846 8260C		6/17/15 05:28	JPA	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	89.4		%	62 - 133	SW846 8260C		6/17/15 05:28	JPA	A
4-Bromofluorobenzene (S)	99.7		%	79 - 114	SW846 8260C		6/17/15 05:28	JPA	A
Dibromofluoromethane (S)	91.4		%	78 - 116	SW846 8260C		6/17/15 05:28	JPA	A
Toluene-d8 (S)	99.7		%	76 - 127	SW846 8260C		6/17/15 05:28	JPA	A

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

Appendix C

Support Documentation

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER No. 028498

PROJECT NO: 112IC06247	FACILITY: MRC SW	PROJECT MANAGER TONY APANAVAGE	PHONE NUMBER 301 233 5230	LABORATORY NAME ALS ENVIRONMENTAL
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER JOSH MULLIS	PHONE NUMBER 410 279 2700	ADDRESS 34 OOGWOOD LANE
		CARRIER/WAYBILL NUMBER		CITY, STATE MIDDLETOWN, PA 17507

STANDARD TAT ☒
RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G
PRESERVATIVE USED: HCl / Sodium Sulfate

DATE YEAR 2015	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: VOCs (Method 8260C)	PCBs (Method 680)	1-4 dioxane (Method 522)	COMMENTS
6/10	0800	MRC-SW1A-061015	MRC			SW	G	3	X		X	
	0814	MRC-SW2A-061015						3	X		X	
	0932	MRC-SW5A1-061015						4	X	X		
	0927	MRC-SW5A2-061015							X	X		
	0936	MRC-SW5B-061015							X	X		
	0903	MRC-SW6A-061015							X	X		
	0907	MRC-SW6B-061015							X	X		
	0840	MRC-SW7A-061015							X	X		
	0845	MRC-SW7B-061015							X	X		
	0915	MRC-SW8A-061015							X	X		
	0918	MRC-SW8B-061015							X	X		
	0851	MRC-SW9A-061015							X	X		
	0855	MRC-SW9B-061015							X	X		

6/11/15

	Y	N	Initials	Cooler Temp.
Custody Seals Present?				°C
(If present) Seals Intact?				Cooler #
Received on Ice?				
COC/Labs Complete				Therm ID
Cont in Good Cond?				
Correct Containers?				Ship Carrier:
Correct Samp Vol?				FedEx UPS
Correct Preservation?				DHL
Headspace/Volatiles?				

Tracking # 805924448641

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6/10/15	1430	1. RECEIVED BY	6/11/15	0900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: SAMPLES FOR MRC SURFACE WATER EVENT

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R FORM NO. TINUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER Nº 028499 | PAGE 2 OF 20 2628

PROJECT NO: 112IC06247	FACILITY: MRC SW	PROJECT MANAGER TONY ARANAVAGE	PHONE NUMBER 301 233 8230	LABORATORY NAME AND CONTACT: ALS ENVIRONMENTAL / DEB MUSSER
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER JOSH MULLIS	PHONE NUMBER 410 279 2700	ADDRESS 34 DOGWOOD LANE
		CARRIER/WAYBILL NUMBER		CITY, STATE MIDDLETOWN, PA

STANDARD TAT [X]
RUSH TAT [ ] 24 hr. [ ] 48 hr. [ ] 72 hr. [ ] 7 day [ ] 14 day

DATE YEAR 2015	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	CONTAINER TYPE PLASTIC (P) or GLASS (G)	PRESERVATIVE USED	TYPE OF ANALYSIS VOCs (Method 8260C)	COMMENTS
									G	HCl		
6/10	—	MRC-SWOUP-061015	MRC			SW	G	2			X	AT 6/11/15
6/10	—	TB-061015	—			SW	G	2			X	

6/10/15

	Y	N	Initials	Cooler Temp
Custody Seals Present?			AT	2 °C
(If present) Seals Intact?				Cooler #:
Received on Ice?				
COC/Labls Complete				Therm ID: YH291
Cont In Good Cond?				
Correct Containers?				Ship Carrier:
Correct Samp Vol?				FedEx UPS
Correct Preservation?				DHL
Headspace/Volatiles?				Tracking #: 805924448641

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	6/10/15	1430	1. RECEIVED BY	6/11/15	0902
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: SAMPLES FOR MRC SURFACE WATER EVENT

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TINUS-001

Tetra Tech, Inc.
MRC-GW 2015 Sampling

ALS-Middletown
Case Narrative
TMM-039

Sample Management

This report contains the results of the analysis of fifteen (15) water samples collected on June 10-11, 2015. Analytical results and quality control information are summarized in this data package.

Sample Receipt

Samples arrived at ALS via courier on June 11, 2015. Upon receipt, the samples were inspected and compared to the Chain of Custody. Sample temperature was documented on the enclosed Chain of Custody. Samples were received intact and properly preserved, unless noted on the enclosed Certificate of Analysis and/or Chain of Custody.

Volatile Organics by SW-846 Method 8260

Sample Handling. Fifteen (15) ground water samples were analyzed by SW-846 Method 8260 for volatile organic compounds. All analyses were performed within the holding time.

Initial Calibrations. Initial calibrations were properly analyzed and met method criteria for all target analytes. **Note:** The batch LCS also serves as a second source (ICV).

Continuing Calibration Checks. Continuing calibration standards were properly analyzed and met method criteria for all target analytes.

Blanks. Target analytes were not detected in the blank; except as follows:

- In 2192630, carbon disulfide was detected at 0.39J µg/L; 1,3-dichlorobenzene was detected at 0.25J µg/L; 1,4-dichlorobenzene was detected at 0.32J µg/L.

Surrogates. Recoveries were within control limits.

Laboratory control samples. Target analytes were recovered within control limits.

Internal Standards. All internal standard results met method criteria.

1,4-Dioxane by Method 522

Sample Handling. Two (2) water samples were extracted and analyzed by EPA Method 522 for 1,4-dioxane. All extractions and analyses were performed within the holding time.

Initial Calibrations. An initial calibration was properly analyzed and met method criteria for 1,4-dioxane.

Calibration Checks. Continuing calibration standards were properly analyzed and met method criteria for 1,4-dioxane.

Blanks. 1,4-dioxane was not detected in the method blank.

Surrogates. Surrogate recoveries were within control limits.

Blank Spikes. 1,4-dioxane was recovered within control limits in the blank spike.

Internal Standards. Internal standards met method criterial.

Polychlorinated Biphenyls as Aroclors Method 8082

Sample Handling. Eleven (11) water samples were extracted by SW-846 Method 3510 and analyzed for PCBs by SW-846 Method 8082. The extractions and analyses were performed within the holding times associated with each method.

Reporting. The samples were analyzed using dual-column instrumentation. Detected analytes were reported from the column yielding the lower result, unless quality control data or poor chromatography warranted the selection of the higher result.

If the difference in results above the reporting limit between the two columns exceeds 40% RPD, and that difference cannot be explained by matrix interferences evident from the chromatography, the results are qualified on the Certificate of Analysis.

Initial Calibrations. Prior to sample analysis, initial calibrations were performed and verified with an initial calibration verification standard. All results met method criteria.

Calibration verification. The initial calibration was verified prior to sample analysis and every 12 hours, thereafter. The average peak concentration results for each Aroclor were within control limits.

Blanks. Target analytes were not detected in the method blank.

Surrogates. All surrogate results were within control limits, except as follows:

- On column RTX-CLPEST, decachlorobiphenyl was below the control limits for sample MRC-SW8A-061015. The surrogate recovery was within acceptable control limits on the other column.

Spiked Blanks. Target analytes were recovered within control limits in both analytical columns: except as follows:

- In column RTX-CLPEST, Aroclor 1260 was recovered below the control limits. This analyte was recovered within control limits in the alternate column.

***M*atrix Spikes.** A matrix spike, identified as 2192538, was extracted and analyzed from project sample MRC-SW5A2-061015 (2076215004). Target analytes were recovered within control limits in both analytical columns.

I Jennifer M. Lamoreux, as the designated Quality Assurance Officer, hereby attest that all electronic deliverables have been thoroughly reviewed and are in agreement with the associated hardcopy data. The enclosed electronic files have been reviewed for accuracy (including significant figures), completeness and format. The laboratory will be responsible for any labor time necessary to correct enclosed electronic deliverables that have been found to be in error. I can be reached at (717) 944-5541 if there are any questions or problems with the enclosed electronic deliverables.

Signature:  Title: Reporting Manager Date: 7/13/2015

ALS Environmental

34 Dogwood Lane ▪ Middletown, PA 17057 ▪ Phone: 717-944-5541 ▪ Fax: 717-944-1430 ▪ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2076215 TMM039|112IC06247

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2076215001	MRC-SW1A-061015	Water	6/10/2015 08:00	6/11/2015 09:02	Collected by Client
2076215002	MRC-SW2A-061015	Water	6/10/2015 08:14	6/11/2015 09:02	Collected by Client
2076215003	MRC-SW5A1-061015	Water	6/10/2015 09:32	6/11/2015 09:02	Collected by Client
2076215004	MRC-SW5A2-061015	Water	6/10/2015 09:27	6/11/2015 09:02	Collected by Client
2076215005	MRC-SW5B-061015	Water	6/10/2015 09:36	6/11/2015 09:02	Collected by Client
2076215006	MRC-SW6A-061015	Water	6/10/2015 09:03	6/11/2015 09:02	Collected by Client
2076215007	MRC-SW6B-061015	Water	6/10/2015 09:07	6/11/2015 09:02	Collected by Client
2076215008	MRC-SW7A-061015	Water	6/10/2015 08:40	6/11/2015 09:02	Collected by Client
2076215009	MRC-SW7B-061015	Water	6/10/2015 08:45	6/11/2015 09:02	Collected by Client
2076215010	MRC-SW8A-061015	Water	6/10/2015 09:15	6/11/2015 09:02	Collected by Client
2076215011	MRC-SW8B-061015	Water	6/10/2015 09:18	6/11/2015 09:02	Collected by Client
2076215012	MRC-SW9A-061015	Water	6/10/2015 08:51	6/11/2015 09:02	Collected by Client
2076215013	MRC-SW9B-061015	Water	6/10/2015 08:55	6/11/2015 09:02	Collected by Client
2076215014	MRC-SWDUP-061015	Water	6/10/2015 00:00	6/11/2015 09:02	Collected by Client
2076215015	TB-061015	Water	6/11/2015 09:02	6/11/2015 09:02	Collected by Client

Volatile Organics by 8260C Summary Forms

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ALS Contract: HPJ019

Lab Code: VOA Case No.: SAS No.: SDG NO.: TMM-039

Lab File ID: 15061700.D BFB Injection Date: 6/17/2015

Instrument ID: ms15.i BFB Injection Time: 00:52

GC Column: RTXVMS ID: 0.25 (mm) Heated Purge: Y/N N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	17.3
75	30.0 - 60.0% of mass 95	49.0
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.9
173	Less than 2.0% of mass 174	0.5(0.6) 1
174	50.0 - 100.0% of mass 95	81.2
175	5.0 - 9.0% of mass 174	5.5 (6.8) 1
176	95.0 - 101.0% of mass 174	77.3 (95.2) 1
177	5.0 - 9.0% of mass 176	4.9 (6.4) 2

1-Value is % mass 174

2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
VSTD00.5	VSTD00.5	15061703.D	6/17/2015	01:45
1234	1234	15061704.D	6/17/2015	02:03
1235	1235	15061705.D	6/17/2015	02:20
1236	1236	15061706.D	6/17/2015	02:37
1237	1237	15061707.D	6/17/2015	02:54
1238	1238	15061708.D	6/17/2015	03:11
1239	1239	15061709.D	6/17/2015	03:28
2192630(MB)	2192630	15061713.D	6/17/2015	04:37
2192631(LCS)	2192631	15061714.D	6/17/2015	04:54
TB-061015	2076215015	15061716.D	6/17/2015	05:28
MRC-SW1A-061015	2076215001	15061717.D	6/17/2015	05:45
MRC-SW2A-061015	2076215002	15061718.D	6/17/2015	06:02
MRC-SW5A1-061015	2076215003	15061719.D	6/17/2015	06:20
MRC-SW5A2-061015	2076215004	15061720.D	6/17/2015	06:37
MRC-SW5B-061015	2076215005	15061721.D	6/17/2015	06:54
MRC-SW6A-061015	2076215006	15061722.D	6/17/2015	07:11
MRC-SW6B-061015	2076215007	15061723.D	6/17/2015	07:28
MRC-SW7A-061015	2076215008	15061724.D	6/17/2015	07:45
MRC-SW7B-061015	2076215009	15061725.D	6/17/2015	08:02
MRC-SW8A-061015	2076215010	15061726.D	6/17/2015	08:20

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ALS Contract: HPJ019

Lab Code: VOA Case No.: SAS No.: SDG NO.: TMM-039

Lab File ID: 15061700.D BFB Injection Date: 6/17/2015

Instrument ID: ms15.i BFB Injection Time: 00:52

GC Column: RTXVMS ID: 0.25 (mm) Heated Purge: Y/N N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	17.3
75	30.0 - 60.0% of mass 95	49.0
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.9
173	Less than 2.0% of mass 174	0.5(0.6) 1
174	50.0 - 100.0% of mass 95	81.2
175	5.0 - 9.0% of mass 174	5.5 (6.8) 1
176	95.0 - 101.0% of mass 174	77.3 (95.2) 1
177	5.0 - 9.0% of mass 176	4.9 (6.4) 2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
MRC-SW8B-061015	2076215011	15061727.D	6/17/2015	08:37
MRC-SW9A-061015	2076215012	15061728.D	6/17/2015	08:54
MRC-SW9B-061015	2076215013	15061729.D	6/17/2015	09:11
MRC-SWDUP-061015	2076215014	15061730.D	6/17/2015	09:28

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: ALS SDG No.: TMM-039

Instrument ID: ms15.i Calibration Date(s): 6/17/2015 6/17/2015

Heated Purge: (Y/N) N Calibration Time(s): 01:45 03:28

GC Column: RTXVMS ID: 0.25 (mm)

LAB FILE ID: RRF001 = 15061704.D RRF005 = 15061705.D RRF020 = 15061706.D RRF050 = 15061707.D

RRF100 = 15061708.D RRF200 = 15061709.D RRF00.5 = 15061703.D

COMPOUND	RRF001	RRF005	RRF020	RRF050	RRF100	CT
Acetone	0.02507	0.02334	0.02317	0.02184	0.02219	A
Acrolein	0.03677	0.04060	0.04258	0.04093	0.04220	A
Acrylonitrile	0.08402	0.09205	0.09453	0.09133	0.09679	A
Acetonitrile	0.03282	0.03230	0.03213	0.02996	0.03045	A
tert-Amyl Ethylether	22741	138762	672896	1832909	4047470	L
tert-Amyl methyl ether	29873	188554	906087	2372245	5162042	L
tert-Amyl Alcohol	0.01247	0.01261	0.01380	0.01393	0.01537	A
Benzene	103359	424102	1735184	4338872	9005639	Q
Benzyl Chloride	2094	12683	70744	238711	621845	Q
Bromobenzene	0.75395	0.94739	0.95603	0.95495	0.99381	A
Bromochloromethane	0.15660	0.16529	0.16689	0.16066	0.16756	A
Bromodichloromethane	0.32496	0.38097	0.39685	0.41006	0.43669	A
Bromoform *	6702	42582	205685	590101	1338449	L
Bromomethane	16816	77251	278279	593338	1173569	L
2-Butanone	0.02595	0.03117	0.03530	0.03432	0.03630	A
tert.- Butyl Alcohol	0.02159	0.02377	0.02373	0.02254	0.02338	A
tert-Butylbenzene	9957	71591	371476	988847	2105157	L
n-Butylbenzene	8080	65090	373513	1006472	2184294	L
sec-Butylbenzene	44546	364243	1904166	5053889	10807720	Q
Carbon Disulfide	0.66159	0.72702	0.75490	0.76077	0.80295	A
Carbon Tetrachloride	0.32306	0.38348	0.40778	0.40976	0.43059	A
Chloroacetonitrile	1406	8784	52280	132698	291963	Q
Chlorobenzene *	1.92656	2.22473	2.20500	2.18123	2.28177	A
1-Chlorobutane	0.26729	0.31728	0.31989	0.30694	0.31487	A
Chlorodibromomethane	12127	80799	381363	1028927	2295593	L
Chloroethane	0.25384	0.23902	0.23385	0.22292	0.22950	A
2-Chloroethylvinyl ether		440	2097	6156	13732	L
Chloroform **	57578	226212	853074	2065517	4246117	L
1-Chlorohexane	14828	94690	492720	1347225	2932385	L
Chloromethane *	0.42476	0.39743	0.38966	0.38053	0.39124	A
Chloroprene	0.39568	0.45325	0.45466	0.44269	0.46171	A
3-Chloro-1-propene	0.35189	0.38045	0.38182	0.37215	0.37364	A
o-Chlorotoluene	43016	301322	1479075	3859474	8261084	L
p-Chlorotoluene	35665	276208	1347932	3560535	7662785	Q

CT Column contains the Calibration Type. A - Average Response Factor, L - Linear Regression, and Q - Quadratic.
SPCC Compounds (*) with required minimum RRF.
CCC Compounds (**) with required maximum %RSD.

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: ALS SDG No.: TMM-039

Instrument ID: ms15.i Calibration Date(s): 6/17/2015 6/17/2015

Heated Purge: (Y/N) N Calibration Time(s): 01:45 03:28

GC Column: RTXVMS ID: 0.25 (mm)

LAB FILE ID: RRF001 = 15061704.D RRF005 = 15061705.D RRF020 = 15061706.D RRF050 = 15061707.D

RRF100 = 15061708.D RRF200 = 15061709.D RRF00.5 = 15061703.D

COMPOUND	RRF001	RRF005	RRF020	RRF050	RRF100	CT
Cyclohexane	0.37625	0.41344	0.44483	0.43515	0.45311	A
1,2-Dibromo-3-Chloropropane	0.11961	0.11106	0.11595	0.12692	0.14056	A
1,2-Dibromoethane	0.52535	0.58757	0.60247	0.61969	0.66595	A
Dibromomethane	0.15992	0.19123	0.18957	0.18516	0.19268	A
trans-1,4-Dichloro-2-butene	3065	19337	98908	270193	601570	L
1,2-Dichlorobenzene	1.40812	1.69443	1.67721	1.69477	1.78481	A
1,3-Dichlorobenzene	1.53586	1.82869	1.77292	1.78074	1.87441	A
1,4-Dichlorobenzene	1.70098	1.92429	1.82097	1.81702	1.91248	A
Dichlorodifluoromethane	0.44177	0.45472	0.46139	0.43133	0.44381	A
1,1-Dichloroethane *	0.50916	0.58977	0.57331	0.54843	0.56945	A
1,2-Dichloroethene, Total	44995	267877	1119957	2758733	5729991	L
1,2-Dichloroethane	0.37799	0.42508	0.42754	0.40766	0.41962	A
1,1-Dichloroethene **	0.37625	0.42406	0.42498	0.39977	0.40766	A
cis-1,2-Dichloroethene	0.36831	0.41527	0.41496	0.40417	0.42714	A
trans-1,2-Dichloroethene	0.36468	0.42529	0.41726	0.39542	0.40230	A
Dichlorofluoromethane	0.52244	0.59289	0.58106	0.55137	0.55851	A
1,1-Dichloro-2-Propanone	896	6523	33360	89811	196476	Q
2,2-Dichloropropane	0.30426	0.35709	0.36983	0.36951	0.39463	A
1,3-Dichloropropane	0.96935	1.12545	1.13514	1.13830	1.20075	A
1,2-Dichloropropane **	0.28469	0.30291	0.30773	0.30613	0.32547	A
1,1-Dichloropropene	0.35398	0.41365	0.43150	0.42552	0.44569	A
cis-1,3-Dichloropropene	18547	120669	571932	1608946	3565045	L
trans-1,3-Dichloropropene	15661	104544	528288	1450653	3188318	L
1,3-Dichloropropene, Total	34208	225213	1100220	3059599	6753363	L
Diisobutylene	91501	257478	952993	2315173	4785320	L
Diisopropyl ether	0.80322	0.92390	0.89531	0.87588	0.90990	A
1,4-Dioxane	0.00255	0.00258	0.00291	0.00290	0.00316	A
Ethyl Acetate	0.18653	0.20186	0.23460	0.23042	0.24654	A
Ethyl ether	0.16721	0.19249	0.18722	0.18479	0.18669	A
Ethyl Methacrylate	11715	82944	450569	1254130	2783565	L
Ethyl tert-butyl ether	0.67847	0.74178	0.81376	0.81006	0.87182	A
Ethylbenzene **	1.03687	1.11214	1.14985	1.14492	1.21224	A
Freon 113	0.26177	0.28269	0.27814	0.26021	0.25571	A
Heptane	0.13853	0.16992	0.19290	0.19392	0.20227	A

CT Column contains the Calibration Type. A - Average Response Factor, L - Linear Regression, and Q - Quadratic.
SPCC Compounds (*) with required minimum RRF.
CCC Compounds (**) with required maximum %RSD.

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: ALS SDG No.: TMM-039

Instrument ID: ms15.i Calibration Date(s): 6/17/2015 6/17/2015

Heated Purge: (Y/N) N Calibration Time(s): 01:45 03:28

GC Column: RTXVMS ID: 0.25 (mm)

LAB FILE ID: RRF001 = 15061704.D RRF005 = 15061705.D RRF020 = 15061706.D RRF050 = 15061707.D

RRF100 = 15061708.D RRF200 = 15061709.D RRF00.5 = 15061703.D

COMPOUND	RRF001	RRF005	RRF020	RRF050	RRF100	CT
Hexachlorobutadiene	0.41907	0.43372	0.42858	0.42003	0.44537	A
Hexachloroethane	0.39029	0.45002	0.47522	0.50598	0.56683	A
Hexane	0.52980	0.53574	0.53209	0.50979	0.51266	A
2-Hexanone	29277	192755	1076958	2872978	6203831	L
Iodomethane	2975	13842	114181	432168	1010714	Q
Isobutyl alcohol	3822	32360	152753	415393	901137	Q
Isopropyl Alcohol	0.01945	0.01582	0.01553	0.01461	0.01526	A
Isopropylbenzene	48137	354658	1833991	4951852	10563227	Q
p-Isopropyltoluene	9262	78532	426539	1140979	2478520	L
Methyl acetate	0.04754	0.04623	0.04912	0.04500	0.04599	A
Methyl acrylate	0.18560	0.20028	0.22835	0.23127	0.24917	A
Methacrylonitrile	6408	36122	155762	404529	839179	L
Methyl cyclohexane	0.90948	1.09199	1.12914	1.13124	1.18516	A
Methyl methacrylate	8753	50910	252756	710623	1572191	L
Methyl t-Butyl Ether	0.74363	0.76938	0.76361	0.75248	0.77272	A
4-Methyl-2-Pentanone(MIBK)	43813	308113	1606931	4244097	8906316	Q
Methylene Chloride	40654	132687	456467	1078930	2168780	Q
Naphthalene	25790	146929	923995	2897431	6727355	L
Nitrobenzene	4130	22792	114810	387309	1110457	Q
2-Nitropropane	10495	68671	361215	1018389	2245996	L
Octane	6369	36815	195993	529117	1120645	L
Pentachloroethane	0.50459	0.57042	0.60403	0.61973	0.65932	A
Pentane	0.23108	0.22058	0.20801	0.19152	0.18515	A
n-Propanol	0.01928	0.02112	0.02032	0.01934	0.01967	A
Propionitrile	0.03333	0.03673	0.03621	0.03599	0.03772	A
n-Propylbenzene	12979	99529	530028	1381579	2930659	L
Styrene	30692	226841	1230222	3277954	7024028	L
1,1,1,2-Tetrachloroethane	0.59718	0.72183	0.73006	0.74378	0.80179	A
1,1,2,2-Tetrachloroethane *	0.84836	0.93861	0.87130	0.85379	0.88224	A
Tetrachloroethene	0.71787	0.80554	0.72247	0.69472	0.71816	A
Tetrahydrofuran	0.05356	0.06076	0.06919	0.06938	0.07334	A
Toluene **	45665	233654	1065063	2729493	5727390	L
Total Xylenes	1.08494	1.23911	1.34777	1.39212	1.48760	A
1,2,3-Trichlorobenzene	12813	87607	472374	1261730	2786157	L

CT Column contains the Calibration Type. A - Average Response Factor, L - Linear Regression, and Q - Quadratic.

SPCC Compounds (*) with required minimum RRF.

CCC Compounds (**) with required maximum %RSD.

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: ALS SDG No.: TMM-039

Instrument ID: ms15.i Calibration Date(s): 6/17/2015 6/17/2015

Heated Purge: (Y/N) N Calibration Time(s): 01:45 03:28

GC Column: RTXVMS ID: 0.25 (mm)

LAB FILE ID: RRF001 = 15061704.D RRF005 = 15061705.D RRF020 = 15061706.D RRF050 = 15061707.D

RRF100 = 15061708.D RRF200 = 15061709.D RRF00.5 = 15061703.D

COMPOUND	RRF001	RRF005	RRF020	RRF050	RRF100	CT
1,2,4-Trichlorobenzene	14640	96109	510146	1412214	3144448	L
1,1,1-Trichloroethane	0.39967	0.45271	0.47262	0.45997	0.48400	A
1,1,2-Trichloroethane	0.52978	0.56443	0.56135	0.55147	0.57559	A
Trichloroethene	0.30742	0.32790	0.33334	0.32379	0.33408	A
Trichlorofluoromethane	0.52837	0.54294	0.55041	0.52067	0.53606	A
1,2,3-Trichloropropane	0.24969	0.29206	0.26739	0.27365	0.27579	A
1,2,4-Trimethylbenzene	41067	306267	1619953	4272767	9084125	Q
1,3,5-Trimethylbenzene	37665	302158	1584646	4176659	8864167	Q
Vinyl Acetate	3005	16185	82282	209518	459211	L
Vinyl Chloride **	0.34961	0.37934	0.37926	0.36707	0.38513	A
o-Xylene	22830	140070	707366	1934520	4187404	L
mp-Xylene	1.15481	1.30896	1.39176	1.41500	1.49864	A
4-Bromofluorobenzene	0.84731	0.82265	0.81238	0.83875	0.90207	A
Dibromofluoromethane	0.29142	0.28364	0.29187	0.28798	0.30440	A
1,2-Dichloroethane-d4	0.37051	0.35097	0.32783	0.32123	0.32437	A
Toluene-d8	2.32729	2.29567	2.40572	2.46188	2.68419	A

CT Column contains the Calibration Type. A - Average Response Factor, L - Linear Regression, and Q - Quadratic.
SPCC Compounds (*) with required minimum RRF.
CCC Compounds (**) with required maximum %RSD.

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: ALS SDG No.: TMM-039

Instrument ID: ms15.i Calibration Date(s): 6/17/2015 6/17/2015

Heated Purge: (Y/N) N Calibration Time(s): 01:45 03:28

GC Column: RTXVMS ID: 0.25 (mm)

LAB FILE ID: RRF001 = 15061704.D RRF005 = 15061705.D RRF020 = 15061706.D RRF050 = 15061707.D

RRF100 = 15061708.D RRF200 = 15061709.D RRF00.5 = 15061703.D

COMPOUND	RRF200	RRF00.5		CT	b	m1	m2	% RSD or R^2
Acetone	0.02116			A		0.022800		6.06654
Acrolein	0.04020	0.03659		A		0.039980		6.02969
Acrylonitrile	0.09500	0.07674		A		0.090060		7.96944
Acetonitrile	0.02921			A		0.031150		4.70005
tert-Amyl Ethylether	8956369	10747		L	0.000000	1.680340		0.99853
tert-Amyl methyl ether	11225678	13769		L	0.000000	1.333790		0.99926
tert-Amyl Alcohol	0.01629	0.01018		A		0.013520		14.92461
Benzene	14606763	80502		Q	0.000000	1.505570	-0.077680	0.99782
Benzyl Chloride	1499368			Q	0.000000	0.179470	0.012180	0.99856
Bromobenzene	0.95977	0.77894		A		0.906410		10.70370
Bromochloromethane	0.15341	0.15322		A		0.160520		3.87524
Bromodichloromethane	0.43428	0.31776		A		0.385940		12.51791
Bromoform *	3001900	3247		L	0.000000	1.956410		0.99758
Bromomethane	2347203			L	0.000000	6.202210		0.99655
2-Butanone	0.03564			A		0.033110		11.91075
tert.- Butyl Alcohol	0.02352			A		0.023090		3.72001
tert-Butylbenzene	4364529	5530		L	0.000000	1.315600		0.99955
n-Butylbenzene	4513403			L	0.000000	1.272610		0.99926
sec-Butylbenzene	15462550	22356		Q	0.000000	4.828710	-0.319170	0.99482
Carbon Disulfide	0.77142	0.71707		A		0.742250		6.12739
Carbon Tetrachloride	0.42668	0.32919		A		0.387220		11.48542
Chloroacetonitrile	648017			Q	0.000000	0.018810	0.000070	0.99971
Chlorobenzene *	2.09700	1.96426		A		2.125790		6.37170
1-Chlorobutane	0.30241	0.30853		A		0.305320		5.84950
Chlorodibromomethane	5016674	6442		L	0.000000	1.232740		0.99844
Chloroethane	0.19736			A		0.229410		8.22040
2-Chloroethylvinyl ether	51100			L	0.562240	287		0.95525
Chloroform **	8733761	41558		L	0.000000	1.684710		0.99936
1-Chlorohexane	6333781	8275		L	0.000000	0.972630		0.99903
Chloromethane *	0.36963			A		0.392210		4.75652
Chloroprene	0.45631	0.40131		A		0.437940		6.29968
3-Chloro-1-propene	0.33984	0.36098		A		0.365830		4.27003
o-Chlorotoluene	15410966	21209		L	0.000000	0.362590		0.99424
p-Chlorotoluene	13775085	18700		Q	0.000000	3.077270	-0.102250	0.99849
Cyclohexane	0.44896	0.40588		A		0.425370		6.60473
1,2-Dibromo-3-Chloropropane	0.14476	0.09802		A		0.122410		13.43355

CT Column contains the Calibration Type. A - Average Response Factor, L - Linear Regression, and Q - Quadratic.

SPCC Compounds (*) with required minimum RRF.

CCC Compounds (**) with required maximum %RSD.

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: ALS SDG No.: TMM-039

Instrument ID: ms15.i Calibration Date(s): 6/17/2015 6/17/2015

Heated Purge: (Y/N) N Calibration Time(s): 01:45 03:28

GC Column: RTXVMS ID: 0.25 (mm)

LAB FILE ID: RRF001 = 15061704.D RRF005 = 15061705.D RRF020 = 15061706.D RRF050 = 15061707.D

RRF100 = 15061708.D RRF200 = 15061709.D RRF00.5 = 15061703.D

COMPOUND	RRF200	RRF00.5		CT	b	m1	m2	% RSD or R^2
1,2-Dibromoethane	0.66482	0.48333		A		0.592740		11.50732
Dibromomethane	0.18756	0.16352		A		0.181380		7.54534
trans-1,4-Dichloro-2-butene	1303209	1436		L	0.000000	4.464570		0.99899
1,2-Dichlorobenzene	1.72643	1.47881		A		1.637800		8.47145
1,3-Dichlorobenzene	1.81479	1.55576		A		1.737600		7.78698
1,4-Dichlorobenzene	1.83996	1.73546		A		1.821590		4.54522
Dichlorodifluoromethane	0.42949			A		0.443750		2.83846
1,1-Dichloroethane *	0.55214	0.51336		A		0.550800		5.50475
1,2-Dichloroethene, Total	11800793	23804		L	0.000000	2.496480		0.99949
1,2-Dichloroethane	0.40050	0.36517		A		0.403360		5.94441
1,1-Dichloroethene **	0.38912	0.39416		A		0.402280		4.47187
cis-1,2-Dichloroethene	0.41507	0.37579		A		0.402960		5.51861
trans-1,2-Dichloroethene	0.37874	0.39027		A		0.396280		5.31466
Dichlorofluoromethane	0.53182	0.50397		A		0.548870		5.79912
1,1-Dichloro-2-Propanone	441766			Q	-0.002770	0.012890	0.000050	0.99982
2,2-Dichloropropane	0.39488	0.34705		A		0.362460		8.61041
1,3-Dichloropropane	1.18926	1.02796		A		1.112320		7.58131
1,2-Dichloropropane **	0.31997	0.26518		A		0.301730		6.87192
1,1-Dichloropropene	0.43693	0.35651		A		0.409110		9.31284
cis-1,3-Dichloropropene	7800084	9134		L	0.000000	0.793020		0.99839
trans-1,3-Dichloropropene	6934358	7294		L	0.000000	0.890300		0.99874
1,3-Dichloropropene, Total	14734442	16428		L	0.000000	0.838840		0.99856
Diisobutylene	10021406	79158		L	0.000000	1.475300		0.99965
Diisopropyl ether	0.83024	0.77001		A		0.858350		6.76990
1,4-Dioxane	0.00313			A		0.002870		9.14435
Ethyl Acetate	0.24526	0.18350		A		0.218390		12.43907
Ethyl ether	0.17840	0.17661		A		0.181920		4.64240
Ethyl Methacrylate	6020892	5422		L	0.000000	1.024640		0.99861
Ethyl tert-butyl ether	0.83962	0.66275		A		0.774040		10.45545
Ethylbenzene **	1.18822	1.23715		A		1.154480		5.81553
Freon 113	0.24886	0.26161		A		0.264140		4.56381
Heptane	0.20066	0.14839		A		0.178090		14.63829
Hexachlorobutadiene	0.43660	0.37835		A		0.423100		5.15004
Hexachloroethane	0.57928	0.43133		A		0.485560		14.36565
Hexane	0.48619	0.56672		A		0.524710		4.80767
2-Hexanone	12373966	14477		L	0.000000	2.439590		0.99858

CT Column contains the Calibration Type. A - Average Response Factor, L - Linear Regression, and Q - Quadratic.

SPCC Compounds (*) with required minimum RRF.

CCC Compounds (**) with required maximum %RSD.

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: ALS SDG No.: TMM-039

Instrument ID: ms15.i Calibration Date(s): 6/17/2015 6/17/2015

Heated Purge: (Y/N) N Calibration Time(s): 01:45 03:28

GC Column: RTXVMS ID: 0.25 (mm)

LAB FILE ID: RRF001 = 15061704.D RRF005 = 15061705.D RRF020 = 15061706.D RRF050 = 15061707.D

RRF100 = 15061708.D RRF200 = 15061709.D RRF00.5 = 15061703.D

COMPOUND	RRF200	RRF00.5		CT	b	m1	m2	% RSD or R^2
Iodomethane	2091300	1667		Q	0.000000	0.134620	0.001030	0.99742
Isobutyl alcohol	1992005	1623		Q	0.000000	0.012170	0.000020	0.99979
Isopropyl Alcohol	0.01487			A		0.015920		11.18158
Isopropylbenzene	15478189	24177		Q	0.000000	4.674960	-0.295890	0.99530
p-Isopropyltoluene	5142474	4687		L	0.000000	1.118050		0.99941
Methyl acetate	0.04452	0.05780		A		0.048030		9.53257
Methyl acrylate	0.24715	0.17803		A		0.217120		13.37554
Methacrylonitrile	1755991	3184		L	0.000000	8.425490		0.99974
Methyl cyclohexane	1.17562	0.96228		A		1.083560		9.84166
Methyl methacrylate	3400626	4816		L	0.000000	4.403130		0.99887
Methyl t-Butyl Ether	0.75036	0.77722		A		0.761340		1.66532
4-Methyl-2-Pentanone(MIBK)	14745792	19946		Q	0.000000	0.701480	-0.006490	0.99771
Methylene Chloride	4409137	27806		Q	0.011170	0.320710	-0.003840	0.99990
Naphthalene	13152896	16288		L	0.000000	0.432610		0.99657
Nitrobenzene	3111869	2683		Q	0.000000	0.025280	0.000430	0.99930
2-Nitropropane	4892772	5704		L	0.000000	6.313580		0.99854
Octane	2369746	2719		L	0.000000	2.582550		0.99960
Pentachloroethane	0.66846	0.48488		A		0.587350		12.18267
Pentane	0.17668			A		0.202170		10.52105
n-Propanol	0.01819			A		0.019660		5.07223
Propionitrile	0.03676	0.03084		A		0.035370		6.83922
n-Propylbenzene	6077490	6623		L	0.000000	0.944530		0.99959
Styrene	13282869	15148		L	0.000000	0.422340		0.99539
1,1,1,2-Tetrachloroethane	0.79831	0.62064		A		0.716230		11.16188
1,1,2,2-Tetrachloroethane *	0.85742	0.81829		A		0.867140		4.30617
Tetrachloroethene	0.69520	0.80321		A		0.736740		6.44984
Tetrahydrofuran	0.07268			A		0.066490		11.66503
Toluene **	11655491	32876		L	0.000000	0.519610		0.99934
Total Xylenes	1.26961	1.37325		A		1.313490		9.87473
1,2,3-Trichlorobenzene	5879797	7028		L	0.000000	0.982760		0.99936
1,2,4-Trichlorobenzene	6790089	7851		L	0.000000	0.856310		0.99899
1,1,1-Trichloroethane	0.47546	0.40333		A		0.449680		7.66744
1,1,2-Trichloroethane	0.56329	0.50161		A		0.549650		4.65046
Trichloroethene	0.32478	0.34103		A		0.327480		3.26314
Trichlorofluoromethane	0.51059			A		0.531510		2.75664
1,2,3-Trichloropropane	0.27009	0.22804		A		0.265250		7.78047

CT Column contains the Calibration Type. A - Average Response Factor, L - Linear Regression, and Q - Quadratic.

SPCC Compounds (*) with required minimum RRF.

CCC Compounds (**) with required maximum %RSD.

6A

VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: ALS SDG No.: TMM-039

Instrument ID: ms15.i Calibration Date(s): 6/17/2015 6/17/2015

Heated Purge: (Y/N) N Calibration Time(s): 01:45 03:28

GC Column: RTXVMS ID: 0.25 (mm)

LAB FILE ID: RRF001 = 15061704.D RRF005 = 15061705.D RRF020 = 15061706.D RRF050 = 15061707.D

RRF100 = 15061708.D RRF200 = 15061709.D RRF00.5 = 15061703.D

COMPOUND	RRF200	RRF00.5		CT	b	m1	m2	% RSD or R^2
1,2,4-Trimethylbenzene	14681987	25018		Q	0.000000	3.867170	-0.196440	0.99734
1,3,5-Trimethylbenzene	14397053	19894		Q	0.000000	3.768310	-0.189110	0.99747
Vinyl Acetate	970612	1273		L	0.000000	15.323330		0.99944
Vinyl Chloride **	0.37145			A		0.371980		3.41071
o-Xylene	8835464	12191		L	0.000000	0.693120		0.99935
mp-Xylene	1.18185	1.55566		A		1.358100		11.16539
4-Bromofluorobenzene	0.88254	1.09949		A		0.886460		11.18732
Dibromofluoromethane	0.29454			A		0.292310		2.39930
1,2-Dichloroethane-d4	0.31275			A		0.334610		6.49884
Toluene-d8	2.26660	2.79385		A		2.462170		8.23471

CT Column contains the Calibration Type. A - Average Response Factor, L - Linear Regression, and Q - Quadratic.
SPCC Compounds (*) with required minimum RRF.
CCC Compounds (**) with required maximum %RSD.

4A

VOLATILE METHOD BLANK SUMMARY

SAMPLE NO.

2192630

Lab Name: ALS Contract: HPJ019

Lab Code: VOA Case No.: SAS No.: SDG NO.: TMM-039

Lab File ID: 15061713.D Lab Sample ID: 2192630

Date Analyzed: 6/17/2015 Time Analyzed: 04:37

GC Column: RTXVMS ID: 0.25 (mm) Heated Purge: (Y/N) N

Instrument ID: ms15.i

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
2192631(LCS)	2192631	15061714.D	04:54
TB-061015	2076215015	15061716.D	05:28
MRC-SW1A-061015	2076215001	15061717.D	05:45
MRC-SW2A-061015	2076215002	15061718.D	06:02
MRC-SW5A1-061015	2076215003	15061719.D	06:20
MRC-SW5A2-061015	2076215004	15061720.D	06:37
MRC-SW5B-061015	2076215005	15061721.D	06:54
MRC-SW6A-061015	2076215006	15061722.D	07:11
MRC-SW6B-061015	2076215007	15061723.D	07:28
MRC-SW7A-061015	2076215008	15061724.D	07:45
MRC-SW7B-061015	2076215009	15061725.D	08:02
MRC-SW8A-061015	2076215010	15061726.D	08:20
MRC-SW8B-061015	2076215011	15061727.D	08:37
MRC-SW9A-061015	2076215012	15061728.D	08:54
MRC-SW9B-061015	2076215013	15061729.D	09:11
MRC-SWDUP-061015	2076215014	15061730.D	09:28

COMMENTS:

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

2192630(MB)

Lab Name: ALS Contract: HPJ019

Lab Code: VOA Case No.: SAS No.: SDG No.: TMM-039

Matrix (soil/water): WATER Lab Sample ID: 2192630

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: 15061713.D

Level (low/med): Date Received: 6/17/15

% Moisture: not dec. 100.0 Date Analyzed: 6/17/15

GC Column: RTXVMS ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	1.0	U
74-97-5	Bromochloromethane	1.0	U
75-27-4	Bromodichloromethane	1.0	U
75-25-2	Bromoform	1.0	U
74-83-9	Bromomethane	1.0	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon Disulfide	0.39	J
56-23-5	Carbon Tetrachloride	1.0	U
108-90-7	Chlorobenzene	1.0	U
124-48-1	Chlorodibromomethane	1.0	U
75-00-3	Chloroethane	1.0	U
67-66-3	Chloroform	1.0	U
74-87-3	Chloromethane	1.0	U
110-82-7	Cyclohexane	1.0	U
96-12-8	1,2-Dibromo-3-Chloropropane	7.0	U
106-93-4	1,2-Dibromoethane	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
541-73-1	1,3-Dichlorobenzene	0.25	J
106-46-7	1,4-Dichlorobenzene	0.32	J
75-71-8	Dichlorodifluoromethane	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	U
123-91-1	1,4-Dioxane	320	U
100-41-4	Ethylbenzene	1.0	U
76-13-1	Freon 113	1.0	U
591-78-6	2-Hexanone	5.0	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

2192630(MB)

Lab Name: ALS Contract: HPJ019

Lab Code: VOA Case No.: SAS No.: SDG No.: TMM-039

Matrix (soil/water): WATER Lab Sample ID: 2192630

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: 15061713.D

Level (low/med): Date Received: 6/17/15

% Moisture: not dec. 100.0 Date Analyzed: 6/17/15

GC Column: RTXVMS ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
98-82-8	Isopropylbenzene	1.0	U
79-20-9	Methyl acetate	2.0	U
108-87-2	Methyl cyclohexane	1.0	U
1634-04-4	Methyl t-Butyl Ether	1.0	U
108-10-1	4-Methyl-2-Pentanone(MIBK)	5.0	U
75-09-2	Methylene Chloride	1.0	U
100-42-5	Styrene	1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U
127-18-4	Tetrachloroethene	1.0	U
108-88-3	Toluene	1.0	U
87-61-6	1,2,3-Trichlorobenzene	2.0	U
120-82-1	1,2,4-Trichlorobenzene	2.0	U
71-55-6	1,1,1-Trichloroethane	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
79-01-6	Trichloroethene	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
75-01-4	Vinyl Chloride	1.0	U
95-47-6	o-Xylene	1.0	U
108383/106423	mp-Xylene	2.0	U

3A

WATER VOLATILE LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: ALS Contract: HPJ019

Lab Code: VOA Case No.: SAS No.: SDG No.: TMM-039

Laboratory Control Spike - Sample No: 2192631

COMPOUND	SPIKE ADDED (ug/L)		LCS CONCENTRATION (ug/L)	LCS % REC#	QC LIMIT REC
Acetone	100		96.8	96.8	(40-151)
Benzene	20.0		17.6	87.8	(80-124)
Bromochloromethane	20.0		20.7	104	(73-117)
Bromodichloromethane	20.0		20.8	104	(79-126)
Bromoform	20.0		16.7	83.6	(70-123)
Bromomethane	20.0		24.2	121	(45-148)
2-Butanone	100		104	104	(50-152)
Carbon Disulfide	20.0		18.8	94.1	(57-131)
Carbon Tetrachloride	20.0		21.6	108	(62-132)
Chlorobenzene	20.0		21.3	106	(85-117)
Chlorodibromomethane	20.0		17.4	87.1	(77-122)
Chloroethane	20.0		18.1	90.3	(51-142)
Chloroform	20.0		21.2	106	(78-122)
Chloromethane	20.0		20.2	101	(38-156)
Cyclohexane	20.0		21.4	107	(66-130)
1,2-Dibromo-3-Chloropro	20.0		20.1	100	(59-133)
1,2-Dibromoethane	20.0		21.1	105	(80-124)
1,2-Dichlorobenzene	20.0		21.0	105	(82-118)
1,3-Dichlorobenzene	20.0		21.2	106	(81-118)
1,4-Dichlorobenzene	20.0		20.9	105	(81-116)
Dichlorodifluoromethane	20.0		17.7	88.3	(17-166)
1,1-Dichloroethane	20.0		20.3	101	(78-124)
1,2-Dichloroethane	20.0		20.8	104	(70-133)
1,1-Dichloroethene	20.0		20.5	103	(63-128)
cis-1,2-Dichloroethene	20.0		20.8	104	(78-125)
trans-1,2-Dichloroethen	20.0		21.5	107	(71-122)
1,2-Dichloropropane	20.0		21.3	107	(81-127)
cis-1,3-Dichloropropene	20.0		16.4	82.2	(81-121)
trans-1,3-Dichloroprope	20.0		17.4	87	(78-126)

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits

Spike Recovery: 0 out of 52 outside limits

Comments:

Form III VOA-1

3A

WATER VOLATILE LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: ALS Contract: HPJ019

Lab Code: VOA Case No.: SAS No.: SDG No.: TMM-039

Laboratory Control Spike - Sample No: 2192631

COMPOUND	SPIKE ADDED (ug/L)		LCS CONCENTRATION (ug/L)	LCS % REC#	QC LIMIT REC
1,4-Dioxane	500		453	90.7	(1-280)
Ethylbenzene	20.0		20.5	102	(80-124)
Freon 113	20.0		20.4	102	(50-130)
2-Hexanone	100		94.7	94.7	(65-154)
Isopropylbenzene	20.0		16.4	82.2	(73-129)
Methyl acetate	20.0		19.3	96.5	(70-130)
Methyl cyclohexane	20.0		21.3	107	(70-130)
Methyl t-Butyl Ether	20.0		19.4	96.9	(69-115)
4-Methyl-2-Pentanone(MI	100		85.2	85.2	(71-146)
Methylene Chloride	20.0		20.0	100	(76-121)
Styrene	20.0		20.9	105	(79-123)
1,1,2,2-Tetrachloroetha	20.0		20.7	103	(74-135)
Tetrachloroethene	20.0		20.4	102	(72-124)
Toluene	20.0		20.3	102	(80-125)
1,2,3-Trichlorobenzene	20.0		17.3	86.3	(61-126)
1,2,4-Trichlorobenzene	20.0		16.7	83.5	(67-123)
1,1,1-Trichloroethane	20.0		21.0	105	(66-130)
1,1,2-Trichloroethane	20.0		21.0	105	(82-126)
Trichloroethene	20.0		20.8	104	(77-124)
Trichlorofluoromethane	20.0		19.3	96.3	(38-123)
Vinyl Chloride	20.0		19.7	98.6	(27-138)
o-Xylene	20.0		17.9	89.5	(79-124)
mp-Xylene	40.0		42.6	107	(79-125)

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits

Spike Recovery: 0 out of 52 outside limits

Comments:

Form III VOA-1

2A

WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: ALS Contract: HPJ019

Lab Code: VOA CASE No.: SAS No.: SDG NO.: TMM-039

	Sample NO.	SMC1 (BFB) #	SMC2 (DBFM)	SMC3 (DCE) #	SMC4 (TOL) #	TOT OUT
01	2192630(MB)	101	89.6	88.2	98.2	0
02	2192631(LCS)	96.1	88.3	85.1	95.2	0
03	TB-061015	99.7	91.4	89.4	99.7	0
04	MRC-SW1A-061015	101	89.3	89.4	99.3	0
05	MRC-SW2A-061015	100	90.7	90.5	99.6	0
06	MRC-SW5A1-061015	98.8	89.6	89.3	100	0
07	MRC-SW5A2-061015	95.2	91.3	89.8	96.9	0
08	MRC-SW5B-061015	96.0	93.0	92.8	98.5	0
09	MRC-SW6A-061015	98.9	92.4	91.3	99.7	0
10	MRC-SW6B-061015	99.1	90.8	91.6	98.6	0
11	MRC-SW7A-061015	100	93.2	92.6	99.8	0
12	MRC-SW7B-061015	99.5	94.3	94.7	99.9	0
13	MRC-SW8A-061015	97.2	92.4	91.5	98.8	0
14	MRC-SW8B-061015	97.6	92.6	92.4	99.3	0
15	MRC-SW9A-061015	98.7	94.1	93.2	99.4	0
16	MRC-SW9B-061015	99.0	92.4	92.2	98.0	0
17	MRC-SWDUP-061015	99.5	93.0	92.4	99.2	0

	QC LIMITS
SMC1 (BFB) = 4-Bromofluorobenzene	(79-114)
SMC2 (DBFM) = Dibromofluoromethane	(78-116)
SMC3 (DCE) = 1,2-Dichloroethane-d4	(62-133)
SMC4 (TOL) = Toluene-d8	(76-127)

Column to be used to flag recovery values

* Values outside of contract required QC Limits

D Surrogate Diluted Out

8A

VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ALS Contract: HPJ019

Lab Code: VOA Case No.: SAS No.: SDG No.: TMM-039

Lab File ID: 15061707.D Date Analyzed: 6/17/2015

Instrument ID: ms15.i Time Analyzed: 02:54

GC Column: RTXVMS ID: 0.2 (mm) Heated Purge: (Y/N) N

	IS1 AREA #	RT#	IS2 AREA #	RT #	IS3 AREA #	RT #
12 HOUR STD	862124	5.913	797335	7.686	2070111	3.910
UPPER LIMIT	1724248	6.413	1594670	8.186	4140222	4.410
LOWER LIMIT	431062	5.413	398668	7.186	1035056	3.410
SAMPLE NO.						
2192630(MB)	745840	5.913	629608	7.686	1915463	3.910
2192631(LCS)	839992	5.912	778199	7.686	2016972	3.910
TB-061015	701390	5.912	602733	7.686	1823751	3.910
MRC-SW1A-061015	707385	5.913	596470	7.686	1859455	3.910
MRC-SW2A-061015	689235	5.912	578861	7.686	1814160	3.910
MRC-SW5A1-061015	679107	5.912	571982	7.686	1831176	3.910
MRC-SW5A2-061015	680814	5.912	575581	7.686	1783440	3.910
MRC-SW5B-061015	665175	5.913	565361	7.686	1734258	3.910
MRC-SW6A-061015	674941	5.913	559589	7.686	1772162	3.910
MRC-SW6B-061015	678478	5.912	568128	7.686	1813806	3.910
MRC-SW7A-061015	661885	5.912	546620	7.686	1730047	3.910
MRC-SW7B-061015	665522	5.912	559678	7.686	1714322	3.910
MRC-SW8A-061015	681887	5.913	570751	7.686	1776754	3.910
MRC-SW8B-061015	675659	5.913	567984	7.686	1780723	3.910
MRC-SW9A-061015	675286	5.912	557354	7.686	1742137	3.910
MRC-SW9B-061015	665753	5.913	550586	7.686	1756226	3.910
MRC-SWDUP-061015	662946	5.913	546422	7.686	1749651	3.910

IS1 = Chlorobenzene-d5
IS2 = 1,4-Dichlorobenzene-d4
IS3 = Fluorobenzene

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = -50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

Form VIII VOA-1

Semivolatile Organics by 522 Summary Forms

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

GC Column: ZB-625 ID: 0.25(mm) Init. Calib. Date(s): 08/13/14 08/13/14

Instrument ID: MS12

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 8.38

	SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT #	RT #
01	1000	1000	08/13/14	1534		
02	1234	1234	08/13/14	1643	8.38	
03	1235	1235	08/13/14	1713	8.36	
04	1236	1236	08/13/14	1742	8.38	
05	1237	1237	08/13/14	1814	8.38	
06	1238	1238	08/13/14	1845	8.38	
07	1239	1239	08/13/14	1918	8.38	
08	1240	1240	08/13/14	1950	8.38	
09	1241	1241	08/13/14	2018	8.36	
10	1242	1242	08/13/14	2046	8.38	
11	ICV	ICV	08/13/14	2119	8.38	
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						

QC LIMITS
S1 = 1,4-Dioxane-d8 (+/- 0.64 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

GC Column: ZB-625 ID: 0.25(mm) Init. Calib. Date(s): 08/13/14 08/13/14

Instrument ID: MS12

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
S1 : 8.36

	SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	S1 RT	#	RT	#
01	1800	1800	06/21/15	1947	8.36			
02	2194281	2194281	06/21/15	2031	8.36			
03	2194282LCS	2194282	06/21/15	2056	8.36			
04	MRC-SW1A-061	2076215001	06/22/15	0112	8.36			
05	MIDCHECK-5	MIDCHECK-5	06/22/15	0137	8.36			
06	MRC-SW2A-061	2076215002	06/22/15	0203	8.36			
07								
08								
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								

QC LIMITS
S1 = 1,4-Dioxane-d8 (+/- 0.03 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

Date : 13-AUG-2014 15:34

Client ID:

Instrument: ms12.i

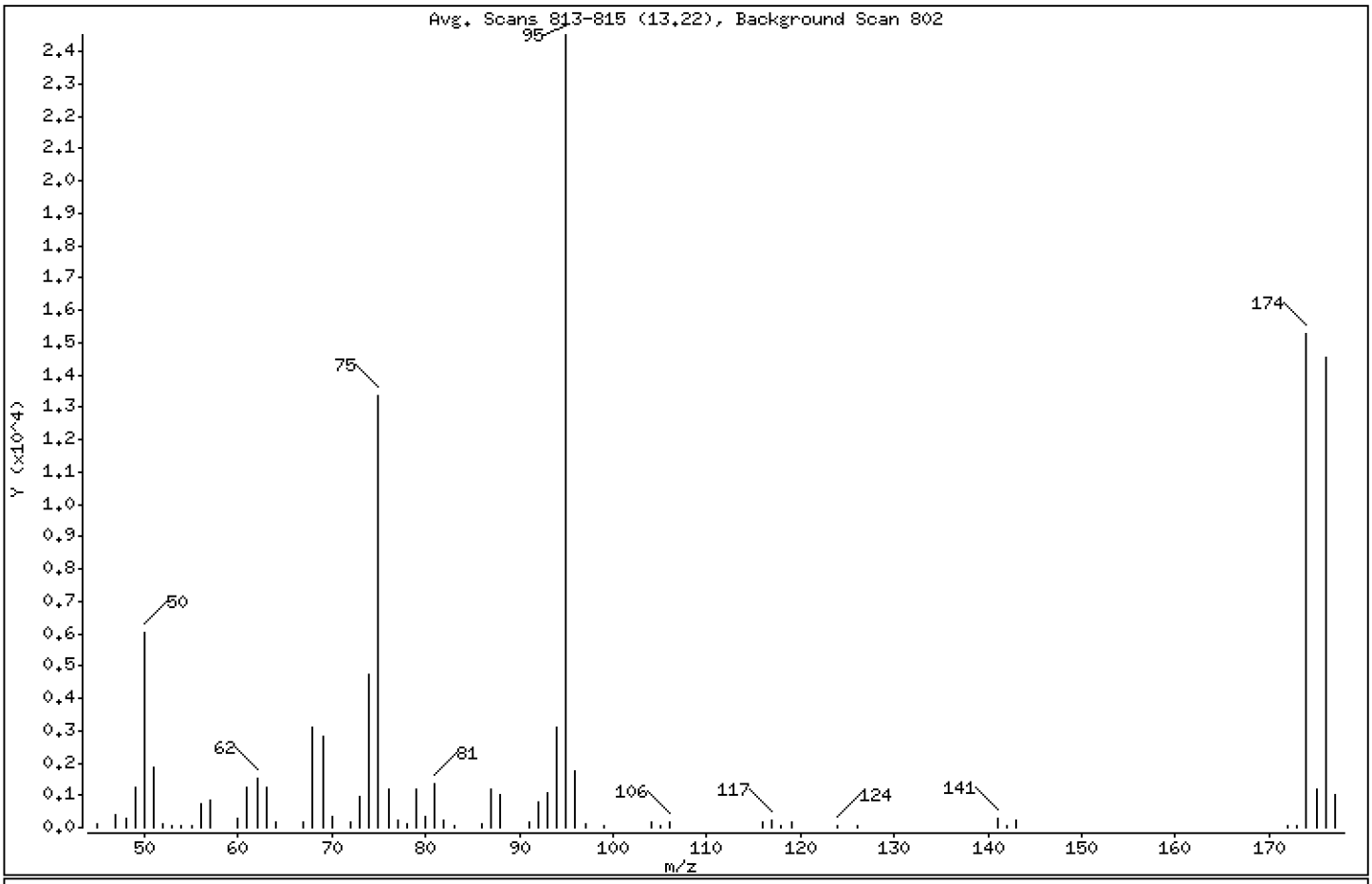
Sample Info: 1000;1;3;;BFB;;;;;

Operator: DHF

Column phase: RTX-VMS

Column diameter: 0.25

1 bfb



m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
95	Base Peak, 100% relative abundance	100.00
50	15.00 - 40.00% of mass 95	24.55
75	30.00 - 60.00% of mass 95	54.58
96	5.00 - 9.00% of mass 95	7.14
173	Less than 2.00% of mass 174	0.18 (0.29)
174	Greater than 50.00% of mass 95	62.30
175	5.00 - 9.00% of mass 174	4.91 (7.88)
176	95.00 - 101.00% of mass 174	59.23 (95.06)
177	5.00 - 9.00% of mass 176	4.21 (7.12)

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: MS12 Calibration Date(s): 08/13/14 08/13/14

Column: ZB-625 ID: 0.25 (mm) Calibration Time(s): 1643 2046

LAB FILE ID: RF0.02: 12081303 RF0.05: 12081304 RF0.1: 12081305
RF0.2: 12081306 RF0.5: 12081307 RF1: 12081308

COMPOUND	RF0.02	RF0.05	RF0.1	RF0.2	RF0.5	RF1
1,4-Dioxane	249	394	889	1829	4280	8555
1,4-Dioxane-d8	0.708	0.704	0.721	0.709	0.711	0.706

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: MS12 Calibration Date(s): 08/13/14 08/13/14

Column: ZB-625 ID: 0.25 (mm) Calibration Time(s): 1643 2046

LAB FILE ID: RF1.5: 12081309 RF2: 12081310 RF3: 12081311

COMPOUND	RF1.5	RF2	RF3
1,4-Dioxane	16492	40374	79045
1,4-Dioxane-d8	0.712	0.719	0.716

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: MS12 Calibration Date(s): 08/13/14 08/13/14

Column: ZB-625 ID: 0.25 (mm) Calibration Time(s): 1643 2046

COMPOUND	CURVE	COEFFICENTS A0	COEFFICENTS A1	%RSD OR R^2	MAX %RSD OR R^2
1,4-Dioxane	WLINR	-0.0000000	0.78373624	0.9995378	0.9900000
1,4-Dioxane-d8	AVRG		0.71178329	0.828	30.000

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: MS12 Calibration Date(s): 08/13/14 08/13/14

Column: ZB-625 ID: 0.25 (mm) Calibration Time(s): 1643 2046

LAB FILE ID: RT1: 12081303 RT2: 12081304 RT3: 12081305
RT4: 12081306 RT5: 12081307 RT6: 12081308

COMPOUND	RT1	RT2	RT3	RT4	RT5	RT6
1,4-Dioxane	8.451	8.437	8.451	8.451	8.451	8.451
1,4-Dioxane-d8	8.379	8.364	8.378	8.379	8.378	8.379

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: MS12 Calibration Date(s): 08/13/14 08/13/14

Column: ZB-625 ID: 0.25 (mm) Calibration Time(s): 1643 2046

LAB FILE ID: RT7: 12081309 RT8: 12081310 RT9: 12081311

COMPOUND	RT7	RT8	RT9	MEAN RT	RT WINDOW FROM	RT WINDOW TO
1,4-Dioxane	8.451	8.437	8.437	8.446	7.801	9.072
1,4-Dioxane-d8	8.378	8.364	8.379	8.375	7.743	9.014

FORM VI SV

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
_____
| INITIAL CALIB |
|RATION VERIFICA|
|_____TION_____|

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Matrix: (soil/water) WATER Lab Sample ID: ICV

Sample wt/vol: 100.0 (g/mL) ML Lab File ID: 12081312

Level: (low/med) LOW

% Moisture: _____ Decanted: (Y/N)___

Concentrated Extract Volume: 2000(uL) Date Analyzed: 08/13/14

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
123-91-1	1,4-Dioxane	1.8	_____

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: MS12 Calibration Date: 06/21/15 Time: 1947

Lab File ID: 12062101 Init. Calib. Date(s): 08/13/14 08/13/14

Init. Calib. Times: 1643 2046

GC Column: ZB-625 ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF5e-002 or AMOUNT	CCAL RRF5e-002	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1,4-Dioxane	3.71e-003	3.5e-003	1.2048116	0.00001	6.00	30.00	WLNR
1,4-Dioxane-d8	0.7120000	0.6142641	0.6142641	0.00001	-13.73	30.00	AVRG

FORM VII SV

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: MS12 Calibration Date: 06/22/15 Time: 0137

Lab File ID: 12062114 Init. Calib. Date(s): 08/13/14 08/13/14

Init. Calib. Times: 1643 2046

GC Column: ZB-625 ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF0.5000 or AMOUNT	CCAL RRF0.5000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
1,4-Dioxane	4.08e-002	5.e-002	1.5636990	0.00001	-18.40	30.00	WLNR
1,4-Dioxane-d8	0.7120000	0.6321059	0.6321059	0.00001	-11.22	30.00	AVRG

FORM VII SV

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

SAMPLE NO.
2194281

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Lab File ID: 12062102 Lab Sample ID: 2194281

Instrument ID: MS12 Date Extracted: 06/19/15

Matrix: (soil/water) WATER Date Analyzed: 06/21/15

Level:(low/med) LOW Time Analyzed: 2031

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	2194282LCS	2194282	12062103	06/21/15
02	MRC-SW1A-061	2076215001	12062113	06/22/15
03	MRC-SW2A-061	2076215002	12062115	06/22/15
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
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29				
30				

COMMENTS:

FORM 1

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

2194281

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Matrix: (soil/water) WATER Lab Sample ID: 2194281

Sample wt/vol: 100.0 (g/mL) ML Lab File ID: 12062102

Level: (low/med) LOW Date Received: 06/19/15

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 06/19/15

Concentrated Extract Volume: 2000(uL) Date Analyzed: 06/21/15

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
123-91-1	1,4-Dioxane	0.070	U

FORM I SV

FORM 3
WATER SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Matrix Spike - Sample No.: INITIAL CALIBRATION VERIFICATION

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
1,4-Dioxane	2.00000	0.00	1.75631	88	80-120

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: _____ZB-625_____

FORM III SV

FORM 3
WATER SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Matrix Spike - Sample No.: 2194282LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC	#	QC. LIMITS REC.
1,4-Dioxane	7.e-002	0.00	0.0563449	80		50-150

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 1 outside limits

COMMENTS: _____ZB-625_____

FORM III SV

FORM 2
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

	SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	2194281	77								0
02	2194282LCS	80								0
03	MRC-SW1A-061	82								0
04	MRC-SW2A-061	82								0
05										
06										
07										
08										
09										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

QC LIMITS
S1 = 1,4-Dioxane-d8 (70-130)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

EPA Sample No. (SSTD050##): 1800 Date Analyzed: 06/21/15

Lab File ID (Standard): 12062101 Time Analyzed: 1947

Instrument ID: MS12 GC Column: ZB-625 ID:0.25(mm)

	IS1 AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	47504	6.35				
	UPPER LIMIT	61755	6.85				
	LOWER LIMIT	33253	5.85				
	SAMPLE NO.						
01	2194281	48862	6.35				
02	2194282LCS	53669	6.35				
03	MRC-SW1A-061	55268	6.35				
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 = Tetrahydrofuran-d8

AREA UPPER LIMIT = + 30% of internal standard area
AREA LOWER LIMIT = - 30% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits

FORM VIII SV

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

EPA Sample No. (SSTD050##): MIDCHECK-5 Date Analyzed: 06/22/15

Lab File ID (Standard): 12062114 Time Analyzed: 0137

Instrument ID: MS12 GC Column: ZB-625 ID:0.25(mm)

	IS1 AREA #	RT #	AREA #	RT #	AREA #	RT #
12 HOUR STD	56731	6.35				
UPPER LIMIT	73750	6.85				
LOWER LIMIT	39712	5.85				
SAMPLE NO.						
01 MRC-SW2A-061	55676	6.35				
02						
03						
04						
05						
06						
07						
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20						
21						
22						

IS1 = Tetrahydrofuran-d8

AREA UPPER LIMIT = + 30% of internal standard area
AREA LOWER LIMIT = - 30% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits

FORM VIII SV

PCBs by Method 8082 Summary Forms

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

GC Column: RTX-CLPEST ID: 0.32(mm) Init. Calib. Date(s): 06/09/15 06/09/15

Instrument ID: GC23

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
TCX: 2.07 DCB: 5.97

	LAB	DATE	TIME	TCX	DCB
	SAMPLE NO.	SAMPLE ID	ANALYZED	ANALYZED	RT #	RT #
01	1016_1260ICA	1016_1260ICA	06/09/15	2026	2.06	5.97
02	1016_1260ICA	1016_1260ICA	06/09/15	2037	2.07	5.97
03	1016_1260ICA	1016_1260ICA	06/09/15	2049	2.06	5.97
04	1016_1260ICA	1016_1260ICA	06/09/15	2100	2.06	5.97
05	1016_1260ICA	1016_1260ICA	06/09/15	2112	2.06	5.97
06	1016_1260ICA	1016_1260ICA	06/09/15	2123	2.07	5.97
07	1016_1260ICV	1016_1260ICV	06/09/15	2245	2.07	5.97
08						
09						
10						
11						
12						
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30						
31						
32						

QC LIMITS
TCX = Tetrachloro-m-xylene (+/- 0.03 MINUTES)
DCB = Decachlorobiphenyl (+/- 0.03 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

GC Column: RTX-CLPEST2 ID: 0.32(mm) Init. Calib. Date(s): 06/09/15 06/09/15

Instrument ID: GC23

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
TCX: 2.35 DCB: 6.66

	SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TCX RT	#	DCB RT	#
01	1016_1260ICA	1016_1260ICA	06/09/15	2026	2.35		6.66	
02	1016_1260ICA	1016_1260ICA	06/09/15	2037	2.35		6.66	
03	1016_1260ICA	1016_1260ICA	06/09/15	2049	2.35		6.66	
04	1016_1260ICA	1016_1260ICA	06/09/15	2100	2.35		6.66	
05	1016_1260ICA	1016_1260ICA	06/09/15	2112	2.35		6.66	
06	1016_1260ICA	1016_1260ICA	06/09/15	2123	2.35		6.66	
07	1016_1260ICV	1016_1260ICV	06/09/15	2245	2.35		6.66	
08								
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
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26								
27								
28								
29								
30								
31								
32								

QC LIMITS
TCX = Tetrachloro-m-xylene (+/- 0.03 MINUTES)
DCB = Decachlorobiphenyl (+/- 0.03 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

GC Column: RTX-CLPEST ID: 0.32(mm) Init. Calib. Date(s): 06/09/15 06/09/15

Instrument ID: GC23

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
TCX: 2.09 DCB: 5.97

	SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TCX RT #	DCB RT #
01	1016_1260CCV	1016_1260CCV	06/17/15	1745	2.07	5.97
02	2192536	2192536	06/17/15	1819	2.07	5.97
03	2192537LCS	2192537	06/17/15	1831	2.07	5.97
04	MRC-SW7A-061	2076215008	06/17/15	1843	2.07	5.97
05	MRC-SW7B-061	2076215009	06/17/15	1854	2.07	5.97
06	MRC-SW9A-061	2076215012	06/17/15	1906	2.07	5.97
07	MRC-SW9B-061	2076215013	06/17/15	1917	2.07	5.97
08	MRC-SW6A-061	2076215006	06/17/15	1929	2.07	5.97
09	MRC-SW6B-061	2076215007	06/17/15	1941	2.07	5.97
10	MRC-SW8A-061	2076215010	06/17/15	1952	2.07	5.97
11	MRC-SW8B-061	2076215011	06/17/15	2004	2.07	5.97
12	MRC-SW5A2-06	2076215004	06/17/15	2015	2.07	5.97
13	MRC-SW5A2-06	2192538	06/17/15	2027	2.07	5.97
14	MRC-SW5A1-06	2076215003	06/17/15	2038	2.07	5.97
15	MRC-SW5B-061	2076215005	06/17/15	2050	2.07	5.97
16	1016_1260CCV	1016_1260CCV	06/17/15	2147	2.07	5.97
17						
18						
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27						
28						
29						
30						
31						
32						

QC LIMITS

TCX = Tetrachloro-m-xylene (+/- 0.03 MINUTES)
DCB = Decachlorobiphenyl (+/- 0.03 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 8
SEMIVOLATILE ANALYTICAL SEQUENCE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

GC Column: RTX-CLPEST ID: 0.32(mm) Init. Calib. Date(s): 06/09/15 06/09/15

Instrument ID: GC23

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

MEAN SURROGATE RT FROM INITIAL CALIBRATION
TCX: 2.09 DCB: 5.97

	LAB	DATE	TIME	TCX	DCB
	SAMPLE NO.	SAMPLE ID	ANALYZED	ANALYZED	RT #	RT #
01	1016_1260CCV	1016_1260CCV	06/17/15	1745	2.36*	6.66*
02	2192536	2192536	06/17/15	1819	2.36*	6.66*
03	2192537LCS	2192537	06/17/15	1831	2.36*	6.66*
04	MRC-SW7A-061	2076215008	06/17/15	1843	2.36*	6.66*
05	MRC-SW7B-061	2076215009	06/17/15	1854	2.36*	6.66*
06	MRC-SW9A-061	2076215012	06/17/15	1906	2.36*	6.66*
07	MRC-SW9B-061	2076215013	06/17/15	1917	2.36*	6.66*
08	MRC-SW6A-061	2076215006	06/17/15	1929	2.36*	6.66*
09	MRC-SW6B-061	2076215007	06/17/15	1941	2.36*	6.66*
10	MRC-SW8A-061	2076215010	06/17/15	1952	2.36*	6.66*
11	MRC-SW8B-061	2076215011	06/17/15	2004	2.36*	6.66*
12	MRC-SW5A2-06	2076215004	06/17/15	2015	2.36*	6.66*
13	MRC-SW5A2-06	2192538	06/17/15	2027	2.36*	6.66*
14	MRC-SW5A1-06	2076215003	06/17/15	2038	2.36*	6.66*
15	MRC-SW5B-061	2076215005	06/17/15	2050	2.36*	6.66*
16	1016_1260CCV	1016_1260CCV	06/17/15	2147	2.36*	6.66*
17						
18						
19						
20						
21						
22						
23						
24						
25						
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27						
28						
29						
30						
31						
32						

QC LIMITS

TCX = Tetrachloro-m-xylene (+/- 0.03 MINUTES)
DCB = Decachlorobiphenyl (+/- 0.03 MINUTES)

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

FORM VIII SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date(s): 06/09/15 06/09/15

Column: RTX-CLPEST ID: 0.32 (mm) Calibration Time(s): 2026 2123

LAB FILE ID: RF0.1: NF9A037 RF0.2: NF9A038 RF0.4: NF9A039
RF1: NF9A040 RF2: NF9A041 RF4: NF9A042

COMPOUND	RF0.1	RF0.2	RF0.4	RF1	RF2	RF4
Aroclor 1016	5524	10699	20120	53066	96042	178313
(2)	8553	17543	33551	96749	183159	342993
(3)	4036	8025	15467	42014	77379	146352
(4)	2572	5395	11315	30015	56738	102333
(5)	2135	4002	9134	24479	44071	72204
Aroclor 1260	6583	9131	17636	49582	89528	164248
(2)	3127	5623	11179	31205	57349	105867
(3)	6854	9666	18743	53544	100266	186651
(4)	12416	21865	43309	127097	220297	392423
(5)	5522	9648	19036	59029	105667	213944
Tetrachloro-m-xylene	12575	24990	49097	139335	259479	491451
Decachlorobiphenyl	18833	23118	36837	93244	167572	323475

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date(s): 06/09/15 06/09/15

Column: RTX-CLPEST ID: 0.32 (mm) Calibration Time(s): 2026 2123

COMPOUND	CURVE	COEFFICENTS A0	A1	A2	%RSD OR R^2	MAX %RSD OR R^2
Aroclor 1016	2ORDR	0.00000000	52973.0894	-2113.1886	0.9996641	0.9900000
(2)	2ORDR	0.00000000	97063.4366	-2817.6233	0.9996963	0.9900000
(3)	2ORDR	0.00000000	41638.9421	-1269.7790	0.9997109	0.9900000
(4)	2ORDR	0.00000000	30946.6729	-1336.9334	0.9998773	0.9900000
(5)	2ORDR	0.00000000	25858.6500	-1948.1541	0.9996238	0.9900000
Aroclor 1260	2ORDR	0.00000000	49513.8773	-2121.4462	0.9993510	0.9900000
(2)	2ORDR	0.00000000	31243.4896	-1195.9891	0.9996456	0.9900000
(3)	2ORDR	0.00000000	53798.8564	-1782.8465	0.9995273	0.9900000
(4)	2ORDR	0.00000000	125786.246	-6946.5477	0.9989124	0.9900000
(5)	2ORDR	0.00000000	54588.6795	-295.46743	0.9988725	0.9900000
Tetrachloro-m-xylene	2ORDR	0.00000000	1379507.10	-377626.85	0.9996691	0.9900000
Decachlorobiphenyl	2ORDR	0.00000000	920318.867	-285285.42	0.9987574	0.9900000

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date(s): 06/09/15 06/09/15

Column: RTX-CLPEST ID: 0.32 (mm) Calibration Time(s): 2026 2123

LAB FILE ID: RT1: NF9A037 RT2: NF9A038 RT3: NF9A039
RT4: NF9A040 RT5: NF9A041 RT6: NF9A042

COMPOUND	RT1	RT2	RT3	RT4	RT5	RT6
Aroclor 1016	2.480	2.480	2.480	2.480	2.480	2.480
(2)	2.780	2.780	2.780	2.780	2.780	2.780
(3)	2.860	2.870	2.860	2.860	2.860	2.860
(4)	2.910	2.910	2.910	2.910	2.910	2.910
(5)	2.990	2.990	2.990	2.990	2.990	2.990
Aroclor 1260	4.620	4.620	4.620	4.620	4.620	4.620
(2)	4.660	4.660	4.660	4.660	4.660	4.660
(3)	4.800	4.810	4.810	4.810	4.810	4.810
(4)	5.030	5.030	5.030	5.030	5.030	5.030
(5)	5.230	5.230	5.230	5.230	5.230	5.230
Tetrachloro-m-xylene	2.060	2.070	2.060	2.060	2.060	2.070
Decachlorobiphenyl	5.970	5.970	5.970	5.970	5.970	5.970

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date(s): 06/09/15 06/09/15

Column: RTX-CLPEST ID: 0.32 (mm) Calibration Time(s): 2026 2123

COMPOUND	MEAN RT	RT WINDOW FROM	RT WINDOW TO
Aroclor 1016	2.480	2.453	2.513
(2)	2.780	2.747	2.807
(3)	2.862	2.833	2.893
(4)	2.910	2.877	2.937
(5)	2.990	2.960	3.020
Aroclor 1260	4.620	4.593	4.653
(2)	4.660	4.627	4.687
(3)	4.808	4.777	4.837
(4)	5.030	5.000	5.060
(5)	5.230	5.200	5.260
Tetrachloro-m-xylene	2.063	2.037	2.097
Decachlorobiphenyl	5.970	5.937	5.997

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date(s): 06/09/15 06/09/15

Column: RTX-CLPEST2 ID: 0.32 (mm) Calibration Time(s): 2026 2123

LAB FILE ID: RF0.1: NF9B037 RF0.2: NF9B038 RF0.4: NF9B039
RF1: NF9B040 RF2: NF9B041 RF4: NF9B042

COMPOUND	RF0.1	RF0.2	RF0.4	RF1	RF2	RF4
Aroclor 1016	4416	8293	15642	37994	69474	127096
(2)	5037	9275	18850	52888	91617	174493
(3)	2976	6307	11156	29350	54977	113034
(4)	1642	3205	6490	17252	32864	62059
(5)	1814	3404	6799	17062	32284	59468
Aroclor 1260	4107	6093	10803	29649	54852	103604
(2)	1838	3375	6366	17158	31571	59557
(3)	4932	6958	12551	34649	64516	122858
(4)	7335	12914	23592	67379	126455	244557
(5)	11712	11556	17521	45887	85327	170469
Tetrachloro-m-xylene	9722	19263	38220	107590	201688	384512
Decachlorobiphenyl	10948	12922	19479	49450	88749	174304

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date(s): 06/09/15 06/09/15

Column: RTX-CLPEST2 ID: 0.32 (mm) Calibration Time(s): 2026 2123

COMPOUND	CURVE	COEFFICENTS A0	A1	A2	%RSD OR R^2	MAX %RSD OR R^2
Aroclor 1016	2ORDR	0.00000000	38791.3776	-1766.4817	0.9998260	0.9900000
(2)	2ORDR	0.00000000	50591.8752	-1766.1923	0.9988466	0.9900000
(3)	2ORDR	0.00000000	27928.1672	69.8612918	0.9996349	0.9900000
(4)	2ORDR	0.00000000	17394.6193	-469.70393	0.9999025	0.9900000
(5)	2ORDR	0.00000000	17526.4197	-665.79397	0.9999707	0.9900000
Aroclor 1260	2ORDR	0.00000000	29566.5187	-922.17866	0.9995738	0.9900000
(2)	2ORDR	0.00000000	17057.3133	-545.37813	0.9997180	0.9900000
(3)	2ORDR	0.00000000	34454.1753	-940.90647	0.9995549	0.9900000
(4)	2ORDR	0.00000000	66216.7174	-1275.2518	0.9996588	0.9900000
(5)	2ORDR	0.00000000	45006.6491	-625.17246	0.9979787	0.9900000
Tetrachloro-m-xylene	2ORDR	0.00000000	1064719.28	-258840.88	0.9997183	0.9900000
Decachlorobiphenyl	2ORDR	0.00000000	483895.784	-124133.62	0.9983298	0.9900000

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date(s): 06/09/15 06/09/15

Column: RTX-CLPEST2 ID: 0.32 (mm) Calibration Time(s): 2026 2123

LAB FILE ID: RT1: NF9B037 RT2: NF9B038 RT3: NF9B039
RT4: NF9B040 RT5: NF9B041 RT6: NF9B042

COMPOUND	RT1	RT2	RT3	RT4	RT5	RT6
Aroclor 1016	2.960	2.960	2.960	2.960	2.960	2.960
(2)	3.310	3.310	3.310	3.310	3.310	3.310
(3)	3.410	3.410	3.410	3.410	3.410	3.410
(4)	3.500	3.500	3.500	3.500	3.500	3.500
(5)	3.570	3.570	3.570	3.570	3.570	3.570
Aroclor 1260	5.290	5.290	5.290	5.290	5.290	5.290
(2)	5.330	5.330	5.330	5.330	5.330	5.330
(3)	5.500	5.500	5.500	5.500	5.500	5.500
(4)	5.670	5.670	5.670	5.670	5.670	5.670
(5)	5.910	5.910	5.920	5.920	5.920	5.920
Tetrachloro-m-xylene	2.350	2.350	2.350	2.350	2.350	2.350
Decachlorobiphenyl	6.660	6.660	6.660	6.660	6.660	6.660

FORM VI SV

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date(s): 06/09/15 06/09/15

Column: RTX-CLPEST2 ID: 0.32 (mm) Calibration Time(s): 2026 2123

COMPOUND	MEAN RT	RT WINDOW FROM	RT WINDOW TO
Aroclor 1016	2.960	2.930	2.990
(2)	3.310	3.280	3.340
(3)	3.410	3.383	3.443
(4)	3.500	3.467	3.527
(5)	3.570	3.540	3.600
Aroclor 1260	5.290	5.263	5.323
(2)	5.330	5.300	5.360
(3)	5.500	5.470	5.530
(4)	5.670	5.637	5.697
(5)	5.917	5.887	5.947
Tetrachloro-m-xylene	2.350	2.323	2.383
Decachlorobiphenyl	6.660	6.633	6.693

FORM VI SV

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date: 06/09/15 Time: 2245

Lab File ID: NF9A049 Init. Calib. Date(s): 06/09/15 06/09/15

Init. Calib. Times: 2026 2123

GC Column: RTX-CLPEST ID: 0.32 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE	
Aroclor 1016	0.8673811	1.0000000	2.24e-005	0.01	-13.26	20.00	2RDR	
(2)	0.8481882	1.0000000	1.16e-005	0.01	-15.18	20.00	2RDR	
(3)	0.8792906	1.0000000	2.68e-005	0.01	-12.07	20.00	2RDR	
(4)	0.8207541	1.0000000	3.98e-005	0.01	-17.92	20.00	2RDR	
(5)	0.7643986	1.0000000	5.18e-005	0.01	-23.56	20.00	2RDR	<- Avg < 20% ✓
Aroclor 1260	0.9688240	1.0000000	2.24e-005	0.01	-3.12	20.00	2RDR	
(2)	0.9203538	1.0000000	3.83e-005	0.01	-7.96	20.00	2RDR	
(3)	0.9186947	1.0000000	2.09e-005	0.01	-8.13	20.00	2RDR	
(4)	0.8970352	1.0000000	9.66e-006	0.01	-10.30	20.00	2RDR	
(5)	0.8756311	1.0000000	1.91e-005	0.01	-12.44	20.00	2RDR	
Tetrachloro-m-xylene	8.02e-002	0.1000000	9.26e-007	0.01	-19.80	20.00	2RDR	
Decachlorobiphenyl	8.02e-002	0.1000000	1.39e-006	0.01	-19.80	20.00	2RDR	

FORM VII SV

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date: 06/09/15 Time: 2245

Lab File ID: NF9B049 Init. Calib. Date(s): 06/09/15 06/09/15

Init. Calib. Times: 2026 2123

GC Column: RTX-CLPEST2 ID: 0.32 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE	
Aroclor 1016	0.8593541	1.0000000	3.1e-005	0.01	-14.06	20.00	2RDR	
(2)	0.9918706	1.0000000	2.18e-005	0.01	-0.81	20.00	2RDR	
(3)	0.9034954	1.0000000	3.89e-005	0.01	-9.65	20.00	2RDR	
(4)	0.8862465	1.0000000	6.52e-005	0.01	-11.38	20.00	2RDR	
(5)	0.8896856	1.0000000	6.82e-005	0.01	-11.03	20.00	2RDR	
Aroclor 1260	0.9922703	1.0000000	3.62e-005	0.01	-0.77	20.00	2RDR	
(2)	0.9820400	1.0000000	6.62e-005	0.01	-1.80	20.00	2RDR	
(3)	0.9543690	1.0000000	3.12e-005	0.01	-4.56	20.00	2RDR	
(4)	0.9525558	1.0000000	1.6e-005	0.01	-4.74	20.00	2RDR	
(5)	0.9871704	1.0000000	2.38e-005	0.01	-1.28	20.00	2RDR	
Tetrachloro-m-xylene	8.e-002	0.1000000	1.2e-006	0.01	-20.00	20.00	2RDR	<-
Decachlorobiphenyl	8.03e-002	0.1000000	2.59e-006	0.01	-19.70	20.00	2RDR	

FORM VII SV

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date: 06/17/15 Time: 1745

Lab File ID: NFHA028 Init. Calib. Date(s): 06/09/15 06/09/15

Init. Calib. Times: 1328 2123

GC Column: RTX-CLPEST ID: 0.32 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE	
Aroclor 1016	0.9613974	1.0000000	2.04e-005	0.01	-3.86	20.00	2RDR	
(2)	0.9271357	1.0000000	1.14e-005	0.01	-7.29	20.00	2RDR	
(3)	0.9761520	1.0000000	2.54e-005	0.01	-2.38	20.00	2RDR	
(4)	0.9302779	1.0000000	3.62e-005	0.01	-6.97	20.00	2RDR	
(5)	0.8490105	1.0000000	4.87e-005	0.01	-15.10	20.00	2RDR	
Aroclor 1221	0.0000000	1.0000000	6.32e-005	0.01	0.00	20.00	2RDR	<-
(2)	0.0000000	1.0000000	1.52e-004	0.01	0.00	20.00	2RDR	<-
(3)	0.0000000	1.0000000	2.77e-005	0.01	0.00	20.00	2RDR	<-
Aroclor 1232	0.0000000	1.0000000	4.02e-005	0.01	0.00	20.00	2RDR	<-
(2)	0.0000000	1.0000000	5.2e-005	0.01	0.00	20.00	2RDR	<-
(3)	0.0000000	1.0000000	2.99e-005	0.01	0.00	20.00	2RDR	<-
(4)	0.0000000	1.0000000	7.14e-005	0.01	0.00	20.00	2RDR	<-
(5)	0.0000000	1.0000000	1.12e-004	0.01	0.00	20.00	2RDR	<-
Aroclor 1242	0.0000000	1.0000000	3.01e-005	0.01	0.00	20.00	2RDR	<-
(2)	0.0000000	1.0000000	1.89e-005	0.01	0.00	20.00	2RDR	<-
(3)	0.0000000	1.0000000	4.05e-005	0.01	0.00	20.00	2RDR	<-
(4)	0.0000000	1.0000000	5.62e-005	0.01	0.00	20.00	2RDR	<-
(5)	0.0000000	1.0000000	6.73e-005	0.01	0.00	20.00	2RDR	<-
Aroclor 1248	0.0000000	1.0000000	4.44e-005	0.01	0.00	20.00	2RDR	<-
(2)	0.0000000	1.0000000	4.19e-005	0.01	0.00	20.00	2RDR	<-
(3)	0.0000000	1.0000000	2.27e-005	0.01	0.00	20.00	2RDR	<-
(4)	0.0000000	1.0000000	4.23e-005	0.01	0.00	20.00	2RDR	<-
(5)	0.0000000	1.0000000	3.42e-005	0.01	0.00	20.00	2RDR	<-
Aroclor 1254	0.0000000	1.0000000	2.73e-005	0.01	0.00	20.00	2RDR	<-
(2)	0.0000000	1.0000000	1.52e-005	0.01	0.00	20.00	2RDR	<-
(3)	0.0000000	1.0000000	1.54e-005	0.01	0.00	20.00	2RDR	<-
(4)	0.0000000	1.0000000	1.99e-005	0.01	0.00	20.00	2RDR	<-
(5)	0.0000000	1.0000000	1.45e-005	0.01	0.00	20.00	2RDR	<-
Aroclor 1260	0.9116680	1.0000000	2.31e-005	0.01	-8.83	20.00	2RDR	
(2)	0.8195739	1.0000000	4.03e-005	0.01	-18.04	20.00	2RDR	
(3)	0.8993701	1.0000000	2.13e-005	0.01	-10.06	20.00	2RDR	
(4)	0.8621129	1.0000000	9.68e-006	0.01	-13.79	20.00	2RDR	
(5)	0.9325552	1.0000000	1.97e-005	0.01	-6.74	20.00	2RDR	
Aroclor 1268	0.0000000	1.0000000	8.1e-006	0.01	0.00	20.00	2RDR	<-
(2)	0.0000000	1.0000000	6.96e-006	0.01	0.00	20.00	2RDR	<-
(3)	0.0000000	1.0000000	1.04e-005	0.01	0.00	20.00	2RDR	<-
(4)	0.0000000	1.0000000	2.74e-005	0.01	0.00	20.00	2RDR	<-
(5)	0.0000000	1.0000000	4.e-006	0.01	0.00	20.00	2RDR	<-
Aroclor 1262	0.0000000	1.0000000	2.34e-005	0.01	0.00	20.00	2RDR	<-
(2)	0.0000000	1.0000000	1.87e-005	0.01	0.00	20.00	2RDR	<-
(3)	0.0000000	1.0000000	1.48e-005	0.01	0.00	20.00	2RDR	<-
(4)	0.0000000	1.0000000	1.73e-005	0.01	0.00	20.00	2RDR	<-

FORM VII SV

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date: 06/17/15 Time: 1745

Lab File ID: NFHA028 Init. Calib. Date(s): 06/09/15 06/09/15

Init. Calib. Times: 1328 2123

GC Column: RTX-CLPEST ID: 0.32 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE	
(5)	0.0000000	1.0000000	7.91e-006	0.01	0.00	20.00	2RDR	<-
Tetrachloro-m-xylene	0.1012778	0.1000000	7.36e-007	0.01	1.28	20.00	2RDR	
Decachlorobiphenyl	9.53e-002	0.1000000	1.17e-006	0.01	-4.70	20.00	2RDR	

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date: 06/17/15 Time: 1745

Lab File ID: NFHB028 Init. Calib. Date(s): 06/09/15 06/09/15

Init. Calib. Times: 2026 2123

GC Column: RTX-CLPEST ID: 0.32 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE	
Aroclor 1016	0.7300353	1.0000000	2.66e-005	0.01	-27.00	20.00	2RDR	<-
(2)	0.5255877	1.0000000	1.99e-005	0.01	-47.44	20.00	2RDR	<-
(3)	0.7828536	1.0000000	3.14e-005	0.01	-21.71	20.00	2RDR	<-
(4)	0.5620758	1.0000000	5.89e-005	0.01	-43.79	20.00	2RDR	<-
(5)	0.6949674	1.0000000	5.87e-005	0.01	-30.50	20.00	2RDR	<-
Aroclor 1260	0.6070580	1.0000000	3.42e-005	0.01	-39.29	20.00	2RDR	<-
(2)	0.5396750	1.0000000	6.06e-005	0.01	-46.03	20.00	2RDR	<-
(3)	0.6487180	1.0000000	2.93e-005	0.01	-35.13	20.00	2RDR	<-
(4)	0.5472656	1.0000000	1.5e-005	0.01	-45.27	20.00	2RDR	<-
(5)	0.8370235	1.0000000	2.2e-005	0.01	-16.30	20.00	2RDR	
Tetrachloro-m-xylene	8.17e-002	0.1000000	9.08e-007	0.01	-18.30	20.00	2RDR	
Decachlorobiphenyl	5.49e-002	0.1000000	2.01e-006	0.01	-45.10	20.00	2RDR	<-

Avg > 20%

Avg > 20%

FORM VII SV

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date: 06/17/15 Time: 2147

Lab File ID: NFHA049 Init. Calib. Date(s): 06/09/15 06/09/15

Init. Calib. Times: 1328 2123

GC Column: RTX-CLPEST ID: 0.32 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE	
Aroclor 1016	0.8891020	1.0000000	2.2e-005	0.01	-11.09	20.00	2RDR	
(2)	0.8129545	1.0000000	1.3e-005	0.01	-18.70	20.00	2RDR	
(3)	0.8820062	1.0000000	2.8e-005	0.01	-11.80	20.00	2RDR	
(4)	0.8405622	1.0000000	3.99e-005	0.01	-15.94	20.00	2RDR	
(5)	0.8304599	1.0000000	4.97e-005	0.01	-16.95	20.00	2RDR	
Aroclor 1221	0.0000000	1.0000000	6.32e-005	0.01	0.00	20.00	2RDR	<-
(2)	0.0000000	1.0000000	1.52e-004	0.01	0.00	20.00	2RDR	<-
(3)	0.0000000	1.0000000	2.77e-005	0.01	0.00	20.00	2RDR	<-
Aroclor 1232	0.0000000	1.0000000	4.02e-005	0.01	0.00	20.00	2RDR	<-
(2)	0.0000000	1.0000000	5.2e-005	0.01	0.00	20.00	2RDR	<-
(3)	0.0000000	1.0000000	2.99e-005	0.01	0.00	20.00	2RDR	<-
(4)	0.0000000	1.0000000	7.14e-005	0.01	0.00	20.00	2RDR	<-
(5)	0.0000000	1.0000000	1.12e-004	0.01	0.00	20.00	2RDR	<-
Aroclor 1242	0.0000000	1.0000000	3.01e-005	0.01	0.00	20.00	2RDR	<-
(2)	0.0000000	1.0000000	1.89e-005	0.01	0.00	20.00	2RDR	<-
(3)	0.0000000	1.0000000	4.05e-005	0.01	0.00	20.00	2RDR	<-
(4)	0.0000000	1.0000000	5.62e-005	0.01	0.00	20.00	2RDR	<-
(5)	0.0000000	1.0000000	6.73e-005	0.01	0.00	20.00	2RDR	<-
Aroclor 1248	0.0000000	1.0000000	4.44e-005	0.01	0.00	20.00	2RDR	<-
(2)	0.0000000	1.0000000	4.19e-005	0.01	0.00	20.00	2RDR	<-
(3)	0.0000000	1.0000000	2.27e-005	0.01	0.00	20.00	2RDR	<-
(4)	0.0000000	1.0000000	4.23e-005	0.01	0.00	20.00	2RDR	<-
(5)	0.0000000	1.0000000	3.42e-005	0.01	0.00	20.00	2RDR	<-
Aroclor 1254	0.0000000	1.0000000	2.73e-005	0.01	0.00	20.00	2RDR	<-
(2)	0.0000000	1.0000000	1.52e-005	0.01	0.00	20.00	2RDR	<-
(3)	0.0000000	1.0000000	1.54e-005	0.01	0.00	20.00	2RDR	<-
(4)	0.0000000	1.0000000	1.99e-005	0.01	0.00	20.00	2RDR	<-
(5)	0.0000000	1.0000000	1.45e-005	0.01	0.00	20.00	2RDR	<-
Aroclor 1260	0.8146810	1.0000000	2.57e-005	0.01	-18.53	20.00	2RDR	
(2)	0.8028521	1.0000000	4.11e-005	0.01	-19.71	20.00	2RDR	
(3)	0.7918160	1.0000000	2.41e-005	0.01	-20.82	20.00	2RDR	<-
(4)	0.8137445	1.0000000	1.02e-005	0.01	-18.62	20.00	2RDR	
(5)	0.8004094	1.0000000	2.3e-005	0.01	-19.96	20.00	2RDR	
Aroclor 1268	0.0000000	1.0000000	8.1e-006	0.01	0.00	20.00	2RDR	<-
(2)	0.0000000	1.0000000	6.96e-006	0.01	0.00	20.00	2RDR	<-
(3)	0.0000000	1.0000000	1.04e-005	0.01	0.00	20.00	2RDR	<-
(4)	0.0000000	1.0000000	2.74e-005	0.01	0.00	20.00	2RDR	<-
(5)	0.0000000	1.0000000	4.e-006	0.01	0.00	20.00	2RDR	<-
Aroclor 1262	0.0000000	1.0000000	2.34e-005	0.01	0.00	20.00	2RDR	<-
(2)	0.0000000	1.0000000	1.87e-005	0.01	0.00	20.00	2RDR	<-
(3)	0.0000000	1.0000000	1.48e-005	0.01	0.00	20.00	2RDR	<-
(4)	0.0000000	1.0000000	1.73e-005	0.01	0.00	20.00	2RDR	<-

FORM VII SV

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date: 06/17/15 Time: 2147

Lab File ID: NFHA049 Init. Calib. Date(s): 06/09/15 06/09/15

Init. Calib. Times: 1328 2123

GC Column: RTX-CLPEST ID: 0.32 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE	
(5)	0.0000000	1.0000000	7.91e-006	0.01	0.00	20.00	2RDR	<-
Tetrachloro-m-xylene	9.36e-002	0.1000000	7.95e-007	0.01	-6.40	20.00	2RDR	
Decachlorobiphenyl	8.38e-002	0.1000000	1.33e-006	0.01	-16.20	20.00	2RDR	

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Instrument ID: GC23 Calibration Date: 06/17/15 Time: 2147

Lab File ID: NFHB049 Init. Calib. Date(s): 06/09/15 06/09/15

Init. Calib. Times: 2026 2123

GC Column: RTX-CLPEST ID: 0.32 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE	
Aroclor 1016	0.6961278	1.0000000	2.79e-005	0.01	-30.39	20.00	2RDR	<-
(2)	0.4970684	1.0000000	2.1e-005	0.01	-50.29	20.00	2RDR	<-
(3)	0.7167152	1.0000000	3.43e-005	0.01	-28.33	20.00	2RDR	<-
(4)	0.5070573	1.0000000	6.52e-005	0.01	-49.29	20.00	2RDR	<-
(5)	0.6616710	1.0000000	6.15e-005	0.01	-33.83	20.00	2RDR	<-
Aroclor 1260	0.5577200	1.0000000	3.71e-005	0.01	-44.23	20.00	2RDR	<-
(2)	0.4988769	1.0000000	6.54e-005	0.01	-50.11	20.00	2RDR	<-
(3)	0.5876457	1.0000000	3.23e-005	0.01	-41.24	20.00	2RDR	<-
(4)	0.4978336	1.0000000	1.64e-005	0.01	-50.22	20.00	2RDR	<-
(5)	0.7459682	1.0000000	2.47e-005	0.01	-25.40	20.00	2RDR	<-
Tetrachloro-m-xylene	7.84e-002	0.1000000	9.45e-007	0.01	-21.60	20.00	2RDR	<-
Decachlorobiphenyl	5.08e-002	0.1000000	2.17e-006	0.01	-49.20	20.00	2RDR	<-

Avg > 20%

Avg > 20%

FORM VII SV

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

SAMPLE NO.
2192536

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Lab File ID: NFHA031 Lab Sample ID: 2192536

Instrument ID: GC23 Matrix: (soil/water) WATER

Level:(low/med) LOW Date Extracted: 06/16/15

Date Analyzed (1): 06/17/15 Date Analyzed (2): 06/17/15

Time Analyzed (1): 1819 Time Analyzed (2): 1819

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED 1	DATE ANALYZED 2
01	2192537LCS	2192537	NFHA032	06/17/15	06/17/15
02	MRC-SW7A-061	2076215008	NFHA033	06/17/15	06/17/15
03	MRC-SW7B-061	2076215009	NFHB034	06/17/15	06/17/15
04	MRC-SW9A-061	2076215012	NFHB035	06/17/15	06/17/15
05	MRC-SW9B-061	2076215013	NFHA036	06/17/15	06/17/15
06	MRC-SW6A-061	2076215006	NFHB037	06/17/15	06/17/15
07	MRC-SW6B-061	2076215007	NFHB038	06/17/15	06/17/15
08	MRC-SW8A-061	2076215010	NFHB039	06/17/15	06/17/15
09	MRC-SW8B-061	2076215011	NFHB040	06/17/15	06/17/15
10	MRC-SW5A2-06	2076215004	NFHB041	06/17/15	06/17/15
11	MRC-SW5A2-06	2192538	NFHA042	06/17/15	06/17/15
12	MRC-SW5A1-06	2076215003	NFHA043	06/17/15	06/17/15
13	MRC-SW5B-061	2076215005	NFHA044	06/17/15	06/17/15
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					

COMMENTS:

FORM IV SV

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
2192536

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Matrix: (soil/water) WATER Lab Sample ID: 2192536

Sample wt/vol: 1000 (g/ml) ML Lab File ID: NFHA031

Level: (low/med) LOW Date Received: 06/16/15

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 06/16/15

Concentrated Extract Volume: 5000(uL) Date Analyzed: 06/17/15

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
12674-11-2	Aroclor 1016	0.50	U
11104-28-2	Aroclor 1221	0.50	U
11141-16-5	Aroclor 1232	0.50	U
53469-21-9	Aroclor 1242	0.50	U
12672-29-6	Aroclor 1248	0.50	U
11097-69-1	Aroclor 1254	0.50	U
11096-82-5	Aroclor 1260	0.50	U
11100-14-4	Aroclor 1268	0.50	U
37324-23-5	Aroclor 1262	0.50	U

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
2192536

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Matrix: (soil/water) WATER Lab Sample ID: 2192536

Sample wt/vol: 1000 (g/ml) ML Lab File ID: NFHB031

Level: (low/med) LOW Date Received: 06/16/15

% Moisture: _____ Decanted: (Y/N)___ Date Extracted: 06/16/15

Concentrated Extract Volume: 5000(uL) Date Analyzed: 06/17/15

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: _____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
12674-11-2	Aroclor 1016	0.50	U
11104-28-2	Aroclor 1221	0.50	U
11141-16-5	Aroclor 1232	0.50	U
53469-21-9	Aroclor 1242	0.50	U
12672-29-6	Aroclor 1248	0.50	U
11097-69-1	Aroclor 1254	0.50	U
11096-82-5	Aroclor 1260	0.50	U
11100-14-4	Aroclor 1268	0.50	U
37324-23-5	Aroclor 1262	0.50	U

FORM 3
WATER SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Matrix Spike - Sample No.: 2192537LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Aroclor 1016	5.00000	0.00	3.53031	71	43-132
Aroclor 1260	5.00000	0.00	3.01040	60	49-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 2 outside limits

COMMENTS: _____RTX-CLPEST_____

FORM III SV

FORM 3
WATER SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Matrix Spike - Sample No.: 2192537LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Aroclor 1016	5.00000	0.00	2.55173	51	43-132
Aroclor 1260	5.00000	0.00	2.13327	43*	49-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 1 out of 2 outside limits

COMMENTS: _____RTX-CLPEST_____

FORM III SV

FORM 3
WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Matrix Spike - 2192538 Sample No.: MRC-SW5A2-061015(2076215004)

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
Aroclor 1016	4.62963	0.000000	2.75084	59	43-132
Aroclor 1260	4.62963	0.000000	2.92341	63	49-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 0 out of 2 outside limits

COMMENTS: _____RTX-CLPEST_____

FORM III SV

FORM 3
WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

Matrix Spike - 2192538 Sample No.: MRC-SW5A2-061015(2076215004)

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
Aroclor 1016	4.62963	0.000000	2.33275	50	43-132
Aroclor 1260	4.62963	0.000000	2.21826	48*	49-130

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 1 out of 2 outside limits

COMMENTS: _____RTX-CLPEST_____

FORM III SV

FORM 2
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ALSI Contract:

Lab Code: PA-010 Case No.: SAS No.: SDG No.: TMM039

GC Column(1):RTX-CLPEST ID:0.32(mm) GC Column(2):RTX-CLPESTID:0.32(mm)

	SAMPLE NO.	S1 1 (TCX)#	S1 2 (TCX)#	S2 1 (DCB)#	S2 2 (DCB)#	S3 1 #	S3 2 #	S4 1 #	S4 2 #	TOT OUT
01	2192536	70	55	69	38					0
02	2192537LCS	78	63	82	46					0
03	MRC-SW7A-061	80	65	73	41					0
04	MRC-SW7B-061	61	76	36	64					0
05	MRC-SW9A-061	58	72	35	61					0
06	MRC-SW9B-061	68	55	59	34					0
07	MRC-SW6A-061	61	75	44	76					0
08	MRC-SW6B-061	58	71	36	62					0
09	MRC-SW8A-061	43	52	27*	46					1
10	MRC-SW8B-061	56	69	36	60					0
11	MRC-SW5A2-06	62	75	41	69					0
12	MRC-SW5A2-06	75	62	63	37					0
13	MRC-SW5A1-06	71	59	73	43					0
14	MRC-SW5B-061	64	53	61	37					0
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

QC LIMITS

S1 (TCX) = Tetrachloro-m-xylene (30-133)
S2 (DCB) = Decachlorobiphenyl (30-140) (advisory)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

APPENDIX C—CHEMICAL-RESULTS DATA TABLES

TABLE C-1

CHEMICAL RESULTS FOR SURFACE WATER SAMPLES - JUNE/AUGUST 2015
LOCKHEED MARTIN MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

LOCATION SAMPLE ID SAMPLE DATE	MRC-SW1A MRC-SW1A-061015 20150610	MRC-SW2A MRC-SW2A-061015 20150610	MRC-SW5A1 MRC-SW5A1-061015 20150610
VOLATILES (UG/L)			
1,1,1-TRICHLOROETHANE	0.22 U	0.22 U	0.22 U
1,1,2,2-TETRACHLOROETHANE	0.34 U	0.34 U	0.34 U
1,1,2-TRICHLOROETHANE	0.33 U	0.33 U	0.33 U
1,1,2-TRICHLOROTRIFLUOROETHANE	0.26 U	0.26 U	0.26 U
1,1-DICHLOROETHANE	0.28 U	0.28 U	0.28 U
1,1-DICHLOROETHENE	0.29 U	0.29 U	0.29 U
1,2,3-TRICHLOROBENZENE	0.93 U	0.93 U	0.93 U
1,2,4-TRICHLOROBENZENE	0.82 U	0.82 U	0.82 U
1,2-DIBROMO-3-CHLOROPROPANE	1.5 U	1.5 U	1.5 U
1,2-DIBROMOETHANE	0.28 U	0.28 U	0.28 U
1,2-DICHLOROBENZENE	0.38 U	0.38 U	0.38 U
1,2-DICHLOROETHANE	0.32 U	0.32 U	0.32 U
1,2-DICHLOROPROPANE	0.24 U	0.24 U	0.24 U
1,3-DICHLOROBENZENE	0.25 U	0.25 U	0.25 U
1,4-DICHLOROBENZENE	0.27 U	0.27 U	0.27 U
1,4-DIOXANE	58.9 UR	58.9 UR	58.9 UR
2-BUTANONE	1.8 U	1.8 U	1.8 U
2-HEXANONE	1.3 U	1.3 U	1.3 U
4-METHYL-2-PENTANONE	1.5 U	1.5 U	1.5 U
ACETONE	6 J	6.1 J	5.5 J
BENZENE	0.23 U	0.23 U	0.23 U
BROMOCHLOROMETHANE	0.32 U	0.32 U	0.32 U
BROMODICHLOROMETHANE	0.27 U	0.27 U	0.27 U
BROMOFORM	0.4 U	0.4 U	0.4 U
BROMOMETHANE	0.39 U	0.39 U	0.39 U
CARBON DISULFIDE	0.27 U	0.45 U	0.23 U
CARBON TETRACHLORIDE	0.31 U	0.31 U	0.31 U
CHLOROBENZENE	0.19 U	0.19 U	0.19 U
CHLORODIBROMOMETHANE	0.45 U	0.45 U	0.45 U
CHLOROETHANE	0.33 U	0.33 U	0.33 U
CHLOROFORM	0.21 U	0.21 U	0.21 U
CHLOROMETHANE	0.31 U	0.31 U	0.31 U
CIS-1,2-DICHLOROETHENE	0.32 U	0.32 U	0.32 U
CIS-1,3-DICHLOROPROPENE	0.31 U	0.31 U	0.31 U
CYCLOHEXANE	0.29 U	0.29 U	0.29 U
DICHLORODIFLUOROMETHANE	0.33 U	0.33 U	0.33 U
ETHYLBENZENE	0.34 U	0.34 U	0.34 U
ISOPROPYLBENZENE	0.22 U	0.22 U	0.22 U
M+P-XYLENES	0.52 U	0.52 U	0.52 U
METHYL ACETATE	0.32 U	0.32 U	0.32 U
METHYL CYCLOHEXANE	0.3 U	0.3 U	0.3 U
METHYL TERT-BUTYL ETHER	0.33 U	0.33 U	0.33 U
METHYLENE CHLORIDE	0.45 U	0.45 U	0.45 U
O-XYLENE	0.33 U	0.33 U	0.33 U
STYRENE	0.24 U	0.24 U	0.24 U
TETRACHLOROETHENE	0.35 U	0.35 U	0.35 U
TOLUENE	0.23 U	0.25 J	0.23 U
TRANS-1,2-DICHLOROETHENE	0.26 U	0.26 U	0.26 U
TRANS-1,3-DICHLOROPROPENE	0.29 U	0.29 U	0.29 U
TRICHLOROETHENE	0.33 U	0.33 U	0.33 U
TRICHLOROFLUOROMETHANE	0.24 U	0.24 U	0.24 U
VINYL CHLORIDE	0.3 U	0.3 U	0.3 U
SEMIVOLATILES (UG/L)			
1,4-DIOXANE	0.13	0.13	NA
PCBS (UG/L)			
AROCLOR-1016	NA	NA	0.056 UJ
AROCLOR-1221	NA	NA	0.065 UJ
AROCLOR-1232	NA	NA	0.18 UJ
AROCLOR-1242	NA	NA	0.22 UJ

TABLE C-1

CHEMICAL RESULTS FOR SURFACE WATER SAMPLES - JUNE/AUGUST 2015
LOCKHEED MARTIN MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

LOCATION SAMPLE ID SAMPLE DATE	MRC-SW1A MRC-SW1A-061015 20150610	MRC-SW2A MRC-SW2A-061015 20150610	MRC-SW5A1 MRC-SW5A1-061015 20150610
AROCLOR-1248	NA	NA	0.13 UJ
AROCLOR-1254	NA	NA	0.093 UJ
AROCLOR-1260	NA	NA	0.065 UJ
AROCLOR-1262	NA	NA	0.093 UJ
AROCLOR-1268	NA	NA	0.16 UJ
TOTAL AROCLOR	NA	NA	0.47 UJ
			MRC-SW5A1-081315 20150813
PCBH (UG/L)			
DECACHLOROBIPHENYL	NA	NA	0.021 U
DICHLOROBIPHENYLS	NA	NA	0.0037 U
HEPTACHLOROBIPHENYLS	NA	NA	0.01 U
HEXACHLOROBIPHENYLS	NA	NA	0.0084 U
MONOCHLOROBIPHENYLS	NA	NA	0.0028 U
NONACHLOROBIPHENYLS	NA	NA	0.019 U
OCTACHLOROBIPHENYLS	NA	NA	0.0093 U
PENTACHLOROBIPHENYLS	NA	NA	0.0056 U
TETRACHLOROBIPHENYLS	NA	NA	0.0065 U
TRICHLOROBIPHENYLS	NA	NA	0.0037 U

J - Positive result is considered estimated as a result of technical noncompliance.
MRC - Middle River Complex
NA - not analyzed
SW - surface water
U - Not detected at the detection limit shown left of the letter.
UG/L - micrograms per liter (i.e., parts per billion)
UJ -The analyte was not detected. However, the quantitation or detection limit may be inaccurate or imprecise.

TABLE C-1

CHEMICAL RESULTS FOR SURFACE WATER SAMPLES - JUNE/AUGUST 2015
LOCKHEED MARTIN MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

LOCATION SAMPLE ID SAMPLE DATE	MRC-SW5A2 MRC-SW5A2-061015 20150610	MRC-SW5B MRC-SW5B-061015 20150610	MRC-SW6A MRC-SW6A-061015 20150610
VOLATILES (UG/L)			
1,1,1-TRICHLOROETHANE	0.22 U	0.22 U	0.22 U
1,1,2,2-TETRACHLOROETHANE	0.34 U	0.34 U	0.34 U
1,1,2-TRICHLOROETHANE	0.33 U	0.33 U	0.33 U
1,1,2-TRICHLOROTRIFLUOROETHANE	0.26 U	0.26 U	0.26 U
1,1-DICHLOROETHANE	0.28 U	0.28 U	0.28 U
1,1-DICHLOROETHENE	0.29 U	0.29 U	0.29 U
1,2,3-TRICHLOROBENZENE	0.93 U	0.93 U	0.93 U
1,2,4-TRICHLOROBENZENE	0.82 U	0.82 U	0.82 U
1,2-DIBROMO-3-CHLOROPROPANE	1.5 U	1.5 U	1.5 U
1,2-DIBROMOETHANE	0.28 U	0.28 U	0.28 U
1,2-DICHLOROBENZENE	0.38 U	0.38 U	0.38 U
1,2-DICHLOROETHANE	0.32 U	0.32 U	0.32 U
1,2-DICHLOROPROPANE	0.24 U	0.24 U	0.24 U
1,3-DICHLOROBENZENE	0.25 U	0.25 U	0.25 U
1,4-DICHLOROBENZENE	0.27 U	0.27 U	0.27 U
1,4-DIOXANE	58.9 UR	58.9 UR	58.9 UR
2-BUTANONE	1.8 U	1.8 U	1.8 U
2-HEXANONE	1.3 U	1.3 U	1.3 U
4-METHYL-2-PENTANONE	1.5 U	1.5 U	1.5 U
ACETONE	5.6 J	4.1 J	5.8 J
BENZENE	0.23 U	0.23 U	0.23 U
BROMOCHLOROMETHANE	0.32 U	0.32 U	0.32 U
BROMODICHLOROMETHANE	0.27 U	0.27 U	0.27 U
BROMOFORM	0.4 U	0.4 U	0.4 U
BROMOMETHANE	0.39 U	0.43 U	0.39 U
CARBON DISULFIDE	0.23 U	0.23 U	0.23 U
CARBON TETRACHLORIDE	0.31 U	0.31 U	0.31 U
CHLOROBENZENE	0.19 U	0.19 U	0.19 U
CHLORODIBROMOMETHANE	0.45 U	0.45 U	0.45 U
CHLOROETHANE	0.33 U	0.33 U	0.33 U
CHLOROFORM	0.21 U	0.21 U	0.21 U
CHLOROMETHANE	0.31 U	0.31 U	0.31 U
CIS-1,2-DICHLOROETHENE	0.32 U	0.32 U	0.32 U
CIS-1,3-DICHLOROPROPENE	0.31 U	0.31 U	0.31 U
CYCLOHEXANE	0.29 U	0.29 U	0.29 U
DICHLORODIFLUOROMETHANE	0.33 U	0.33 U	0.33 U
ETHYLBENZENE	0.34 U	0.34 U	0.34 U
ISOPROPYLBENZENE	0.22 U	0.22 U	0.22 U
M+P-XYLENES	0.52 U	0.52 U	0.52 U
METHYL ACETATE	0.32 U	0.32 U	0.32 U
METHYL CYCLOHEXANE	0.3 U	0.3 U	0.3 U
METHYL TERT-BUTYL ETHER	0.33 U	0.33 U	0.33 U
METHYLENE CHLORIDE	0.45 U	0.45 U	0.45 U
O-XYLENE	0.33 U	0.33 U	0.33 U
STYRENE	0.24 U	0.24 U	0.24 U
TETRACHLOROETHENE	0.35 U	0.35 U	0.35 U
TOLUENE	0.24 J	0.23 U	0.23 U
TRANS-1,2-DICHLOROETHENE	0.26 U	0.26 U	0.26 U
TRANS-1,3-DICHLOROPROPENE	0.29 U	0.29 U	0.29 U
TRICHLOROETHENE	0.42 J	0.33 U	0.33 U
TRICHLOROFLUOROMETHANE	0.24 U	0.24 U	0.24 U
VINYL CHLORIDE	0.3 U	0.3 U	0.3 U
SEMIVOLATILES (UG/L)			
1,4-DIOXANE	NA	NA	NA
PCBS (UG/L)			
AROCLOR-1016	0.056 UJ	0.056 UJ	0.056 UJ
AROCLOR-1221	0.065 UJ	0.065 UJ	0.065 UJ
AROCLOR-1232	0.18 UJ	0.18 UJ	0.18 UJ
AROCLOR-1242	0.22 UJ	0.22 UJ	0.22 UJ

TABLE C-1

CHEMICAL RESULTS FOR SURFACE WATER SAMPLES - JUNE/AUGUST 2015
LOCKHEED MARTIN MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

LOCATION SAMPLE ID SAMPLE DATE	MRC-SW5A2 MRC-SW5A2-061015 20150610	MRC-SW5B MRC-SW5B-061015 20150610	MRC-SW6A MRC-SW6A-061015 20150610
AROCLOR-1248	0.13 UJ	0.13 UJ	0.13 UJ
AROCLOR-1254	0.093 UJ	0.093 UJ	0.093 UJ
AROCLOR-1260	0.065 UJ	0.065 UJ	0.065 UJ
AROCLOR-1262	0.093 UJ	0.093 UJ	0.093 UJ
AROCLOR-1268	0.16 UJ	0.16 UJ	0.16 UJ
TOTAL AROCLOR	0.46 UJ	0.46 UJ	0.47 UJ
	MRC-SW5A2-081315 20150813	MRC-SW5B-081315 20150813	MRC-SW6A-081315 20150813
PCBH (UG/L)			
DECACHLOROBIPHENYL	0.021 U	0.021 U	0.021 U
DICHLOROBIPHENYLS	0.0037 U	0.0037 U	0.0037 U
HEPTACHLOROBIPHENYLS	0.01 U	0.01 U	0.01 U
HEXACHLOROBIPHENYLS	0.0084 U	0.0084 U	0.0084 U
MONOCHLOROBIPHENYLS	0.0028 U	0.0028 U	0.0028 U
NONACHLOROBIPHENYLS	0.019 U	0.019 U	0.019 U
OCTACHLOROBIPHENYLS	0.0093 U	0.0093 U	0.0093 U
PENTACHLOROBIPHENYLS	0.0056 U	0.0056 U	0.0056 U
TETRACHLOROBIPHENYLS	0.0065 U	0.0065 U	0.0065 U
TRICHLOROBIPHENYLS	0.0037 U	0.0037 U	0.0037 U

J - Positive result is considered estimated as a result of techı
MRC - Middle River Complex
NA - not analyzed
SW - surface water
U - Not detected at the detection limit shown left of the lett
UG/L - micrograms per liter (i.e., parts per billion)
UJ -The analyte was not detected. However, the quantitatio

TABLE C-1

CHEMICAL RESULTS FOR SURFACE WATER SAMPLES - JUNE/AUGUST 2015
LOCKHEED MARTIN MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

LOCATION SAMPLE ID SAMPLE DATE	MRC-SW6B MRC-SW6B-061015 20150610	MRC-SW7A MRC-SW7A-061015 20150610	MRC-SW7B MRC-SW7B-061015 20150610
VOLATILES (UG/L)			
1,1,1-TRICHLOROETHANE	0.22 U	0.22 U	0.22 U
1,1,2,2-TETRACHLOROETHANE	0.34 U	0.34 U	0.34 U
1,1,2-TRICHLOROETHANE	0.33 U	0.33 U	0.33 U
1,1,2-TRICHLOROTRIFLUOROETHANE	0.26 U	0.26 U	0.26 U
1,1-DICHLOROETHANE	0.28 U	0.28 U	0.28 U
1,1-DICHLOROETHENE	0.29 U	0.29 U	0.29 U
1,2,3-TRICHLOROBENZENE	0.93 U	0.93 U	0.93 U
1,2,4-TRICHLOROBENZENE	0.82 U	0.82 U	0.82 U
1,2-DIBROMO-3-CHLOROPROPANE	1.5 U	1.5 U	1.5 U
1,2-DIBROMOETHANE	0.28 U	0.28 U	0.28 U
1,2-DICHLOROBENZENE	0.38 U	0.38 U	0.38 U
1,2-DICHLOROETHANE	0.32 U	0.32 U	0.32 U
1,2-DICHLOROPROPANE	0.24 U	0.24 U	0.24 U
1,3-DICHLOROBENZENE	0.25 U	0.25 U	0.25 U
1,4-DICHLOROBENZENE	0.27 U	0.27 U	0.27 U
1,4-DIOXANE	58.9 UR	58.9 UR	58.9 UR
2-BUTANONE	1.8 U	1.8 U	1.8 U
2-HEXANONE	1.3 U	1.3 U	1.3 U
4-METHYL-2-PENTANONE	1.5 U	1.5 U	1.5 U
ACETONE	4.7 J	3.1 U	4.3 J
BENZENE	0.23 U	0.23 U	0.23 U
BROMOCHLOROMETHANE	0.32 U	0.32 U	0.32 U
BROMODICHLOROMETHANE	0.27 U	0.27 U	0.27 U
BROMOFORM	0.4 U	0.4 U	0.4 U
BROMOMETHANE	0.48 U	0.39 U	0.39 U
CARBON DISULFIDE	0.23 U	0.23 U	0.23 U
CARBON TETRACHLORIDE	0.31 U	0.31 U	0.31 U
CHLOROBENZENE	0.19 U	0.19 U	0.19 U
CHLORODIBROMOMETHANE	0.45 U	0.45 U	0.45 U
CHLOROETHANE	0.33 U	0.33 U	0.33 U
CHLOROFORM	0.21 U	0.68 J	0.42 J
CHLOROMETHANE	0.31 U	0.31 U	0.31 U
CIS-1,2-DICHLOROETHENE	0.32 U	0.32 U	0.32 U
CIS-1,3-DICHLOROPROPENE	0.31 U	0.31 U	0.31 U
CYCLOHEXANE	0.29 U	0.29 U	0.29 U
DICHLORODIFLUOROMETHANE	0.33 U	0.33 U	0.33 U
ETHYLBENZENE	0.34 U	0.34 U	0.34 U
ISOPROPYLBENZENE	0.22 U	0.22 U	0.22 U
M+P-XYLENES	0.52 U	0.52 U	0.52 U
METHYL ACETATE	0.32 U	0.32 U	0.32 U
METHYL CYCLOHEXANE	0.3 U	0.3 U	0.3 U
METHYL TERT-BUTYL ETHER	0.33 U	0.33 U	0.33 U
METHYLENE CHLORIDE	0.45 U	0.45 U	0.45 U
O-XYLENE	0.33 U	0.33 U	0.33 U
STYRENE	0.24 U	0.24 U	0.24 U
TETRACHLOROETHENE	0.35 U	0.35 U	0.35 U
TOLUENE	0.23 U	0.23 U	0.23 U
TRANS-1,2-DICHLOROETHENE	0.26 U	0.26 U	0.26 U
TRANS-1,3-DICHLOROPROPENE	0.29 U	0.29 U	0.29 U
TRICHLOROETHENE	0.33 U	0.33 U	0.33 U
TRICHLOROFLUOROMETHANE	0.24 U	0.24 U	0.24 U
VINYL CHLORIDE	0.3 U	0.3 U	0.3 U
SEMIVOLATILES (UG/L)			
1,4-DIOXANE	NA	NA	NA
PCBS (UG/L)			
AROCLOR-1016	0.056 UJ	0.056 UJ	0.056 UJ
AROCLOR-1221	0.065 UJ	0.065 UJ	0.065 UJ
AROCLOR-1232	0.18 UJ	0.18 UJ	0.18 UJ
AROCLOR-1242	0.22 UJ	0.22 UJ	0.22 UJ

TABLE C-1

CHEMICAL RESULTS FOR SURFACE WATER SAMPLES - JUNE/AUGUST 2015
LOCKHEED MARTIN MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

LOCATION SAMPLE ID SAMPLE DATE	MRC-SW6B MRC-SW6B-061015 20150610	MRC-SW7A MRC-SW7A-061015 20150610	MRC-SW7B MRC-SW7B-061015 20150610
AROCLOR-1248	0.13 UJ	0.13 UJ	0.13 UJ
AROCLOR-1254	0.093 UJ	0.093 UJ	0.093 UJ
AROCLOR-1260	0.065 UJ	0.065 UJ	0.065 UJ
AROCLOR-1262	0.093 UJ	0.093 UJ	0.093 UJ
AROCLOR-1268	0.16 UJ	0.16 UJ	0.16 UJ
TOTAL AROCLOR	0.47 UJ	0.46 UJ	0.46 UJ
	MRC-SW6B-081315 20150813	MRC-SW7A-081315 20150813	MRC-SW7B-081315 20150813
PCBH (UG/L)			
DECACHLOROBIPHENYL	0.021 U	0.021 U	0.021 U
DICHLOROBIPHENYLS	0.0037 U	0.0037 U	0.0037 U
HEPTACHLOROBIPHENYLS	0.01 U	0.01 U	0.01 U
HEXACHLOROBIPHENYLS	0.0084 U	0.0084 U	0.0084 U
MONOCHLOROBIPHENYLS	0.0028 U	0.0028 U	0.0028 U
NONACHLOROBIPHENYLS	0.019 U	0.019 U	0.019 U
OCTACHLOROBIPHENYLS	0.0093 U	0.0093 U	0.0093 U
PENTACHLOROBIPHENYLS	0.0056 U	0.0056 U	0.0056 U
TETRACHLOROBIPHENYLS	0.0065 U	0.0065 U	0.0065 U
TRICHLOROBIPHENYLS	0.0037 U	0.0037 U	0.0037 U

J - Positive result is considered estimated as a result of techı
MRC - Middle River Complex
NA - not analyzed
SW - surface water
U - Not detected at the detection limit shown left of the lett
UG/L - micrograms per liter (i.e., parts per billion)
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TABLE C-1

CHEMICAL RESULTS FOR SURFACE WATER SAMPLES - JUNE/AUGUST 2015
LOCKHEED MARTIN MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

LOCATION SAMPLE ID SAMPLE DATE	MRC-SW8A MRC-SW8A-061015 20150610	MRC-SW8B MRC-SW8B-061015 20150610	 MRC-SW9A-061015 20150610
VOLATILES (UG/L)			
1,1,1-TRICHLOROETHANE	0.22 U	0.22 U	0.22 U
1,1,2,2-TETRACHLOROETHANE	0.34 U	0.34 U	0.34 U
1,1,2-TRICHLOROETHANE	0.33 U	0.33 U	0.33 U
1,1,2-TRICHLOROTRIFLUOROETHANE	0.26 U	0.26 U	0.26 U
1,1-DICHLOROETHANE	0.28 U	0.28 U	0.28 U
1,1-DICHLOROETHENE	0.29 U	0.29 U	0.29 U
1,2,3-TRICHLOROBENZENE	0.93 U	0.93 U	0.93 U
1,2,4-TRICHLOROBENZENE	0.82 U	0.82 U	0.82 U
1,2-DIBROMO-3-CHLOROPROPANE	1.5 U	1.5 U	1.5 U
1,2-DIBROMOETHANE	0.28 U	0.28 U	0.28 U
1,2-DICHLOROBENZENE	0.38 U	0.38 U	0.38 U
1,2-DICHLOROETHANE	0.32 U	0.32 U	0.32 U
1,2-DICHLOROPROPANE	0.24 U	0.24 U	0.24 U
1,3-DICHLOROBENZENE	0.25 U	0.25 U	0.25 U
1,4-DICHLOROBENZENE	0.27 U	0.27 U	0.27 U
1,4-DIOXANE	58.9 UR	58.9 UR	58.9 UR
2-BUTANONE	1.8 U	1.8 U	1.8 U
2-HEXANONE	1.3 U	1.3 U	1.3 U
4-METHYL-2-PENTANONE	1.5 U	1.5 U	1.5 U
ACETONE	8.2 J	3.1 U	4 J
BENZENE	0.23 U	0.23 U	0.23 U
BROMOCHLOROMETHANE	0.32 U	0.32 U	0.32 U
BROMODICHLOROMETHANE	0.27 U	0.27 U	0.27 U
BROMOFORM	0.4 U	0.4 U	0.4 U
BROMOMETHANE	0.39 U	0.39 U	0.39 U
CARBON DISULFIDE	0.23 U	0.23 U	0.23 U
CARBON TETRACHLORIDE	0.31 U	0.31 U	0.31 U
CHLOROBENZENE	0.19 U	0.19 U	0.19 U
CHLORODIBROMOMETHANE	0.45 U	0.45 U	0.45 U
CHLOROETHANE	0.33 U	0.33 U	0.33 U
CHLOROFORM	0.21 U	0.21 U	0.21 U
CHLOROMETHANE	0.31 U	0.31 U	0.31 U
CIS-1,2-DICHLOROETHENE	0.32 U	0.32 U	0.32 U
CIS-1,3-DICHLOROPROPENE	0.31 U	0.31 U	0.31 U
CYCLOHEXANE	0.29 U	0.29 U	0.29 U
DICHLORODIFLUOROMETHANE	0.33 U	0.33 U	0.33 U
ETHYLBENZENE	0.34 U	0.34 U	0.34 U
ISOPROPYLBENZENE	0.22 U	0.22 U	0.22 U
M+P-XYLENES	0.52 U	0.52 U	0.52 U
METHYL ACETATE	0.32 U	0.32 U	0.32 U
METHYL CYCLOHEXANE	0.3 U	0.3 U	0.3 U
METHYL TERT-BUTYL ETHER	0.33 U	0.33 U	0.33 U
METHYLENE CHLORIDE	0.45 U	0.45 U	0.45 U
O-XYLENE	0.33 U	0.33 U	0.33 U
STYRENE	0.24 U	0.24 U	0.24 U
TETRACHLOROETHENE	0.35 U	0.35 U	0.35 U
TOLUENE	0.23 U	0.23 U	0.23 U
TRANS-1,2-DICHLOROETHENE	0.26 U	0.26 U	0.26 U
TRANS-1,3-DICHLOROPROPENE	0.29 U	0.29 U	0.29 U
TRICHLOROETHENE	0.33 U	0.33 U	0.33 U
TRICHLOROFLUOROMETHANE	0.24 U	0.24 U	0.24 U
VINYL CHLORIDE	0.3 U	0.3 U	0.3 U
SEMIVOLATILES (UG/L)			
1,4-DIOXANE	NA	NA	NA
PCBS (UG/L)			
AROCLOR-1016	0.056 UJ	0.056 UJ	0.056 UJ
AROCLOR-1221	0.065 UJ	0.065 UJ	0.065 UJ
AROCLOR-1232	0.18 UJ	0.18 UJ	0.18 UJ
AROCLOR-1242	0.22 UJ	0.22 UJ	0.22 UJ

TABLE C-1

CHEMICAL RESULTS FOR SURFACE WATER SAMPLES - JUNE/AUGUST 2015
LOCKHEED MARTIN MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

LOCATION SAMPLE ID SAMPLE DATE	MRC-SW8A MRC-SW8A-061015 20150610	MRC-SW8B MRC-SW8B-061015 20150610	 MRC-SW9A-061015 20150610
AROCLOR-1248	0.13 UJ	0.13 UJ	0.13 UJ
AROCLOR-1254	0.093 UJ	0.093 UJ	0.093 UJ
AROCLOR-1260	0.065 UJ	0.065 UJ	0.065 UJ
AROCLOR-1262	0.093 UJ	0.093 UJ	0.093 UJ
AROCLOR-1268	0.16 UJ	0.16 UJ	0.16 UJ
TOTAL AROCLOR	0.46 UJ	0.46 UJ	0.46 UJ
	MRC-SW8A-081315 20150813	MRC-SW8B-081315 20150813	MRC-SW9A-081315 20150813
PCBH (UG/L)			
DECACHLOROBIPHENYL	0.021 U	0.021 U	0.021 U
DICHLOROBIPHENYLS	0.0037 U	0.0037 U	0.0037 U
HEPTACHLOROBIPHENYLS	0.01 U	0.01 U	0.01 U
HEXACHLOROBIPHENYLS	0.0084 U	0.0084 U	0.0084 U
MONOCHLOROBIPHENYLS	0.0028 U	0.0028 U	0.0028 U
NONACHLOROBIPHENYLS	0.019 U	0.019 U	0.019 U
OCTACHLOROBIPHENYLS	0.0093 U	0.0093 U	0.0093 U
PENTACHLOROBIPHENYLS	0.0056 U	0.0056 U	0.0056 U
TETRACHLOROBIPHENYLS	0.0065 U	0.0065 U	0.0065 U
TRICHLOROBIPHENYLS	0.0037 U	0.0037 U	0.0037 U

J - Positive result is considered estimated as a result of techı
MRC - Middle River Complex
NA - not analyzed
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U - Not detected at the detection limit shown left of the lett
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CHEMICAL RESULTS FOR SURFACE WATER SAMPLES - JUNE/AUGUST 2015
LOCKHEED MARTIN MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

LOCATION	MRC-SW9A		MRC-SW9B
SAMPLE ID	MRC-SW9A-061015-AVG	MRC-SW9A-061015-D	MRC-SW9B-061015
SAMPLE DATE	20150610	20150610	20150610
VOLATILES (UG/L)			
1,1,1-TRICHLOROETHANE	0.22 U	0.22 U	0.22 U
1,1,2,2-TETRACHLOROETHANE	0.34 U	0.34 U	0.34 U
1,1,2-TRICHLOROETHANE	0.33 U	0.33 U	0.33 U
1,1,2-TRICHLOROTRIFLUOROETHANE	0.26 U	0.26 U	0.26 U
1,1-DICHLOROETHANE	0.28 U	0.28 U	0.28 U
1,1-DICHLOROETHENE	0.29 U	0.29 U	0.29 U
1,2,3-TRICHLOROBENZENE	0.93 U	0.93 U	0.93 U
1,2,4-TRICHLOROBENZENE	0.82 U	0.82 U	0.82 U
1,2-DIBROMO-3-CHLOROPROPANE	1.5 U	1.5 U	1.5 U
1,2-DIBROMOETHANE	0.28 U	0.28 U	0.28 U
1,2-DICHLOROBENZENE	0.38 U	0.38 U	0.38 U
1,2-DICHLOROETHANE	0.32 U	0.32 U	0.32 U
1,2-DICHLOROPROPANE	0.24 U	0.24 U	0.24 U
1,3-DICHLOROBENZENE	0.25 U	0.25 U	0.25 U
1,4-DICHLOROBENZENE	0.27 U	0.27 U	0.27 U
1,4-DIOXANE	58.9 R	58.9 UR	58.9 UR
2-BUTANONE	1.8 U	1.8 U	1.8 U
2-HEXANONE	1.3 U	1.3 U	1.3 U
4-METHYL-2-PENTANONE	1.5 U	1.5 U	1.5 U
ACETONE	4.55	5.1 J	8.2 J
BENZENE	0.23 U	0.23 U	0.23 U
BROMOCHLOROMETHANE	0.32 U	0.32 U	0.32 U
BROMODICHLOROMETHANE	0.27 U	0.27 U	0.27 U
BROMOFORM	0.4 U	0.4 U	0.4 U
BROMOMETHANE	0.39 U	0.39 U	0.39 U
CARBON DISULFIDE	0.23 U	0.23 U	0.23 U
CARBON TETRACHLORIDE	0.31 U	0.31 U	0.31 U
CHLOROBENZENE	0.19 U	0.19 U	0.19 U
CHLORODIBROMOMETHANE	0.45 U	0.45 U	0.45 U
CHLOROETHANE	0.33 U	0.33 U	0.33 U
CHLOROFORM	0.21 U	0.21 U	0.21 U
CHLOROMETHANE	0.31 U	0.31 U	0.31 U
CIS-1,2-DICHLOROETHENE	0.32 U	0.32 U	0.32 U
CIS-1,3-DICHLOROPROPENE	0.31 U	0.31 U	0.31 U
CYCLOHEXANE	0.29 U	0.29 U	0.29 U
DICHLORODIFLUOROMETHANE	0.33 U	0.33 U	0.33 U
ETHYLBENZENE	0.34 U	0.34 U	0.34 U
ISOPROPYLBENZENE	0.22 U	0.22 U	0.22 U
M+P-XYLENES	0.52 U	0.52 U	0.52 U
METHYL ACETATE	0.32 U	0.32 U	0.32 U
METHYL CYCLOHEXANE	0.3 U	0.3 U	0.3 U
METHYL TERT-BUTYL ETHER	0.33 U	0.33 U	0.33 U
METHYLENE CHLORIDE	0.45 U	0.45 U	0.45 U
O-XYLENE	0.33 U	0.33 U	0.33 U
STYRENE	0.24 U	0.24 U	0.24 U
TETRACHLOROETHENE	0.35 U	0.35 U	0.35 U
TOLUENE	0.23 U	0.23 U	0.23 U
TRANS-1,2-DICHLOROETHENE	0.26 U	0.26 U	0.26 U
TRANS-1,3-DICHLOROPROPENE	0.29 U	0.29 U	0.29 U
TRICHLOROETHENE	0.33 U	0.33 U	0.33 U
TRICHLOROFLUOROMETHANE	0.24 U	0.24 U	0.24 U
VINYL CHLORIDE	0.3 U	0.3 U	0.3 U
SEMIVOLATILES (UG/L)			
1,4-DIOXANE	NA	NA	NA
PCBS (UG/L)			
AROCLOR-1016	0.056 UJ	NA	0.056 UJ
AROCLOR-1221	0.065 UJ	NA	0.065 UJ
AROCLOR-1232	0.18 UJ	NA	0.18 UJ
AROCLOR-1242	0.22 UJ	NA	0.22 UJ

TABLE C-1

CHEMICAL RESULTS FOR SURFACE WATER SAMPLES - JUNE/AUGUST 2015
LOCKHEED MARTIN MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

LOCATION	MRC-SW9A		MRC-SW9B
SAMPLE ID	MRC-SW9A-061015-AVG	MRC-SW9A-061015-D	MRC-SW9B-061015
SAMPLE DATE	20150610	20150610	20150610
AROCLOR-1248	0.13 UJ	NA	0.13 UJ
AROCLOR-1254	0.093 UJ	NA	0.093 UJ
AROCLOR-1260	0.065 UJ	NA	0.065 UJ
AROCLOR-1262	0.093 UJ	NA	0.093 UJ
AROCLOR-1268	0.16 UJ	NA	0.16 UJ
TOTAL AROCLOR	0.46 UJ	NA	0.46 UJ
			MRC-SW9B-081315
			08/13/2015
PCBH (UG/L)			
DECACHLOROBIPHENYL	NA	NA	0.021 U
DICHLOROBIPHENYLS	NA	NA	0.0037 U
HEPTACHLOROBIPHENYLS	NA	NA	0.01 U
HEXACHLOROBIPHENYLS	NA	NA	0.0084 U
MONOCHLOROBIPHENYLS	NA	NA	0.0028 U
NONACHLOROBIPHENYLS	NA	NA	0.019 U
OCTACHLOROBIPHENYLS	NA	NA	0.0093 U
PENTACHLOROBIPHENYLS	NA	NA	0.0056 U
TETRACHLOROBIPHENYLS	NA	NA	0.0065 U
TRICHLOROBIPHENYLS	NA	NA	0.0037 U

J - Positive result is considered estimated as a result of techı
MRC - Middle River Complex
NA - not analyzed
SW - surface water
U - Not detected at the detection limit shown left of the lett
UG/L - micrograms per liter (i.e., parts per billion)
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Table C-2

Primary VOC and 1,4-Dioxane Results for Surface Water Samples, 2012-2015
Cow Pen Creek and Dark Head Cove
Lockheed Martin Middle River Complex, Middle River, Maryland

Location/Date	Trichloroethene (µg/L)	cis-1,2-Dichloroethene (µg/L)	Vinyl chloride (µg/L)	1,4-Dioxane (µg/L)
Cow Pen Creek				
SW1A				
2015 (June)	--	--	--	0.13
2014 (June)	--	--	--	0.235 J
2013 (June)	0.33 J	--	--	--
2012 (June)	--	--	--	NA
SW2A				
2015 (June)	--	--	--	0.13
2014 (June)	--	--	--	0.156 J
2013 (June)	--	--	--	--
2012 (June)	--	--	--	NA
Dark Head Cove				
SW5A1				
2015 (June)	--	--	--	NA
2014 (June)	--	--	--	NA
2013 (June)	1.1	0.17 J	--	NA
2012 (June)	0.17 J	--	--	NA
SW5A2				
2015 (June)	0.42J	--	--	NA
2014 (June)	0.3 J	--	--	NA
2013 (June)	1.9	0.26 J	--	NA
2012 (June)	0.19 J	--	--	NA
SW5B				
2015 (June)	--	--	--	NA
2014 (June)	--	--	--	NA
2013 (June)	1.5	0.35 J	--	NA
2012 (June)	0.19 J	--	--	NA
SW6A				
2015 (June)	--	--	--	NA
2014 (June)	0.52 J	--	--	NA
2013 (June)	0.46 J	--	--	NA
2012 (June)	0.55 J	--	--	NA
SW6B				
2015 (June)	--	--	--	NA
2014 (June)	0.39 J	--	--	NA
2013 (June)	0.81 J	--	--	NA
2012 (June)	0.63 J	--	--	NA
SW7A				
2015 (June)	--	--	--	NA
2014 (June)	0.44 J	--	--	NA
2013 (June)	0.7 J	--	--	NA
2012 (June)	--	--	--	NA
SW7B				
2015 (June)	--	--	--	NA
2014 (June)	0.49 J	--	--	NA
2013 (June)	0.51 J	--	--	NA
2012 (June)	0.32 J	--	--	NA
SW8A				
2015 (June)	--	--	--	NA
2014 (June)	0.54 J	--	--	NA
2013 (June)	0.65 J	--	--	NA
2012 (June)	0.66 J	--	--	NA
SW8B				
2015 (June)	--	--	--	NA
2014 (June)	0.47 J	--	--	NA
2013 (June)	0.65 J	--	--	NA
2012 (June)	0.82 J	--	--	NA

Table C-2

Primary VOC and 1,4-Dioxane Results for Surface Water Samples, 2012-2015
Cow Pen Creek and Dark Head Cove
Lockheed Martin Middle River Complex, Middle River, Maryland

Location/Date	Trichloroethene (µg/L)	cis-1,2-Dichloroethene (µg/L)	Vinyl chloride (µg/L)	1,4-Dioxane (µg/L)
SW9A				
2015 (June)	--	--	--	NA
2014 (June)	0.45 J	--	--	NA
2013 (June)	0.62 J	--	--	NA
2012 (June)	0.33 J	--	--	NA
SW9B				
2015 (June)	--	--	--	NA
2014 (June)	0.47 J	--	--	NA
2013 (June)	0.35 J	--	--	NA
2012 (June)	0.34 J	--	--	NA

-- not detected
NA - not analyzed
J - estimated concentration
VOC - volatile organic compound
µg/L - micrograms per liter

APPENDIX D—RISK ESTIMATES FOR RECREATIONAL SWIMMING IN DARK HEAD COVE

Memorandum

To: *Michael Martin, P.G. Tetra Tech*

From: Edmund Crouch

Edmund Crouch

Date: *November 18, 2014*

Subject: *Risk estimates for recreational swimming in Dark Head Cove*

As requested, we have evaluated risk estimates for recreational contact with water containing dissolved PCBs in the water column at Dark Head Cove. These risk estimates are conservative, in that they address the activity associated with the greatest level of exposure — that is, swimming — and make very conservative exposure assumptions for exposure time, duration and contact rates in the absence of site-specific measurements. In particular, we assume:

- The measurements represent dissolved PCBs in the water column (*i.e.,* the samples include no contaminated sediment). The samples were not filtered and the total PCB values reported may include some component of suspended sediment that would result in an overestimation of dissolved PCB concentrations.
- The measurements are representative of the water in Dark Head Cove where recreational swimming might occur. The samples were collected off the Middle River Complex outfalls where the concentrations would be expected to be the highest in the cove.
- The recreational swimmer is in the water for 4 hours/day, 70 days/year, for 6 years as a child and 20 years as an adult.
- The tetrachlorobiphenyls and pentachlorobiphenyls detected have an ingestion carcinogenic potency equal to the highest current estimate for the most carcinogenic tested PCB mixture. Other cancer potency values are available which would result in lower estimated potential risk.
- The tetrachlorobiphenyls and pentachlorobiphenyls detected have an ingestion reference dose (RfD) equal to that of Aroclor 1254, the lowest among PCB mixtures that have assigned RfDs.
- Cancer potency and RfD are the same for dermal exposure as for ingestion exposure.

The recreational activity exposure assumptions of 4 hours/day and 70 days/year were initially introduced in the January 2006 *Revised Human Risk Assessment for Martin State Airport* prepared for Lockheed Martin by Tetra Tech. In the subsequent April 2006 report *Surface Water and Sediment Sampling Report Lockheed Martin Middle River Complex* prepared by Tetra Tech, the 70

day/year exposure frequency assumption was used for swimming exposures, but with a 2 hours/day exposure time. It is important to note for a recreational swimming exposure scenario, adjusting the exposure time from four hours to two hours does not reduce the cancer or noncancer risk by a factor of two. For ingestion of surface water, the risk estimate scales linearly with the daily exposure time; while for dermal contact with surface water, the risk estimate is a sub-linear function of the daily exposure time. In other words, for dermal exposure absorption continues even after the exposure time in the water has ended.

With the stated site-specific exposure assumptions, and using other default exposure assumptions from the Regional Screening Level (RSL) table (EPA 2014a), together with the dermal exposure methodology described in the Risk Assessment Guidance for Superfund, Volume 1E, and the estimated 95 percent upper confidence limit (95% UCL) of the mean of the measurements as exposure point concentrations, the lifetime risk estimates are:

Incidental water ingestion	1.7×10^{-8}
Dermal absorption	4.9×10^{-6}

with highest hazard quotients (for children)

Incidental water ingestion	0.003
Dermal absorption	0.47

The calculations documenting these estimates are included in the accompanying workbook *Dark Head Cove Swimming PCBs.xlsx*, which also contains references for the values of all parameters used.

Modifying the daily exposure period to 2 hours/day halves the incidental water ingestion lifetime risk estimate and reduces the dermal absorption estimate to 3.2×10^{-6}, with similar effects on the hazard quotients (0.0014 and 0.30).

There are considerable uncertainties in these estimates that have been resolved in a conservative direction. As noted, the samples were not filtered, allowing potential incorporation of contaminated sediment, which would not contribute to dermal absorption — the dermal absorption calculation assumes dissolved PCBs. Two observations support the likelihood of sediment incorporation in the samples — the lack of detection of the more soluble (lower chlorinated) homologs, and the analysis of sample MRC-SW8B. This sample as originally tested contained a higher total PCB content than any other sample; but those results were rejected because of low recovery of the spike surrogates. Re-extraction and re-analysis of the sample produced non-detect results, suggesting that the first extraction included contaminated sediment (that may also have contributed to the low surrogate recovery) that was missing from the second.

The default ingestion rate of 50 ml/hour assumed for both children and adults as presented in EPA's RSL Risk-Based Concentration Table Equations for a recreational user exposed to surface water may be a conservative assumption for this evaluation. The Exposure Factors Handbook (EPA 2011) recommends a swimming water ingestion rate of 50 ml/hour for children under 18, but a

value of 21 ml/hour for adults which likely contributes to an overestimation of risk for the adult population swimming in Dark Head Cove. Further, the 50 ml/hour value is based on mean ingestion rates derived from swimming pool studies, while results from seawater ingestion studies indicate lower mean values for children (31 ml/hour), men (27 ml/hour and women (18 ml/hour) (EPA 2011). Dark Head Cove averages approximately 2% salt content, closer to seawater than the fresh water of swimming pools. Therefore, the use of the EPA default surface water ingestion rate likely overestimates ingestion risk.

There are additional uncertainties related to dermal risk estimates. In general, chemical specific permeability coefficients (Kp) are used to estimate dermal absorption of a chemical from water. A Kp is a predicted value obtained from a regression equation using a chemical-specific octanol-water coefficient (Kow) and molecular weight (MW). However, for some chemicals, the Kow value or the MW may be too high or too low (outside the effective prediction domain) and the estimated Kp using the regression is uncertain. For PCBs, both the Kow and MW values are high outside of effective prediction domain resulting in an uncertain predicted Kp value that is combined with a theoretical correction factor (EPA 2004).

The assignment of the highest (most conservative) carcinogenic and noncarcinogenic toxicity values measured for any PCB mixtures for the combinations of PCB homologs measured here (where only tetrachlorobiphenyls and pentachlorobiphenyls were detected) likely overestimates risk calculations

Even with the use of conservative assumptions, the resultant risk estimates lie below the MDE threshold of 1×10^{-5} lifetime increased cancer risk and hazard quotient of 1.0, and within the EPA's range 1×10^{-6} to 1×10^{-4} and hazard quotient of 1.0, indicating no significant risk from exposures due to swimming in Dark Head Cove.

References

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