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LOCKHEED MARTIN

December 4, 2020

VIA OVERNIGHT CARRIER

Mr. Brian Dietz
Chief, State Assessment &
Remediation Division
Land Restoration Program
Land and Material Administration
Maryland Department of the Environment
1800 Washington Road, Suite 625
Baltimore, Maryland 21230

Re: Transmittal of the 2020 PER- and Polyfluoroalkyl Substances (PFAS) Investigation Report
Round 2 – June-July 2020
Martin State Airport, 701 Wilson Point Road
Middle River, Maryland

Dear Mr. Dietz:

For your review, please find enclosed two hard copies with CDs of the above-referenced document. This prepared report summarizes the second round of groundwater and surface water sampling for per- and polyfluoroalkyl substances at portions of Martin State Airport in Middle River, Maryland.

If possible, we respectfully request to receive MDE's document review comments by January 19, 2021.

If you have any questions or require any additional information please contact me by phone at 301-548-2223, or via e-mail at charles.trione@lmco.com.

Sincerely,

Charles Trione
Project Lead, Environmental Remediation
Lockheed Martin Corporation

cc: (via email without enclosure)
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2020 PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) INVESTIGATION REPORT ROUND 2 – JUNE-JULY 2020 MARTIN STATE AIRPORT 701 WILSON POINT ROAD MIDDLE RIVER, MARYLAND

Prepared for:
Lockheed Martin Corporation

Prepared by:
Tetra Tech, Inc.

December 2020

Revision 0

Approved by:
Lockheed Martin, Inc.



Michael Martin, P.G.
Regional Manager



Josh Mullis
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ACRONYMS AND ABBREVIATIONS

6:2FTS	6:2 fluorotelomer sulfonate
8:2FTS	8:2 fluorotelomer sulfonate
AFFF	aqueous film-forming foam
AST	air stripper
cm	centimeters
DO	dissolved oxygen
DRA	Dump Road Area
ESH	environment, safety and health
EW	extraction well
FOL	field operations leader
GIS	geographic information system
GSP	Greater Strawberry Point
HASP	health and safety plan
HA	health advisory
HDPE	high-density polyethylene
IDW	investigation derived waste
IRA	interim response action
ITRC	Interstate Technology and Regulatory Council
LDPE	low-density polyethylene
LGAC	liquid-phase activated carbon
Lockheed Martin	Lockheed Martin Corporation
MDE	Maryland Department of the Environment
MHSWMA	Maryland Hazardous and Solid Waste Management Administration
ml/min	milliliter(s) per minute
MRC	Middle River Complex
MSA	Martin State Airport
MSL	mean sea level
MS/MSD	matrix spike/matrix duplicate

NAVD88	North American Vertical Datum of 1988
NTUs	nephelometric turbidity units
ORP	oxygen reduction potential
PDF	portable document format
PFAS	per- and polyfluoroalkyl substances
PFBA	perfluorobutanoic acid
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFC	perfluorinated compound
PFDA	perfluorodecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PM	project manager
PPE	personal protective equipment
PTFE	polytetrafluoroethylene
QA/QC	quality assurance/quality control
RSL	regional screening level
RTO	Remediation Technical Operations
SDG	sample delivery group
SOP	standard operating procedure
SVOC	semivolatile organic compound
TB	trip blank
Tetra Tech	Tetra Tech, Inc.
USDOT	United States Department of Transportation

USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WMP	waste management plan

SECTION 1
INTRODUCTION

On behalf of Lockheed Martin Corporation (Lockheed Martin), Tetra Tech, Inc. (Tetra Tech) has prepared this report summarizing the second round (Round 2) of groundwater and surface water sampling for per- and polyfluoroalkyl substances (PFAS) at portions of Martin State Airport (MSA) in Middle River, Maryland (see Figure 1-1). This report presents the field sampling approach and chemical analytical results for select groundwater monitoring well and surface water samples collected in June/July 2020. The objectives of this investigation, conducted in accordance with the Addendum No. 1 of the 2020 work plan for the PFAS investigation (Tetra Tech, Inc. [Tetra Tech], 2020), were to:

- provide PFAS groundwater data for selected monitoring wells
- provide PFAS surface water data for selected monitoring locations
- better understand the nature and extent of PFAS in groundwater and surface water
- provide PFAS process water data for selected process sampling points at the groundwater treatment plant

These data can be used to support numerical modeling of shallow-groundwater flow-patterns, including the flow influenced by the groundwater interim remedial action and direct groundwater flow that discharges to Frog Mortar Creek. This report is organized as follows:

Section 2—Site Background: Briefly describes site history, subsurface conditions, and previous investigations.

Section 3—Investigation Approach and Methodology: Presents the technical approach for groundwater and surface water sampling, and describes the methodology employed during the field investigation.

Section 4— Results: Presents the investigation results.

Section 5—Summary: Summarizes the investigation findings.

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

SECTION 2
SITE BACKGROUND

Martin State Airport (MSA) is in eastern Baltimore County at 701 Wilson Point Road in Middle River, Maryland. Frog Mortar Creek and Stansbury Creek form the airport's eastern and western borders (Figure 2-1). These creeks conjoin at the southern boundary of the site and continue south to feed Middle River and Chesapeake Bay. The Dump Road Area (DRA), in the southeastern portion of MSA, is bounded by Frog Mortar Creek to the east and the main airport runway to the west. The Greater Strawberry Point (GSP) area comprises approximately 75 acres in the southwestern portion of MSA. Figure 2-1 shows the locations of MSA, the DRA, and the GSP area.

Lockheed Martin has conducted detailed investigations at the DRA since 1999. Lockheed Martin has also conducted additional investigations at Strawberry Point, GSP, and Frog Mortar Creek (Figure 2-1).

2.1 DUMP ROAD AREA

Environmental investigations of MSA began in the mid-1980s, when the Maryland Department of the Environment (MDE) conducted site inspections related to stored drums and a reported chemical dump. In 1989, MDE conducted a preliminary assessment of MSA that identified fill areas and ponds, the latter of which were reportedly used from the 1930s through the 1960s to dispose of spent battery acid, acid-type strippers, and other acidic solutions (MDE, 1989).

From 1999–2010, Lockheed Martin conducted a remedial investigation (Tetra Tech, Inc., 2012b) and supplemental fieldwork to further delineate the extent of chemical contamination in soil, groundwater, and pond-sediment that had been indicated by earlier DRA studies. Through geophysical surveys, membrane-interface probes, test pits, soil borings, and chemical analyses of soil and pond-sediment samples, the remedial investigation identified large areas of buried fill and

debris and surface and subsurface soil contamination, in and around buried fill material and in pond sediment.

A 2012 review of historical aerial photographs (Tetra Tech, 2013b) identified and mapped what appeared to be open burning areas, open pits or ponds, soil or debris piles, possible ammunition bunkers, ground scars, and fill areas. Several of these historical features coincide with areas of elevated contaminant concentrations in soil and/or groundwater; these areas were later identified as possible contaminant-source areas and were subsequently investigated in 2012–2019 (Tetra Tech, 2013a, 2014a, 2014b, 2016a, 2016b, 2017, 2019a, 2019b). Sampling of DRA groundwater monitoring wells is conducted annually, with the sampling events starting in 2006 and continuing through 2020.

An interim extraction and treatment system to contain impacts to DRA groundwater was constructed in 2017 and is currently operational at the DRA site. This system consists of 16 groundwater extraction wells, underground piping, and a building that houses components to capture and treat groundwater containing volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals. PFAS sampling was initiated in September 2019 on the treatment plant. The wells and underground piping pump groundwater from the surficial aquifer to the treatment building, creating a "hydraulic barrier" that captures groundwater and prevents contaminants from migrating off-site. The treatment building is 60 feet wide and 170 feet long (10,200 square feet) and is near Frog Mortar Creek in the east-central portion of the DRA. Treated groundwater, which is tested routinely, is discharged to Frog Mortar Creek via an MDE-permitted outfall. Frog Mortar Creek surface water data from 2019 and early 2020 show a significant reduction in the magnitude and extent of VOCs previously detected in surface water (Tetra Tech, 2019a, 2019b).

Additional details regarding DRA background and history, including details of previous environmental investigations and discussions of contaminant-source areas at the DRA, are in the *Dump Road Area Characterization of Possible Source Areas Report* (Tetra Tech, 2013a) and *Taxiway Tango Soil Characterization Report* (Tetra Tech, 2014c), and therefore are not repeated herein. A detailed chronological discussion of investigations at the DRA from 1985–2012 is provided as Appendix A of the *Dump Road Source-Areas Investigation Work Plan*

(Tetra Tech, 2012a). Recent DRA groundwater sampling results are provided in annual groundwater monitoring reports (Tetra Tech, 2015, 2016b, 2017, 2019a, 2019b). PFAS sampling began in 2019 so no data are available for these constituents from previous years.

2.2 GREATER STRAWBERRY POINT AREA

The GSP area is a cleared and partially-developed 75-acre site comprised of a former seaplane ramp, hangars, fuel tank farm, police building, and maintenance buildings. The site boundary extends from the southern end of the peninsula to Taxiway J, and eastward from Stansbury Creek to Taxiway F. The main terminal of MSA is northeast of GSP. From 1943 to 1963, the United States Navy leased GSP from the Glenn L. Martin Company for use as a hangar and equipment facility. During the tenancy, the Navy used a large hangar for seaplane maintenance, launching, and recovery operations. The former hangar and surrounding GSP area were known as Naval Weapons Industrial Reserve Plant No. 148. The United States Air Force subsequently occupied the facility (permit No. 1-N-MD-714) from December 16, 1963 until 1967. Currently, the State of Maryland uses the GSP area as a storage facility for police and medevac helicopters. Lockheed Martin owns one of the corporate hangar facilities within the GSP area (Figure 2-1).

2.3 PHYSICAL FEATURES

2.3.1 Land Use

MSA is generally characterized as a moderately-developed tract in a largely suburban setting. Land use surrounding MSA is, to a significant degree, a combination of mixed suburban, industrial, and light-to-moderate commercially developed and woodland tracts. MSA is bordered on the north by Eastern Boulevard (Maryland Route 150) and Amtrak railroad tracks. Undeveloped woodland tracts and low-density residential properties are north of MSA and the Amtrak line. The eastern, southern, and western boundaries of MSA are bordered by Frog Mortar Creek and Stansbury Creeks; these creeks are wide, brackish, tidal tributaries of the Chesapeake Bay. The Lockheed Martin Middle River Complex (MRC) is along the northwestern boundary of MSA. Low- to medium-density residential land use and light commercial land use (e.g., shopping centers, convenience stores, restaurants) are beyond the creeks north, east, and west of MSA. Farther east and west of MSA are the high-density residential communities of Bengies Corner and Hawthorne Park.

2.3.2 Physiography

MSA is in the western shore of the Coastal Plain physiographic province. The Coastal Plain is comprised of alluvium-composed sediment from the Pleistocene Epoch and the Potomac Group of the Cretaceous Period. The Coastal Plain is generally characterized by low topographic relief. However, steep embankments and hills are found along stream channels, rivers, and the Chesapeake Bay.

2.3.3 Topography

Most of the land surface at MSA is flat to gently sloping in the areas of the airport runway, taxiways, and surrounding support operations. The airport runway forms a northwest to southeast-trending topographic ridge or drainage divide that gently slopes from the northwest to the southeastern end of the site. Runway elevations range from slightly over 20 feet above mean sea level (MSL) at the northern end of the runway to slightly over 10 feet above MSL at its southern end. The land also slopes northeastward and southwestward, away from the runway toward Frog Mortar and Stansbury Creeks.

GSP is southwest and south of the MSA runway. Site topography ranges from flat to gently sloping to the southwest toward Stansbury Creek. In the northern portion of GSP, land elevations range from approximately 11 feet above MSL near the runway to nearly mean sea level along the Stansbury Creek shoreline. A manmade drainage-channel and stormwater-detention basin are located along the northwestern edge of the GSP wooded area, between the Lockheed Martin corporate hangar and the tree line. Localized topography along Taxiway J and the paved areas adjacent to the corporate hangar is sloped toward these features, and surface water drainage follows a southerly slope toward Stansbury Creek.

2.3.4 Surface Water Hydrology

Stansbury and Frog Mortar Creeks are the nearest surface water bodies to the GSP and DRA. Stansbury and Frog Mortar Creeks are wide, brackish, tidal tributaries of the middle Chesapeake Bay. Surface water runoff from Taxiways F and J enters Stansbury Creek via localized drainage channels and storm sewers.

The GSP area has been historically documented as having poor surface/soil drainage. The 1989 preliminary assessment report for MSA states that the former nuclear buildings are within the Lenoir-Urban land complex, a soil type that is somewhat poorly drained and has low permeability (Maryland Hazardous and Solid Waste Management Administration [MHSWMA], 1989). The shoreline of Stansbury Creek historically extended more than 1500 feet north of its present location, passing along what is now the western side of the Northrop Grumman hangar into a wet grassy area that has never been developed. The former northern reach of the creek was partially filled in 1941; its current shoreline was filled in around 1945. Natural drainage patterns near the former creek bed (about 600 feet west of the former locations of Buildings KC and KJ, see Figure 2-2) make the entire area vulnerable to wet soil conditions.

2.3.5 Historic Uses of Per- and Polyfluoroalkyl Substances

Per- and polyfluoroalkyl substances (PFAS) are members of a diverse group of fluorinated chemicals that have been used in various applications and products since the 1940s. The various current and historical aviation, military, manufacturing, maintenance, and waste disposal activities at MSA may be potential sources of PFAS. The use of aqueous film-forming foams (AFFFs) has been documented as a potential source of PFAS at airports and military bases (Interstate Technology and Regulatory Council [ITRC], 2017). One such potential source of PFAS at MSA is the use of AFFF in the fire suppression systems of hangars, and in mobile fire suppression systems at the airport. Historical waste disposal activities and groundwater flow through the former landfill area may have introduced and distributed PFAS in the DRA.

SECTION 3
INVESTIGATION APPROACH AND METHODOLOGY

The March 2020 groundwater and surface water sampling work plan (Tetra Tech, 2020a) and the June 2020 addendum to this work plan (Tetra Tech, 2020b) were developed to determine the presence or absence of per- and polyfluoroalkyl substances (PFAS) in groundwater and surface water areas of Martin State Airport (MSA), with the overall objective of providing data to better understand the nature and extent of possible PFAS in site media. Field tasks included recording groundwater levels in select Dump Road Area (DRA) and Greater Strawberry Point (GSP) monitoring wells, and sampling and analyzing groundwater and surface water for PFAS.

3.1 GROUNDWATER AND SURFACE WATER SAMPLING

This section describes the field procedures that were implemented during this groundwater and surface water sampling program. Groundwater samples were collected from 27 groundwater monitoring wells (Table 3-1), including 16 monitoring wells within DRA and eleven wells within GSP. Figures 3-1 and 3-2 show Round 2 (June–July 2020) groundwater elevations for sampled upper and intermediate (respectively) surficial aquifer wells at the DRA; sampling occurred at 12 wells screened in the upper surficial aquifer and at four wells screened in the intermediate surficial aquifer. Figures 3-3 and 3-4 (respectively) show Round 2 (July 2020) groundwater elevations in upper and intermediate surficial aquifers sampled at GSP; Round 2 samples were collected from 10 wells screened in the upper surficial aquifer and from one well screened in the intermediate surficial aquifer. Figures 3-5 and 3-6 depict Round 2 surface water locations sampled at the DRA (two locations) and GSP (three locations), respectively, along with monitoring wells sampled at the DRA and GSP during Round 2. All sampling was accomplished in accordance with established methods and protocols for collecting and handling groundwater and surface water samples analyzed for PFAS, as outlined in the Tetra Tech Standard Operating Procedure (SOP) SA-1.8, included as Appendix A.

3.1.1 Water Level Measurements and Well Condition Assessment

Before sampling, static water levels were obtained from all groundwater-monitoring wells sampled, and from staff gauges within the two on–site ponds (Ponds 1 and 2), using a graduated electronic-sounding water-level meter. Static water levels were determined by lowering the meter's probe into the well until the liquid level indicator emitted an audible tone, indicating the air/water interface. The same method was used for the stilling wells in Ponds 1 and 2. The water level was read from the probe cable and recorded to the nearest 0.01 foot (as the depth to water with respect to the top of the casing). The water level was recorded on the appropriate groundwater-level measurement field form and in the field logbook.

3.1.2 Groundwater Sampling and Chemical Analyses

The wells sampled during this PFAS investigation are listed in Table 3-1.

Well purging—Monitoring wells were purged using low-flow purging techniques (United States Environmental Protection Agency [USEPA], 2002, 2010) before sample collection. Groundwater was purged with a peristaltic pump fitted with dedicated, disposable high-density polyethylene (HDPE) tubing or a PFAS-free submersible bladder pump (for deeper wells) positioned midway in the length of the well's saturated screen. While purging, the pumping rate ranged between 100 to 500 milliliters per minute (ml/min) and was measured constantly using a graduated cylinder and a timekeeping device. The purge rate was adjusted so that it did not exceed 300 ml/min, thus preventing a water level drawdown greater than 0.3 feet from the initial static water level (Tetra Tech, 2016c).

During groundwater purging, water-level drawdown measurements and groundwater general chemistry parameters (i.e., pH, temperature, specific conductance, dissolved oxygen [DO], oxidation-reduction potential [ORP], and turbidity) were recorded in the appropriate site-specific logbook every five to 10 minutes until purging was complete; these data were also recorded on low-flow purge data sheets. Water quality parameters were measured using a Horiba U-52 water quality meter. Turbidity readings were collected using a separate LaMotte 2020 portable turbidity meter. Before sampling each day, the water quality meters were calibrated using calibration standards and procedures provided in the instrument's user manual. Daily equipment and

calibration information was recorded on Tetra Tech "Equipment Calibration Log" sheets (Appendix B).

Dedicated groundwater sampling equipment and supplies, including tubing, were PFAS-free (e.g., non-Teflon® and non-polytetrafluoroethylene [PTFE]), as specified in Appendix A. All nondedicated equipment was certified PFAS-free (Appendix C). Water level meters were rinsed between locations to ensure they were not a source of cross contamination.

Purging was considered complete when the monitored water quality parameters were stabilized, when three saturated well-casing volumes had been removed, when the well was purged dry, or after 90-minutes, whichever occurred first. Well casing volumes were calculated by using the following formula:

$$(Total\ Depth\ of\ Well - Depth\ to\ Water) \times Well\ Radius\ (squared) \times \pi = Well\ Casing\ Volume$$

Well diameter values and well volumes based on one-foot water columns are as follows:

- one-inch wells; 0.041 gallons per foot
- two-inch wells; 0.163 gallons per foot
- three-inch wells; 0.367 gallons per foot
- six-inch wells; 1.469 gallons per foot

Stabilization was considered achieved when three consecutive readings, taken at five- to 10-minute intervals, were within ±0.2 standard units for pH, ± 10% for specific conductance and temperature, ±10% for DO and ORP, and less than 10 nephelometric turbidity units (NTUs) for turbidity. All purged water from the DRA wells was collected in five-gallon buckets and subsequently discharged into the DRA groundwater treatment plant facility sump at the end of each workday, as detailed in Section 3.1.7. Purged water from GSP wells was containerized in a 55-gallon United States Department of Transportation (USDOT)-approved steel drum (see Section 3.1.7).

Sample collection—After purging, groundwater was sampled from monitoring wells using the same dedicated tubing that was used during purging. Groundwater samples were collected using low-flow sampling protocols (USEPA, 2002, 2010) at the same pumping rate used during well purging (i.e., samples were collected immediately after purging without stopping the pump or changing the pumping rate). Water for PFAS analyses was pumped directly into the appropriate

PFAS-free sample containers (supplied by the laboratory). All samples were shipped to the lab on the same day they were collected.

Laboratory analyses— The analytical method used for this investigation is a laboratory-specific modified version of the USEPA Method 537. Groundwater monitoring wells were sampled for analysis of the following PFAS compounds:

- perfluorooctanesulfonic acid (PFOS)
- perfluorooctanoic acid (PFOA)
- perfluorononanoic acid (PFNA)
- perfluoroheptanoic acid (PFHpA)
- perfluorohexanesulfonic acid (PFHxS)
- perfluorobutanesulfonic acid (PFBS)
- 6:2 fluorotelomer sulfonate (6:2FTS)
- 8:2 fluorotelomer sulfonate (8:2FTS)

Eurofins Lancaster Laboratories met PFAS detection limits of 1 to 2 nanograms per liter (ng/L). Currently, Maryland does not have specific/numeric reporting requirements for PFAS.

Quality assurance/quality control (QA/QC) samples were collected to evaluate the accuracy of the analytical results, and to examine any possible source material that may have been introduced in the field or by the laboratory. QA/QC samples collected during this investigation included:

- Field reagent blanks, consisting of an aliquot of laboratory PFAS-free reagent water that was poured into a separate sample bottle nearby the sample collection area, were collected at a rate of one per day (total of seven samples).

- Equipment blanks for the water level meter were collected once per day (total of seven samples), while blanks for the HDPE tubing and water quality meter used for sampling were collected once per event.

- Field duplicate samples were collected at a 10% frequency (four samples).

- Matrix spike/matrix duplicate (MS/MSD) samples were collected on a 1:20 basis (three samples).

All analyses were turned around within 21 business days.

3.1.3 Surface Water Sampling and Chemical Analyses

Surface water sampling locations at DRA and GSP are listed in Table 3-2 and are shown on Figures 3-5 and 3-6 (respectively).

Surface water samples were collected as grab samples using direct fill sampling techniques. All samples were collected from a depth of approximately 10 centimeters (cm) below the water surface, and at least 10 cm above the bottom of the water body, as close to the center of the channel or water body as practical. A laboratory-provided pre-cleaned unpreserved HDPE bottle was submerged and allowed to fill until the desired sample volume was achieved. Care was taken to collect the sample volume from unagitated water to ensure that a representative sample free of sediment particles was collected.

All bottleware was supplied clean by the laboratory and specifically designed for PFAS analysis. This non-glass bottleware was free of materials containing Teflon™ or low-density polyethylene (LDPE) products.

Surface water samples collected at the DRA and GSP area during Round 2 were analyzed for the same eight PFAS compounds as the groundwater samples, plus an additional four compounds:

- perfluorobutanoic acid (PFBA)
- perfluoropentanoic acid (PFPeA)
- perfluorohexanoic acid (PFHxA)
- perfluorodecanoic acid (PFDA)

3.1.4 Documentation

A master site logbook was maintained as an overall record of field activities. Sample documentation was comprised of completed chain-of-custody forms and matrix-specific sample log sheets. The chain-of-custody forms were standardized to summarize and document pertinent sample information such as sample identification and type, matrix, date and time of collection,

preservation, and requested analysis. Sample custody procedures document sample acquisition and integrity. Groundwater-level measurement records and well purging and sampling records can be found in Appendix D, and all data validation reports, laboratory analysis reports, and chain-of-custody forms can be found in Appendix E.

3.1.5 Sample Nomenclature and Handling

Each groundwater and surface water sample collected during the characterization study was identified with a unique sample identification tag. The sample identification tag consisted of the site location (for groundwater samples only), the well number or surface water sampling location, and a six-digit sampling date. For example, a groundwater sample collected on July 3, 2020 from monitoring well MSA-MW-34S would be labeled as MSA-MW-34S-070320. A surface water sample collected on June 30, 2020 from monitoring location GSP-SWSD-C1 was labeled as GSP-SWSD-C1-063020.

Sample handling includes field-related considerations concerning the selection of sample containers, preservatives, allowable holding times, and analyses requested. Appropriate groundwater and surface water sample containers were used, as specified in Section 7.5 of the Tetra Tech SOP SA-1.8, which is included as Appendix A.

Proper custody procedures were followed throughout all phases of sample collection and handling. Chain-of-custody protocols were used throughout sample handling to establish the evidentiary integrity of sample containers. These protocols demonstrated that the samples were handled and transferred in a manner that would prevent or detect possible tampering. Sample containers were released under signature from the laboratory and were accepted under signature by the sampler(s) or responsible individual that maintains custody until the sample containers were transferred to the sampler(s). Transport containers returning to the laboratory were sealed with strapping tape and a tamper-proof custody seal. The custody seal included the signature of the individual releasing the transport container, along with the date and time.

3.1.6 Equipment Decontamination

Dedicated as well as disposable equipment was used for groundwater purging and groundwater sampling; therefore, decontamination activities for groundwater sampling were minimal. Reusable

equipment such as pumps and water level meters were decontaminated before and after each use. Decontamination of reusable equipment consisted of the following activities/procedures:

- scrubbing or pumping of Liquinox® and potable water solution throughout the contaminated components of the equipment
- thoroughly rinsing components with potable water
- thoroughly rinsing components with deionized water
- air drying
- collecting decontamination solutions for disposal

Surface water sampling was completed via direct fill using the laboratory-provided sampling containers; therefore, decontamination activities for surface water sampling were not necessary.

3.1.7 Waste Management

Investigation derived waste (IDW) consisting of decontamination rinsate water, purge water, and personal protective equipment (PPE) was generated during the groundwater and surface water characterization study. PPE IDW was brushed off, placed in trash bags, and disposed of in a facility trash receptacle located at the groundwater treatment facility in the DRA. Water generated during DRA well purging was collected in five-gallon buckets and subsequently dumped into the DRA groundwater treatment plant sump at the end of each workday, following protocols established during the 2019 annual groundwater monitoring event. The effluent and spent carbon media at the treatment plant have been analyzed for PFAS. Purge water generated from GSP was collected and stored in a USDOT-approved 55-gallon steel drum. This drum was appropriately labeled, logged on a drum inventory form, and relocated to a drum staging area at GSP.

IDW generated by this investigation was managed in accordance with the Lockheed Martin MSA waste management plan (WMP) (see Appendix F). IDW samples were collected and submitted to profile the wastes for appropriate transportation and disposal. Upon receipt of the IDW analytical data, the generated IDW was removed from the facility and properly disposed of in accordance with federal, state, and local regulations.

3.2 PROCESS WATER SAMPLING

The PFAS detected in DRA groundwater in 2019 prompted Lockheed Martin to determine whether PFAS was recovered by the groundwater interim response action (IRA) treatment system. Therefore, samples have been collected to determine PFAS concentrations in the influent extraction well stream. Samples were also collected at various points in the groundwater treatment system to determine if the PFAS were incidentally removed from the water stream by the existing unit processes, primarily by the liquid-phase granular activated carbon (LGAC) treatment. PFAS process water sampling was conducted in September 2019, and then again in June 2020, with expanded sampling locations to include individual extraction well and LGAC vessel influent/effluent sampling.

3.3 DATA MANAGEMENT

Laboratory data handling procedures met the requirements of the laboratory subcontract. All analytical and field data were maintained in the project files. The project files contain copies of the chain-of-custody forms, sample log forms, sampling location maps, and documentation of quality assurance and data validation.

3.3.1 Data Tracking and Control

Samples were tracked from the beginning to the end of the sampling event. Before field mobilization, the field operations leader (FOL) coordinated/initiated sample tracking. Sample jar labels were handwritten in the field. The labels were reviewed for adherence to work plan requirements and accuracy. The project manager (PM) coordinated with the analytical laboratory to ensure that the laboratory was aware of the number and type of samples and analyses to expect.

When field sampling was underway, the FOL forwarded the chain-of-custody forms to the PM or designee and the laboratory on each day that samples were collected. The PM or designee confirmed that the chain-of-custody forms provided the information required by the work plan. This process allowed for early detection of field errors so that adjustments could be made while the field team was in place.

After successful completion of all requested analyses, the laboratory submitted an electronic deliverable for every sample delivery group (SDG). Receipt of the electronic data deliverables for

Round 2 was delayed due to the implementation of a new laboratory information management system by the laboratory. When all electronic deliverables had been received from the laboratory, the PM or designee ensured that the laboratory had performed all requested analyses. Discrepancies were noted early enough so that all samples could be analyzed within the prescribed holding time.

3.3.2 Sample Information

Data from field measurements were recorded using appropriate log sheets. Reduction of field data entails summarizing and presenting these data in tabular form. Reduction of laboratory data entails manipulation of raw data instrument output into reportable results. The FOL verified field data (e.g., temperature readings) daily. Laboratory data was verified by the group supervisor and then by the laboratory's quality control/documentation department.

3.3.3 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 database was checked against the PDF file provided by the laboratory and updated as required, based on data qualifier flags applied during data validation.

3.3.4 Geographic Information System (GIS)

Data management systems for this investigation consist of a relational database and GIS to manage environmental information pertaining to MSA. The relational database stores chemical, geological, hydrogeological, and other environmental data collected during environmental investigations, and. allows environmental data to be posted onto base maps to graphically represent project information.

3.4 DATA REVIEW

Data obtained from this investigation consisted of groundwater and surface water analytical results that are intended to determine the presence or absence of PFAS in groundwater and surface water. Data validation (consisting of data completeness; holding times; calibrations; laboratory, equipment, and field blank contamination; field duplicate precision; and detection limits) was completed concurrent with the data evaluation. Chemical data were reviewed by Tetra Tech in

accordance with established USEPA protocols to assess the reliability and accuracy of the data. This review was based on the USEPA *National Functional Guidelines for Organic Superfund Methods Data Review* (USEPA, 2017) and the specifics of the analytical method used.

SECTION 4
RESULTS

This section presents groundwater and surface water sampling data and summarizes the results of the Round 2 groundwater and surface water investigation for per- and polyfluoroalkyl substances (PFAS). This section discusses PFAS detections in comparison to available United States Environmental Protection Agency (USEPA) guidance thresholds. The Maryland Department of the Environment (MDE) has not established an advisory level or standard for PFAS in drinking water or groundwater. Neither Maryland nor the USEPA have regulatory thresholds for PFAS in surface water. Results reported for this investigation are included in the summary tables of this section. Note that when discussing individual wells and samples in the following discussion, the prefix of "MSA-" or "GSP-" and the suffix for sampling date are omitted to improve readability.

4.1 DUMP ROAD AREA GROUNDWATER

Seventeen groundwater samples (including one duplicate) were collected for chemical analysis from 16 Dump Road Area (DRA) monitoring wells over a period of three days (June 29, 2020 through July 1, 2020). Twelve of the DRA wells sampled were in the upper surficial aquifer and four wells were in the intermediate surficial aquifer. Depth to water was measured in each well sampled during the June–July 2020 sampling event, as described in Section 3.1.1. Note that different wells were sampled during Round 2 as compared to Round 1, so direct comparisons between these two sampling events (for both chemical concentrations and groundwater elevations) are only possible when a given well was sampled in both rounds; these comparisons are included in the discussion below.

4.1.1 DRA Groundwater-Level Data

Table 4-1 lists groundwater-level measurements collected in June/July 2020 and computed groundwater elevations for sampled MSA wells. Table 4-1 lists static groundwater elevation levels recorded as depths measured from the top of the sampled well casings and includes a column with converted elevations based on the North American Vertical Datum of 1988 (NAVD88).

MSA groundwater elevations for the surficial aquifer around the DRA range from 7.02 feet above NAVD88 at well MW-44S (east of Pond 1) to 0.27 feet above NAVD88 at well MSA-MW-49S (near Frog Mortar Creek). Groundwater depths in the surficial aquifer ranged from approximately two foot to 21 feet below grade. Shallow groundwater was encountered near the MSA groundwater treatment plant (wells DMW-04S and DMW-05S) and adjacent to Frog Mortar Creek (wells MW-46S and MW-49S); deeper groundwater was found in the eastern portion of the site along the top of the fill embankment near Frog Mortar Creek (e.g., well MW-48I).

As shown on Figures 3-1 and 3-2, groundwater in MSA upper and intermediate surficial-aquifers generally flows east–northeast from the runway and taxiway toward Frog Mortar Creek.

4.1.2 DRA Groundwater-Chemical Data

Groundwater samples were collected from the DRA wells and analyzed for PFAS to provide data to better understand the nature and extent of PFAS in groundwater. Validated analytical results (Appendix E) data were used to generate statistical summary tables and positive detections (or "hits") tables for analytes detected in groundwater. Tables 4-2 through 4-5 present the Round 2 PFAS data for DRA. If the same well was sampled in both rounds, the Round 1 results are also presented.

Tables 4-2 and 4-4 (respectively) present statistical summaries for PFAS detections in upper and intermediate monitoring wells sampled in DRA, while Tables 4-3 and 4-5 list respective PFAS detections in the upper and intermediate aquifer. Shading in Tables 4-3 and 4-5 indicates results that exceed available comparison criteria; screening criteria are currently only available for three PFAS. The comparison criteria used for this investigation are USEPA drinking water advisory levels (USEPA, 2019) of 40 nanograms per liter (ng/L) for perfluorooctanoic acid (PFOA) and 40 ng/L for perfluorooctanesulfonic acid (PFOS), and the USEPA regional screening level (RSL) of 40,000 ng/L for perfluorobutanesulfonic acid (PFBS).

Figures 4-1 and 4-2 are DRA maps presenting detected concentrations of the three PFAS compounds (PFOA, PFOS, and PFBS) with USEPA-established screening levels; results exceeding criteria are shown in red. Analytical reports, data-validation reports, and chain-of-

custody forms are on compact disc (CD) in Appendix E. Results of the groundwater-chemical analyses for the DRA are below.

4.1.2.1 Perfluorooctanoic Acid (PFOA)

PFOA was detected at all groundwater sampling locations, including all 12 upper surficial aquifer wells (and one duplicate) and at all four intermediate aquifer wells (Tables 4-2 and 4-4), at concentrations ranging from 4.6 ng/L (MW-49S) to 2,300 ng/L (DMW-06S). PFOA was detected in DRA intermediate surficial aquifer wells at concentrations ranging from 2.6 ng/L (MW-34I) to 240 ng/L (MW-40I). The average PFOA concentrations (detects only) are 320 ng/L for upper surficial aquifer wells (Table 4-2), and 72 ng/L for intermediate surficial aquifer wells (Table 4-4). The detected average PFOA concentration from all DRA wells sampled in Round 1 was 27 ng/L.

As shown in Tables 4-3 and 4-5, PFOA exceeds its screening criterion (40 ng/L) in 12 of 16 samples (10 upper surficial aquifer wells and two intermediate wells). Exceedances occur in the upper surficial-aquifer zones, east of Pond 1 at well MW-46S (74 ng/L), and at wells MW-50S (62 ng/L) and MW-51S (140 ng/L) alongside Frog Mortar Creek (Figure 4-1). Note that PFOA was detected at similar concentrations (78 ng/L and 80 ng/L) at well MW-46S during Round 1. Other surficial aquifer exceedances occurred near Taxiway Tango in the northwestern portion of the site at MW-34S (110 ng/L) and MW-35S (680 ng/L), and south and southeast of the groundwater treatment plant at DMW-04S (46 ng/L), DMW-05S (95 ng/L), DMW-07S (160 ng/L), and MW-40S (170 ng/L), with the highest detected DRA concentration at DMW-06S (2,300 ng/L). Round 2 PFOA exceedances were also detected in two intermediate surficial aquifer wells: MW-05I (43 ng/L) and MW-40I (240 ng/L).

4.1.2.2 Perfluorobutanesulfonic Acid (PFBS)

PFBS was detected in 12 upper surficial aquifer wells (including both the parent and duplicate at location MW-44S) and in all four intermediate aquifer wells sampled during Round 2 (Tables 4-2 and 4-4). Detected PFBS concentrations ranged from 1.6*J* ng/L (MW-44S) to 69 ng/L (MW-34S); all detected concentrations are well below its 40,000 ng/L screening level. During Round 2 the average detected PFBS concentrations for upper and intermediate surficial aquifer wells are 25.9 ng/L (Table 4-2) and 14.25 ng/L (Table 4-4), respectively. The average Round 1 detected PFBS concentration at DRA was 10.7 ng/L. The highest Round 2 PFBS concentration (69 ng/L

at MW-34S) detected at DRA was in the surficial aquifer in the northwestern Taxiway Tango area, alongside Dump Road. This location (MW-34S) also had the greatest PFBS concentration in DRA groundwater during Round 1.

4.1.2.3 Perfluorooctanesulfonic Acid (PFOS)

PFOS was detected at all 16 DRA Round 2 sampling locations (Tables 4-2 and 4-4), at concentrations ranging from 9.1 ng/L (MW-34I) to 7,800 ng/L (DMW-06S). PFOS concentrations range from 11 ng/L (MW-49S) to 7,800 ng/L (DMW-06S) in upper surficial aquifer wells (Figure 4-1), with an average (detects only) of 1,060 ng/L (Table 4-2), and from 9.1 ng/L (MW-34I) to 220 ng/L (MW-40I) in intermediate surficial aquifer wells (Figure 4-2), with a detected average of 66 ng/L (Table 4-4). The average detected PFOS concentration in Round 1 samples in all DRA wells was lower, at 42 ng/L.

PFOS exceeds its screening criterion (40 ng/L) in eight of 12 upper surficial-aquifer wells (Table 4-3 and Figure 4-1) and in one of four intermediate surficial aquifer wells (Table 4-5 and Figure 4-2). Exceedances occur in northwestern Taxiway Tango area alongside Dump Road at MW-34S (500*J* ng/L) and MW-35S (3,000 ng/L), and at wells east of the groundwater treatment plant (Figure 4-1). The only Round 2 intermediate-well exceedance (220 ng/L) of PFOS was at well MW-40I (Table 4-5, Figure 4-2). The highest Round 2 PFOS concentration at the DRA (7,800 ng/L at DMW-06S) is at a location southeast of the groundwater treatment plant and is co-located with the location of the highest Round 2 PFOA concentration. The location of the greatest Round 1 PFOA concentration (MW-40S) is located south of the treatment plant.

4.1.2.4 Perfluorononanoic Acid (PFNA)

PFNA was detected in 11 of 12 upper surficial aquifer samples and in two of four intermediate surficial-aquifer well samples collected during Round 2 (Tables 4-2 and 4-4). PFNA concentrations in the upper surficial aquifer wells ranged from 0.75*J* ng/L (MW-50S) to 25 ng/L (DMW-06S) with an average detected concentration of 8.1 ng/L, and from 0.56*J* ng/L (DMW-05I) to 3.3 ng/L (MW-40I) with an average of 1.9 ng/L in intermediate surficial-aquifer wells. The average detected PFNA concentration at DRA during Round 1 was 2.3 ng/L. The highest Round 2 PFNA concentration (25 ng/L at DMW-06S) occurred southeast of the groundwater treatment

plant and is also the location of the highest Round 2 PFOS and PFOA concentrations. Currently, no screening level is available for PFNA.

4.1.2.5 Perfluoroheptanoic Acid (PFHpA)

Perfluoroheptanoic acid (PFHpA) was detected in all 16 DRA wells sampled during Round 2 (Tables 4-2 and 4-4), at concentrations ranging from 3.4 ng/L (MW-49S) to 220 ng/L (DMW-06S) in upper surficial aquifer wells, and from 2.4 ng/L (MW-34I, MW-48I) to 37 ng/L (MW-40I) in intermediate surficial-aquifer wells. Average (detects only) PFNA concentrations are 42.9 ng/L and 12.3 ng/L for upper and intermediate surficial-aquifer wells, respectively. The location of the highest Round 2 PFHpA concentration (220 ng/L at DMW-06S) is collocated with other Round 2 maximum PFAS concentrations. Currently, no screening level is available for PFHpA.

4.1.2.6 Perfluorohexanesulfonic Acid (PFHxS)

Perfluorohexanesulfonic acid (PFHxS) was also detected in all groundwater samples collected at during Round 2 (Tables 4-2 and 4-4), at concentrations ranging from 4.2 ng/L (MW-44S) to 4,900 ng/L (DMW-06S) in upper surficial aquifer wells, and from 5.3 ng/L (MW-48I) to 1,400 ng/L (MW-40I) in intermediate surficial-aquifer wells. Average PFHxS concentrations (detects only) are 835 ng/L and 408.6 ng/L for upper and intermediate surficial-aquifer wells, respectively. Similar to PFOA and PFOS, the highest PFHxS concentration in the upper surficial-aquifer was detected at location DMW-06S. No screening level is currently available for PFHxS.

4.1.2.7 6:2 Fluorotelomer sulfonate

6:2 Fluorotelomer sulfonate (6:2FTS) was detected at three of 12 upper surficial-aquifer wells sampled during Round 2 (Tables 4-2 and 4-3), but was not detected in Round 1. Detected concentrations ranged from 30 ng/L (MW-34S) to 180 ng/L (DMW-06S and MW-35S). There were no 6:2FTS detections in intermediate surficial aquifer wells sampled. No screening level is currently available for 6:2FTS.

4.1.2.8 8:2 Fluorotelomer sulfonate

8:2 Fluorotelomer sulfonate (8:2FTS) was detected at two upper surficial-aquifer wells sampled during Round 2 (Tables 4-2 and 4-3), but was not detected in DRA wells during Round 1. Detected concentrations were 25*J* ng/L and 26 ng/L (DMW-06S and MW-35S, respectively). There were

no 8:2FTS detections in intermediate surficial aquifer wells sampled. No screening level is currently available for 8:2FTS.

4.2 GREATER STRAWBERRY POINT AREA GROUNDWATER

Fourteen groundwater samples (including three duplicates) were collected for chemical analysis from eleven GSP monitoring wells; samples were collected on July 1-7, 2020. Note that (similar to DRA) different wells were sampled during Round 2 as compared to Round 1, so direct comparisons between these two sampling events (for both chemical concentrations and groundwater elevations) are only possible when a given well was sampled in both rounds; these comparisons are included in the discussion below.

4.2.1 GSP Groundwater-Level Data

Table 4-1 lists the July 2020 groundwater-level measurements and computed groundwater elevations for sampled GSP wells. Table 4-1 lists static groundwater levels recorded as depth to groundwater measured from the top of the sampled wells' casings and includes a column with converted elevations based on the NAVD88. Surficial aquifer elevations at GSP range from 3.62 feet (GSP-MW-09) to 9.93 feet (GSP-MW-14) above NAVD88. As shown on Figure 3-3, localized mounding in the southeast portion of GSP produces flow both towards the taxiway to the northeast and towards Stansbury Creek.

4.2.2 GSP Groundwater-Chemical Data

Groundwater samples were collected from the Greater Strawberry Point (GSP) wells to provide PFAS groundwater data for selected monitoring wells and to better understand the nature and extent of PFAS in groundwater. Validated analytical results are in Appendix E. Validated groundwater-chemical data were used to generate statistical summary tables (Tables 4-6 and 4-8) that list only detected analytes.

Tables 4-7 and 4-9 list positive detections (or "hits") in Round 2 sampling data. Shading highlights PFAS results that exceed available comparison criteria (40 ng/L for PFOA, 40 ng/L for PFOS, and 40,000 ng/L for PFBS [USEPA, 2019]). Figure 4-3 presents detected concentrations of PFOA, PFOS, and PFBS in Round 2 GSP groundwater samples highlighting results exceeding USEPA

criteria in red. Analytical reports, data-validation reports, and chain-of-custody forms are on compact disc (CD) in Appendix E. Results of the groundwater-chemical analyses for sampled GSP wells are below.

4.2.2.1 Perfluorooctanoic Acid (PFOA)

PFOA was detected at all 10 upper surficial aquifer wells and in the one intermediate GSP well sampled during Round 2 (Tables 4-6 to 4-9, and Figure 4-3), at concentrations ranging from 0.84*J* ng/L (MW-19) to 66 ng/L (MW-20). The average PFOA concentration detected in upper surficial wells at GSP in Round 2 was 14.9 ng/L, which is similar to the average detection of 18.3 ng/L in GSP wells sampled during Round 1. The maximum PFOA concentration (66 ng/L) was the sole exceedance of the USEPA screening level (40 ng/L) and was detected in the upper surficial aquifer alongside Taxiway F, in the northwestern area of GSP (Figure 4-3). The remaining nine detections of PFOA were all below 40 ng/L.

4.2.2.2 Perfluorobutanesulfonic Acid (PFBS)

PFBS was detected in all 11 GSP wells sampled (Tables 4-6 and 4-8, and Figure 4-3), at concentrations ranging from 0.67*J* ng/L (MW-14) to 67 ng/L (MW-12).The Round 2 average (detects only) upper surficial PFBS concentration was 16.6 ng/L, compared to the Round 1 average detected concentration of 20.8 ng/L. The highest Round 2 PFBS concentration was detected in the upper surficial aquifer between the MSA maintenance building and the GSP wooded area (Figure 4-3). All detected PFBS concentrations are several orders of magnitude below its USEPA screening criterion (40,000 ng/L).

4.2.2.3 Perfluorooctanesulfonic Acid (PFOS)

PFOS was detected at all but one (MW-19) well sampled at GSP (Tables 4-6 and 4-8; Figure 4-3). Concentrations ranged from 5.6 ng/L (MW-14) to 170 ng/L (MW-10). Concentrations in three upper surficial aquifer wells (MW-07 [58 ng/L, in both the parent and duplicate samples], MW-10 [170 ng/L], and MW-12 [65 ng/L]) exceeded the USEPA screening level of 40 ng/L. These three wells are located near the MSA maintenance building. The average Round 2 PFOS concentration (detections only) in GSP upper surficial aquifer wells was 47.5 ng/L (above the 40 ng/L screening level); during Round 1 the average detected concentration in GSP wells sampled was only

22.4 ng/L. The PFOS concentration (29 ng/L) detected in the only sampled intermediate surficial-aquifer well (MW-23I) was below the USEPA screening level (Figure 4-3).

4.2.2.4 Perfluorononanoic Acid (PFNA)

PFNA was detected in nine of 11 GSP wells sampled, at concentrations ranging from 1.2*J* ng/L (MW-14) to 5.9 ng/L (MW-10), as shown in Tables 4-6 through 4-9. The highest PFNA concentration occurred in the southeastern area of GSP.

4.2.2.5 Perfluoroheptanoic Acid (PFHpA)

PFHpA was detected in 11 wells and in all three duplicate samples at GSP as shown in Tables 4-6 through 4-9. Concentrations ranged from 0.93 ng/L (MW-19) to 44 ng/L (MW-20). The spatial distribution (locations of minimum and maximum concentrations) is similar to that of PFOA, with the highest concentration (MW-20) near Taxiway F, and the lowest concentration only about 100 feet away (MW-19). PFHpA was detected at 19 ng/L in the southeastern area of GSP at MW-10. The next highest concentrations were detected nearby at wells MW-12 (12 ng/L) and MW-07 (8.7 ng/L and 9.1 ng/L in the parent and duplicate, respectively).

4.2.2.6 Perfluorohexanesulfonic Acid (PFHxS)

PFHxS was detected in all but one of the GSP Round 2 well locations (MW-19 and its duplicate). Concentrations ranged from 1.4*J* ng/L (MW-14) to 280 ng/L (MW-20), with the latter detected in the northwestern area of GSP near Taxiway F, and consistent with other Round 2 PFAS maximum concentrations (PFOA and PFHpA). The next highest concentrations (120 ng/L and 220 ng/L) were detected in the southeastern portion of GSP, at wells MW-10 and MW-12, respectively.

4.2.2.7 6:2 Fluorotelomer sulfonate

6:2 Fluorotelomer sulfonate (6:2FTS) was detected at four of the 11 Round 2 GSP groundwater sampling locations, and in upper surficial aquifer wells only. No detections were observed in Round 1. Concentrations ranged from 2.5*J* ng/L (MW-07, parent and duplicate) to 15 ng/L (MW-15). The maximum 6:2FTS concentration at MW-15 is southeast of the MSA maintenance building.

4.2.2.8 8:2 Fluorotelomer sulfonate

8:2 Fluorotelomer sulfonate (8:2FTS) was not detected in any of the GSP groundwater samples collected during Round 1 or Round 2.

4.3 DUMP ROAD AREA SURFACE WATER DATA

Surface water samples were collected for chemical analysis from both DRA locations (Pond 1 and Pond 2) on July 1, 2020 to provide data to better understand the nature and extent of PFAS in surface water. Validated analytical results are in Appendix E. Neither Maryland nor the USEPA have guidance thresholds for PFAS in surface water, so no comparison of site data to standards is provided.

Validated DRA surface water data were used to generate a statistical summary table (Table 4-10), and a table (Table 4-11) that lists only positive detections (or "hits") generated from these data. Analytical reports, data-validation reports, and chain-of-custody forms are in Appendix E. Results obtained from the surface water-chemical analyses at DRA are below. Figure 4-4 shows detections of PFAS in DRA surface water samples. Note that the samples collected at the two DRA ponds are identified by their names (i.e., Pond 1 or Pond 2) to increase readability.

4.3.1.1 Perfluorooctanoic Acid (PFOA) in DRA Surface Water

PFOA was detected in both DRA ponds (Tables 4-10 and 4-11; Figure 4-4), at concentrations of 3.3 ng/L (Pond 1) and 12 ng/L (Pond 2). The average detected surface water concentration in DRA pond samples during Round 2 was 7.6 ng/L, compared to an average concentration of 5.8 ng/L in Round 1.

4.3.1.2 Perfluorobutanesulfonic Acid (PFBS) in DRA Surface Water

PFBS was detected in Pond 2 only (Tables 4-10 and 4-11; Figure 4-4), at a concentration of 1.7*J* ng/L; this concentration is similar to that detected in Round 1 (1.1 ng/L).

4.3.1.3 Perfluorooctanesulfonate acid (PFOS) in DRA Surface Water

PFOS was detected in both DRA ponds (Tables 4-10 and 4-11; Figure 4-4), at concentrations of 5.4 ng/L (Pond 1) and 7.6 ng/L (Pond 2). The average detected surface water concentration for

DRA ponds during Round 2 was 6.5 ng/L, compared to an average concentration of 6.8 ng/L in Round 1.

4.3.1.4 Perfluorononanoic Acid (PFNA) in DRA Surface Water

PFNA was detected in both DRA ponds (Tables 4-10 and 4-11), at concentrations of 1.6*J* ng/L (Pond 1) and 2.1 ng/L (Pond 2), with an average of 1.8 ng/L.

4.3.1.5 Perfluoroheptanoic Acid (PFHpA) in DRA Surface Water

PFHpA was detected in both DRA ponds (Tables 4-10 and 4-11), at concentrations of 2.7 ng/L (Pond 1) and 6.2 ng/L (Pond 2), with an average of 4.4 ng/L.

4.3.1.6 Perfluorohexanesulfonic Acid (PFHxS) in DRA Surface Water

PFHxS was detected in both DRA ponds (Tables 4-10 and 4-11), at concentrations of 1.2*J* ng/L (Pond 1) and 2.0 ng/L (Pond 2), and with an average of 1.6 ng/L.

4.3.1.7 Other PFAS Detections in DRA Surface Water

6:2FTS and 8:2FTS were not detected in either DRA pond during Round 2. Four more PFAS compounds were analyzed for in surface water samples than in groundwater samples. All four compounds (perfluorobutanoic acid [PFBA], perfluoropentanoic acid [PFPeA], perfluorohexanoic acid [PFHxA], and perfluorodecanoic acid [PFDA]) were detected in both DRA surface water samples, as shown in Tables 4-10 and 4-11. PFDA was detected at low concentrations (0.6*J* ng/L and 0.68*J* ng/L, in Ponds 1 and 2, respectively). Concentrations of PFPeA (4.5 ng/L and 9.8 ng/L, for Ponds 1 and 2, respectively), are similar to PFHxA detections, which were 3.5 ng/L (Pond 1) and 10 ng/L (Pond 2). PFBA concentrations in Ponds 1 and 2 were 8.4 ng/L and 13 ng/L, respectively.

4.4 GREATER STRAWBERRY POINT SURFACE WATER DATA

Surface water samples were collected for chemical analyses from three GSP locations (GSP-SWSD-C1, GSP-SWSD-C2, and GSP-SWSD-C3) on July 7, 2020 (Figure 4-5) to provide data that better define the nature and extent of PFAS in GSP surface water. As stated earlier, neither Maryland nor USEPA have established PFAS guidance criteria for surface water. Validated

analytical results are in Appendix E. Validated groundwater-chemical data were used to generate a statistical summary table (Table 4-12) that lists only detected analytes.

Table 4-13 lists positive detections (or "hits") generated from these data. Figure 4-5 shows GSP surface water sample locations. Analytical reports, data-validation reports, and chain-of-custody forms are in Appendix E. Results of the surface water-chemical analyses for the GSP are below, without the prefix "GSP-SWSD-" to increase readability.

4.4.1.1 Perfluorooctanoic Acid (PFOA) in GSP Surface Water

As shown in Tables 4-12 and 4-13 and on Figure 4-5, PFOA was detected in all GSP surface water samples, at concentrations ranging from 18 ng/L (location C2) to 21 ng/L (location C3), with an average concentration of 19 ng/L. Concentrations in GSP surface water samples collected during Round 1 similarly ranged from 16 to 29 ng/L, with an average of 22.5 ng/L.

4.4.1.2 Perfluorobutanesulfonic Acid (PFBS) in GSP Surface Water

As shown in Tables 4-12 and 4-13 and on Figure 4-5, PFBS was detected in all GSP surface water samples, at concentrations ranging from 0.81*J* ng/L (location C1) to 1.1*J* ng/L (location C3), with an average concentration of 0.97 ng/L. A higher concentration of PFBS (11 ng/L) was detected in C2 during Round 1.

4.4.1.3 Perfluorooctanesulfonate Acid (PFOS) in GSP Surface Water

PFOS was detected in all three GSP surface water samples, at concentrations ranging from 3.4 ng/L (locations C1 and C2) to 4.7 ng/L (location C3), with an average concentration of 3.8 ng/L (see Tables 4-12 and 4-13, and Figure 4-5). The Round 2 PFOS concentration at location C2 is more than two orders of magnitude lower than the concentration (520 ng/L) detected during Round 1.

4.4.1.4 Perfluorononanoic Acid (PFNA) in GSP Surface Water

PFNA was detected in all three GSP surface water samples, at concentrations ranging from 7.5 ng/L (location C1) to 9.3 ng/L (location C3), with an average concentration of 8.37 ng/L (see Tables 4-12 and 4-13). Similarly, the average PFNA concentration for Round 1 GSP surface water samples was 8.0 ng/L.

4.4.1.5 Perfluoroheptanoic Acid (PFHpA) in GSP Surface Water

PFHpA was detected in all three GSP surface water samples, at concentrations ranging from 17 ng/L (locations C1 and C2) to 20 ng/L (location C3), with an average concentration of 18 ng/L (see Tables 4-12 and 4-13). Similarly, the average PFHpA concentration for Round 1 GSP surface water samples was 18.5 ng/L.

4.4.1.6 Perfluorohexanesulfonic Acid (PFHxS) in GSP Surface Water

PFHxS was detected in all three GSP surface water samples, at concentrations ranging from 1.5*J* ng/L (location C2) to 2.2 ng/L (location C3), with an average concentration of 1.76 ng/L (see Tables 4-12 and 4-13).

4.4.1.7 Other PFAS detections in GSP Surface Water

All four additional compounds (PFBA, PFPeA, PFHxA, and PFDA) analyzed for in surface water samples during this investigation were detected in all GSP surface water samples, as shown in Table 4-12. As shown on Table 4-13, PFDA was detected at consistent concentrations (3.2 ng/L-3.3 ng/L) in all three surface water samples, as were PFPeA (26 ng/L-27 ng/L), PFHxA (17 ng/L–18 ng/L), and PFBA (14 ng/L-15 ng/L).

As shown on Tables 4-12 and 4-13, 6:2FTS and 8:2FTS were both detected in all three GSP surface water samples. The concentrations of 6:2FTS ranged from 8.9 ng/L (location C1) to 9.7 ng/L (location C3). 8:2FTS concentrations ranged from 8.2 ng/L (location C1) to 11 ng/L (location C3).

4.5 TREATMENT PLANT PROCESS WATER

Specific sampling locations within the treatment plant process were targeted to determine if PFAS were present. Two rounds of PFAS process water sampling were conducted to date; the first was in September 2019 (Table 4-14) and the second in June 2020 (Table 4-15). Appendix G contains process diagrams depicting sampling locations. The first round of PFAS sampling (in September 2019) targeted three areas including the groundwater treatment plant influent, the air stripper effluent, and effluent from the liquid phase activated carbon (LGAC) vessel. The second round expanded process water PFAS sampling (June 2020) to include five individual extraction wells, as well as effluent from each individual LGAC vessel, in series with LGAC-610 in lead and LGAC-630 in lag) as well as the locations sampled in September 2019. Note that all quality control

samples including field reagent blanks and equipment blanks collected during both sampling rounds were nondetect for all PFAS compounds. Additionally, all effluent samples from the final carbon vessel (LGAC-630) collected in 2019 and 2020 were nondetect for all PFAS compounds.

Screening criteria for PFOA and PFOS were exceeded at two extraction wells in the Round 2 sampling locations. The results from both process water sampling rounds, as conducted in September 2019 and June 2020, are summarized below.

4.5.1 6:2-Fluorotelomer Sulfonate in Process Water

6:2FTS was not detected at any sampling location in September 2019, but was detected at extraction well EW-16S (3 ng/L) in June 2020. There is no current screening criterion for 6:2FTS.

4.5.2 8:2-Fluorotelomer Sulfonate in Process Water

8:2FTS was not detected at any sampling location in September 2019 or June 2020.

4.5.3 Perfluorooctanoic Acid (PFOA) in Process Water

PFOA was detected during both the September 2019 (all three locations) and June 2020 (eight of 10 locations) sampling rounds. PFOA concentrations ranged from 21 ng/L (air stripper effluent duplicate) to 25 ng/L (plant influent) in September 2019, and from 3 ng/L (EW-2I) to 130 ng/L (EW-16S) in June 2020. PFOA exceeded its screening criterion (40 ng/L) at two of eight locations detected in June 2020, both of which were extractions wells: EW-13I (66 ng/L, with 70 ng/L as duplicate) and EW-16S (130 ng/L).

4.5.4 Perfluorobutanesulfonic Acid (PFBS) in Process Water

In September 2019, PFBS was detected at low concentrations in plant influent and air stripper effluent but was nondetect at the LGAC effluent location. Low concentrations of PFBS were detected at nearly all locations in June 2020, and results at locations LGAC-630 effluent and EW-15S were nondetect.

4.5.5 Perfluoroheptanoic Acid (PFHpA) in Process Water

PFHpA was nondetect at LGAC effluent sampling location LGAC-630 in both sampling rounds, but was detected at low concentrations at every other sampling location in both rounds. Influent

PFHpA detections in June 2020 ranged from 1.3 ng/L (EW-2I) to 31 ng/L (EW-16S), and effluent concentrations ranged from 1.1 ng/L (LGAC-620) to 4.5 ng/L (LGAC-610). There is no current screening criterion for PFHpA.

4.5.6 Perfluorohexanesulfonic Acid (PFHxS) in Process Water

PFHxS influent and air-stripper effluent concentrations in September 2019 were similar and ranged from 88 ng/L (in the duplicate for the original air stripper result [92 ng/L]) to 99 ng/L in the plant effluent sample. In June 2020, PFHxS in influent samples ranged from 3.5 ng/L (duplicate sample at EW-2I) to 500 ng/L (diluted sample from EW-16S), while effluent concentrations remained relatively low (1.9 ng/L–63 ng/L), with the latter and highest effluent concentration (collected at the air stripper) slightly decreased from that detected last year. No screening criterion is currently available for PFHxS.

4.5.7 Perfluorononoanoic Acid (PFNA) in Process Water

PFNA was detected at low concentrations in both sampling rounds and was nondetect at the LGAC-630 effluent location in both rounds. In Round 1 (September 2019), PFNA was detected at the plant influent (0.56 ng/L) and at the air stripper effluent (0.51 ng/L, with a duplicate concentration of 0.53 ng/L). Influent PFNA concentrations in June 2020 range from 0.5 ng/L (EW-3S) to 1.9 ng/L (EW-16S); PFNA was detected at only one effluent location (air stripper) at a similar concentration (0.47 ng/L) to that detected in 2019. No screening criterion is currently available for PFNA.

4.5.8 Perfluorooctanesulfonic Acid (PFOS) in Process Water

PFOS was detected at multiple locations during both sampling rounds but was nondetect at LGAC-630 effluent during both rounds. PFOS was detected in plant influent (19 ng/L) and in air-stripper effluent (16 ng/L, with 17 ng/L in the duplicate sample) in September 2019, and at slightly higher concentrations (plant influent 34 ng/L, and air stripper effluent 27 ng/L) in June 2020. PFOS was detected at seven of 10 process water locations in June 2020, but exceeded its screening criterion (40 ng/L) at only two extraction wells (EW-13I [48 ng/L] and EW-16S [280 ng/L]).

SECTION 5
SUMMARY

This section summarizes the findings of the 2020 Round 2 groundwater and surface water sampling and analysis for per- and polyfluorinated substances (PFAS) at the Dump Road Area (DRA) and the Greater Strawberry Point Area (GSP) of Martin State Airport (MSA), as well as the two rounds of process water sampling completed at the Martin State Airport groundwater treatment plant.

Dump Road Area—

- Groundwater elevation data measured for the Dump Road Area upper and intermediate surficial-aquifers indicate the flow direction is generally east–northeast from the runway and taxiway toward Frog Mortar Creek. Consistent with past water-levels, the Round 2 results show higher shallow groundwater levels near the groundwater treatment plant (wells DMW-4S and DMW-5S), and adjacent to Frog Mortar Creek (wells MW-46S and MW-49S).

- Groundwater in the upper and intermediate surficial-aquifer zones flows east and northeast to Frog Mortar Creek. The groundwater interim remedial action extraction and treatment system started operation in November 2017 and has operated continuously with only a few inactive periods. When the system is operating, the groundwater flow field at all aquifer levels is directed towards the 16 extraction wells in the Dump Road Area.

- Samples from 16 groundwater wells and from surface water in two ponds were analyzed for PFAS assessment parameters to better understand the nature and extent of PFAS in groundwater and surface water. Detected groundwater concentrations were compared to the available United States Environmental Protection Agency (USEPA) drinking water advisory levels for three PFAS only: 40 nanograms per liter (ng/L) for perfluorooctanoic acid (PFOA), 40,000 ng/L for perfluorobutanesulfonic acid (PFBS), and 40 ng/L for perfluorooctanesulfonic acid (PFOS). Neither Maryland nor the United States Environmental Protection Agency have guidance thresholds for PFAS in surface water.

- Exceedances of the PFOA screening level (40 ng/L) were detected at 12 of 16 groundwater locations in areas north, west, and southeast of the waste material in the central portion of the Dump Road Area. PFOA was detected in surface water of both ponds at low concentrations (3.3 ng/L and 12 ng/L).

- PFBS was detected in groundwater from all 16 wells sampled during Round 2, but at concentrations well below its screening level (40,000 ng/L). PFBS was also detected at a low concentration (1.7 ng/L) in the surface water sample from Pond 2 only.

- PFOS exceedances of its USEPA screening level (40 ng/L) were detected at nine of 16 groundwater wells sampled, in areas northwest, north, and southeast of the waste material in the central portion of the Dump Road Area. PFOS was also detected in the surface water of both ponds at low concentrations (5.4 ng/L and 7.6 ng/L).

- Perfluorononanoic acid (PFNA) was detected at 13 of 16 groundwater sampling locations in the Dump Road Area, at concentrations ranging from 0.56*J* ng/L to 25 ng/L, and in both pond surface water samples collected.

- Perfluoroheptanoic acid (PFHpA) was detected in samples collected from all locations at concentrations ranging from 2.4 ng/L to 220 ng/L, and in both ponds sampled during Round 2.

- Perfluorohexanesulfonic acid (PFHxS) was detected in all 16 locations sampled in Round 2, at concentrations ranging from 4.2 ng/L to 4,900 ng/L, and in both pond samples.

- 6:2 Fluorotelomer sulfonate was detected in three of 16 locations sampled, and in upper surficial-aquifer wells (only), at concentrations ranging from 30 ng/L to 180 ng/L, and was not detected in pond surface water samples.

- 8:2 Fluorotelomer sulfonate was detected at only two of 16 DRA groundwater locations (upper surficial aquifer wells only), at concentrations of 25*J* ng/L and 26 ng/L, and was not detected in pond surface water samples.

- All four additional PFAS surface water parameters tested during Round 2 (perfluorobutanoic acid [PFBA], perfluoropentanoic acid [PFPeA], perfluorohexanoic acid [PFHxA], and perfluorodecanoic acid [PFDA]) were detected in both DRA pond locations.

- In general, the highest groundwater Round 2 PFAS concentrations in DRA were detected southeast of the waste area and treatment plant, at upper surficial aquifer well DMW-06S and near intermediate surficial aquifer well MW-40I. Greater PFAS concentrations were generally detected in Pond 2 relative to Pond 1.

Greater Strawberry Point Area —

- Fourteen samples (including three duplicates) from eleven groundwater wells and three surface water samples from Greater Strawberry Point were analyzed for PFAS assessment parameters to better understand the nature and extent of PFAS in groundwater and surface water in this area.

- One PFOA exceedance of the screening level (40 ng/L) was detected in upper surficial aquifer groundwater at well GSP-MW-20 (66 ng/L), in the northwestern area of Greater

Strawberry Point, near Taxiway F. PFOA was detected in all GSP groundwater and surface water sample locations collected during Round 2.

- PFBS was detected in groundwater samples collected from all 11 Round 2 locations (and in duplicate samples), and in all three GSP surface water samples. All detected groundwater concentrations were below its applicable screening level (40,000 ng/L).

- PFOS exceedances of the groundwater screening level (40 ng/L) were detected at three of 11 locations in four groundwater samples (three wells and one duplicate) during Round 2. All PFOS exceedances were in the southeastern portion of the site, near the maintenance building. PFOS was detected in all three Round 2 surface water samples at GSP.

- PFNA was detected at nine of 11 groundwater sampling locations (and in two associated duplicate samples), at concentrations ranging from 1.5*J* ng/L to 5.9 ng/L. PFNA was also detected in all three surface water samples.

- PFHpA was detected at all 11 groundwater sampling locations (and in three duplicate samples) at concentrations ranging from 0.93*J* ng/L to 44 ng/L. PFHpA was also detected in all three surface water samples.

- PFHxS was detected at eight of 11 sampling locations (and in two associated duplicate samples) at concentrations ranging from 1.4*J* ng/L to 280 ng/L, and was detected in all three surface water samples.

- 6:2 Fluorotelomer sulfonate (6:2FTS) was detected at four groundwater sampling locations and was detected in all three GSP surface water samples.

- 8:2 Fluorotelomer sulfonate (8:2FTS) was not detected in groundwater samples, but was detected in all three surface water samples collected at Greater Strawberry Point.

- All four additional surface water parameters tested during Round 2 (PFBA, PFPeA, PFHxA, and PFDA) were detected in all three surface water samples.

- At Greater Strawberry Point, the Round 2 maximum PFAS concentrations occurred at varied locations. The maximum PFOA concentration was at MW-20 in the northwestern area of the site, while the maximum PFOS concentration was at MW-10 in the southeastern portion. PFAS concentrations were generally consistent among the three surface water locations sampled at Greater Strawberry Point.

Treatment Plant Process Water—

- Process water sampling for PFAS compounds was conducted in September 2019 and again in June 2020 with expanded sampling locations (including five extraction wells) to determine the presence and concentration of PFAS entering and being processed by the groundwater treatment plant. Samples were collected at three process locations in September 2019: at the plant influent, at the air stripper effluent, and at the liquid-phase granular activated carbon (LGAC) effluent. PFAS sampling was conducted again in

June 2020, but additional sampling occurred at five extraction wells (EW-2I, EW-3S, EW-13I, EW-15I, and EW-16S) and at the individual carbon vessels (LGAC-610 in lead, LGAC-620, and LGAC-630 in lag).

- PFAS was detected in plant influent samples in both sampling rounds, but was not detected at the liquid granular activated carbon vessel effluent (LGAC-630 effluent) during either round, indicating that PFAS is being introduced to the groundwater treatment plant process water via the extraction wells, but is being removed by the carbon vessels.

- In June 2020, extraction wells EW-13I and EW-16S were the only two sampling locations (of the five extraction wells sampled) with PFAS exceedances of screening criteria; both wells contained PFOA and PFOS concentrations that exceeded the screening criteria, which is 40 ng/L for both.

SECTION 6
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FIGURES

Figure 1-1 Martin State Airport Site Location Map

Figure 2-1 Martin State Airport and Surrounding Features

Figure 2-2 Index Map for Current and Historical Structures as Existed in the 1960s, Greater Strawberry Point

Figure 3-1 Groundwater Elevation Contour Map, July 2020, Upper Surficial Aquifer—Dump Road Area

Figure 3-2 Groundwater Elevation Contour Map, July 2020, Intermediate Surficial Aquifer —Dump Road Area

Figure 3-3 Groundwater Elevation Contour Map, July 2020, Upper Surficial Aquifer—Greater Strawberry Point

Figure 3-4 Groundwater Elevation Data, July 2020, Intermediate Surficial Aquifer—Greater Strawberry Point

Figure 3-5 2020 PFAS Groundwater and Surface Water Sampling Locations—Dump Road Area

Figure 3-6 2020 PFAS Groundwater and Surface Water Sampling Locations—Greater Strawberry Point

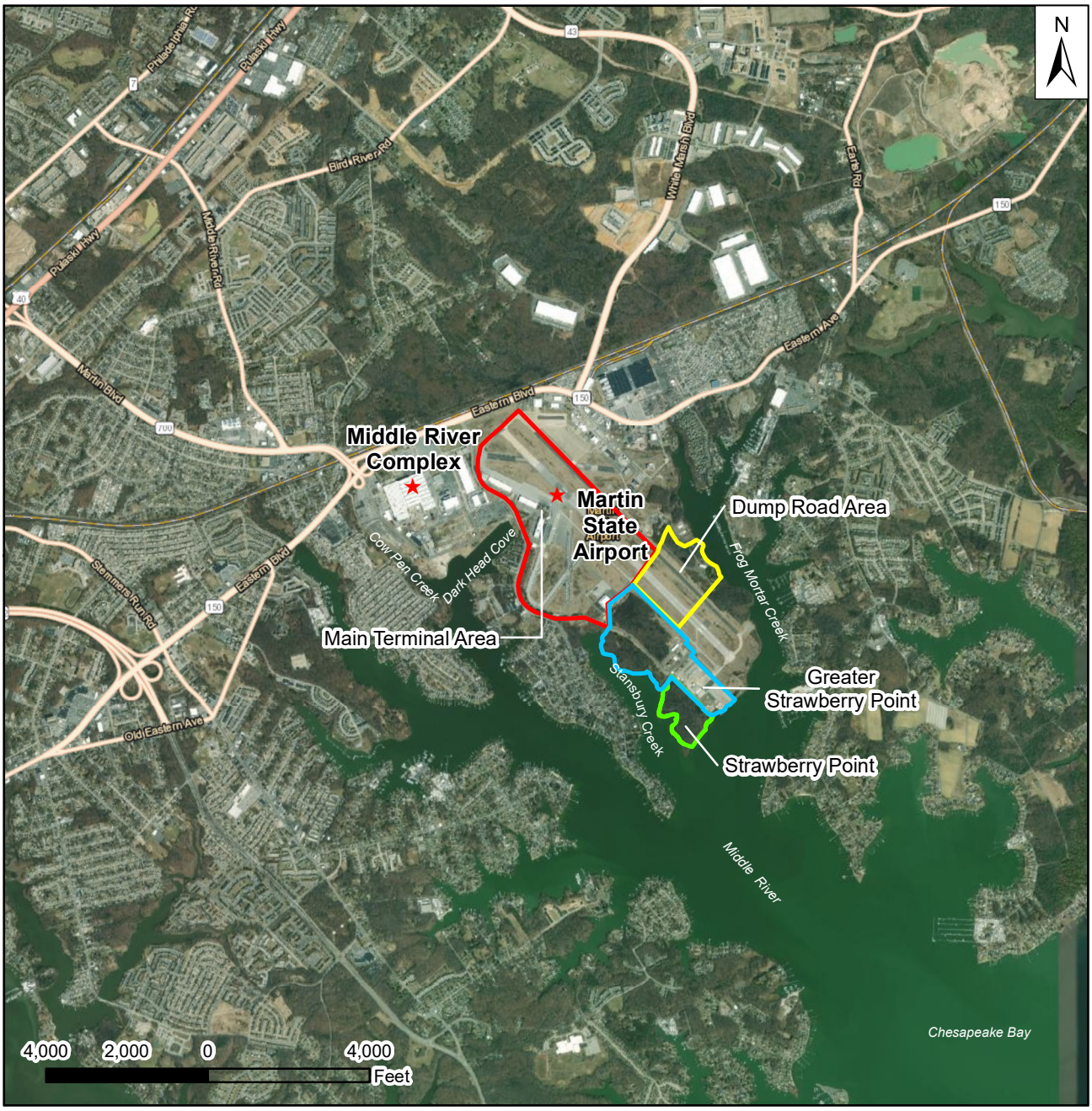
Figure 4-1 Concentrations of Perfluorooctanoic Acid (PFOA), Perfluorobutanesulfonic Acid (PFBS) and Perfluorooctanesulfonic Acid (PFOS) July 2020 – Upper Surficial Aquifer, Dump Road Area

Figure 4-2 Concentrations of Perfluorooctanoic Acid (PFOA), Perfluorobutanesulfonic Acid (PFBS) and Perfluorooctanesulfonic Acid (PFOS) July 2020 – Intermediate Surficial Aquifer, Dump Road Area

Figure 4-3 Concentrations of Perfluorooctanoic Acid (PFOA), Perfluorobutanesulfonic Acid (PFBS) and Perfluorooctanesulfonic Acid (PFOS) July 2020 – Greater Strawberry Point Area

Figure 4-4 Concentrations of Perfluorooctanoic Acid (PFOA), Perfluorobutanesulfonic Acid (PFBS) and Perfluorooctanesulfonic Acid (PFOS) July 2020 – Pond Sample Location, Dump Road Area

Figure 4-5 Concentrations of Perfluorooctanoic Acid (PFOA), Perfluorobutanesulfonic Acid (PFBS) and Perfluorooctanesulfonic Acid (PFOS) July 2020 – Surface Water Samples, Greater Strawberry Point Area



Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2017 ESRI and its data suppliers).

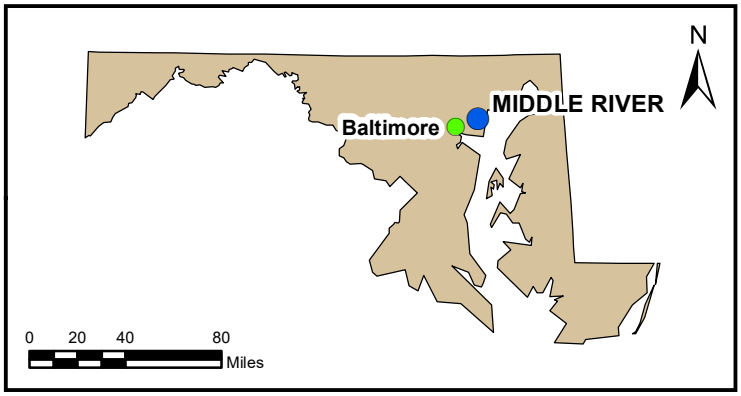


FIGURE 1-1

MARTIN STATE AIRPORT
SITE LOCATION MAP

Lockheed Martin, Martin State Airport
Middle River, Maryland

DATE MODIFIED:	02/12/19	CREATED BY:	JEE

TETRA TECH

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02/12/19 -- JEE



2017 aerial photograph provided by the State of Maryland.

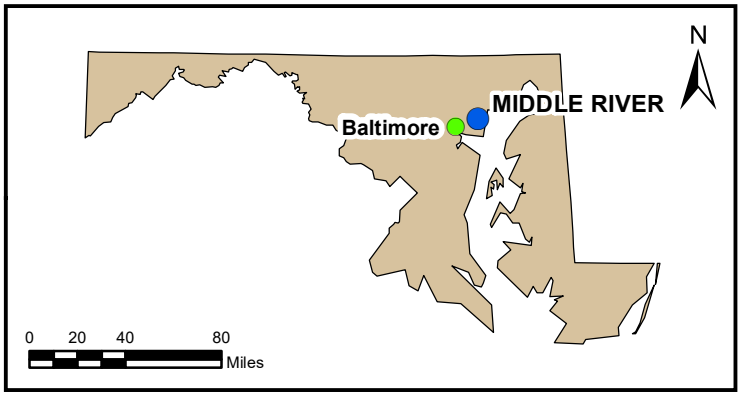

FIGURE 2-1

MARTIN STATE AIRPORT AND SURROUNDING FEATURES

Lockheed Martin, Martin State Airport
Middle River, Maryland

DATE MODIFIED:	CREATED BY:
10/16/20	JEE

TETRA TECH

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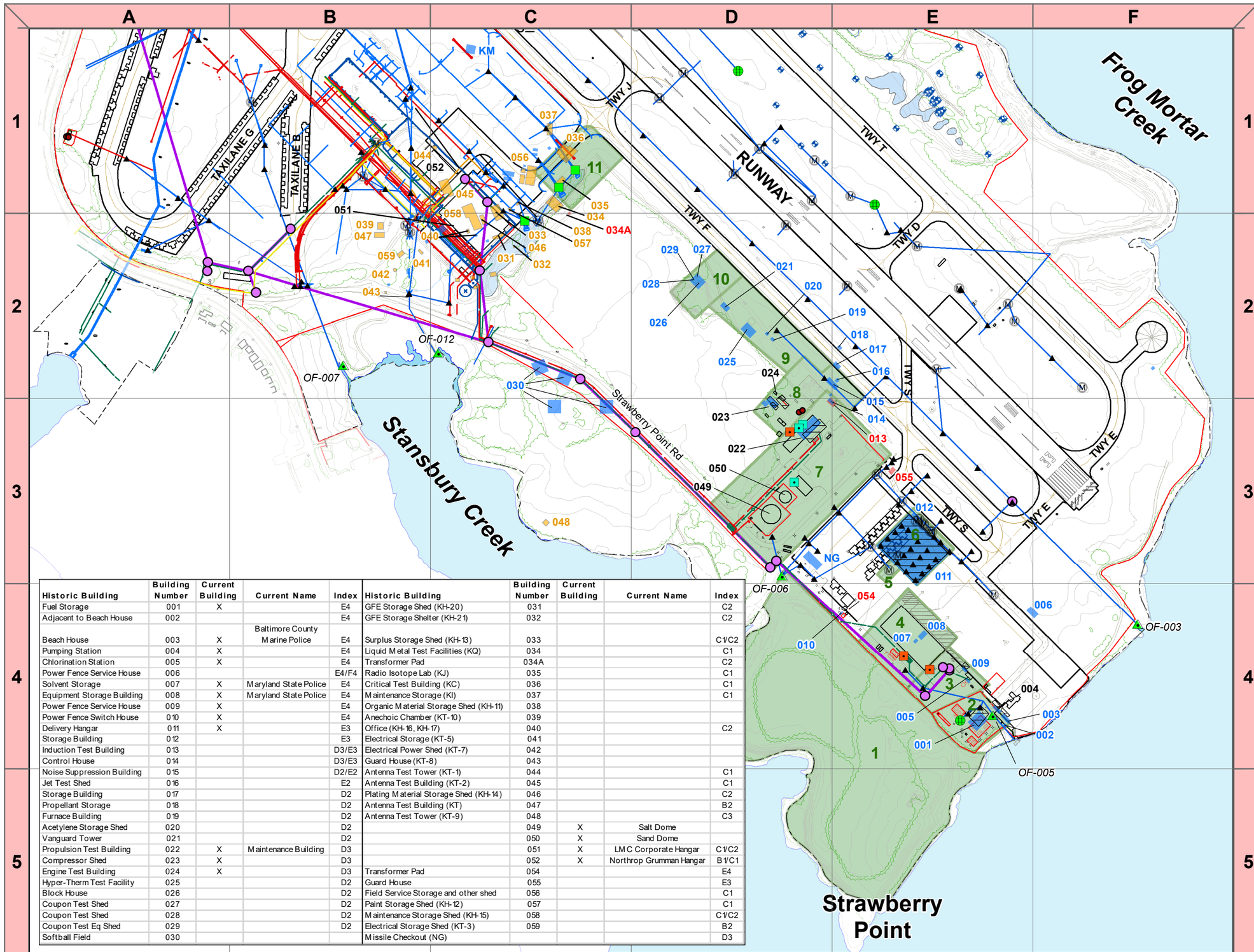
10/16/20 -- JEE

FIGURE 2-2
INDEX MAP FOR CURRENT AND HISTORICAL STRUCTURES AS EXISTED IN THE 1960S, GREATER STRAWBERRY POINT



Historic Building	Building Number	Current Building	Current Name	Index
Fuel Storage	001	X		E4
Adjacent to Beach House	002			E4
Beach House	003	X	Baltimore County Marine Police	E4
Pumping Station	004	X		E4
Chlorination Station	005	X		E4
Power Fence Service House	006			E4/F4
Solvent Storage	007	X	Maryland State Police	E4
Equipment Storage Building	008	X	Maryland State Police	E4
Power Fence Service House	009	X		E4
Power Fence Switch House	010	X		E4
Delivery Hangar	011	X		E3
Storage Building	012			E3
Induction Test Building	013			D3/E3
Control House	014			D3/E3
Noise Suppression Building	015			D2/E2
Jet Test Shed	016			E2
Storage Building	017			D2
Propellant Storage	018			D2
Furnace Building	019			D2
Acetylene Storage Shed	020			D2
Vanguard Tower	021			D2
Propulsion Test Building	022	X	Maintenance Building	D3
Compressor Shed	023	X		D3
Engine Test Building	024	X		D3
Hyper-Therm Test Facility	025			D2
Block House	026			D2
Coupon Test Shed	027			D2
Coupon Test Shed	028			D2
Coupon Test Eq Shed	029			D2
Softball Field	030			
GFE Storage Shed (KH-20)	031			C2
GFE Storage Shelter (KH-21)	032			C2
Surplus Storage Shed (KH-13)	033			C1/C2
Liquid Metal Test Facilities (KQ)	034			C1
Transformer Pad	034A			C2
Radio Isotope Lab (KJ)	035			C1
Critical Test Building (KC)	036			C1
Maintenance Storage (KI)	037			C1
Organic Material Storage Shed (KH-11)	038			
Anechoic Chamber (KT-10)	039			
Office (KH-16, KH-17)	040			C2
Electrical Storage (KT-5)	041			
Electrical Power Shed (KT-7)	042			
Guard House (KT-8)	043			
Antenna Test Tower (KT-1)	044			C1
Antenna Test Building (KT-2)	045			C1
Plating Material Storage Shed (KH-14)	046			C2
Antenna Test Building (KT)	047			B2
Antenna Test Tower (KT-9)	048			C3
	049	X	Salt Dome	
	050	X	Sand Dome	
	051	X	LMC Corporate Hangar	C1/C2
	052	X	Northrop Grumman Hangar	B1/C1
Transformer Pad	054			E4
Guard House	055			E3
Field Service Storage and other shed	056			C1
Paint Storage Shed (KH-12)	057			C1
Maintenance Storage Shed (KH-15)	058			C1/C2
Electrical Storage Shed (KT-3)	059			B2
Missile Checkout (NG)				D3

Legend

- Soil Borings (SB)
- Oil Filled Operational Equipment
- Drum Storage
- MTN Tanks
- MSA GW Wells
- MSA Inlets
- MSA Manholes
- NPDES Outfalls
- Sediment Basin
- Trench Drain
- Sanitary Manholes
- MTN Wells Pipes
- REC
- Current Structures (Black Building Numbers)
- Historical Structures (from 1964 Aerial Photograph, Yellow Building Numbers)
- Historical Structures (from 1966 Aerial Photograph and 1963 and 1964 Site Layout Maps, Blue Building Numbers)
- Historical Structures (from 1956 Drawing, Red Building Numbers)
- Sanitary Pipes
- Storm Pipes
- Gas
- Sanitary Line
- Storm Line
- Water
- Electricity
- Telephone Line
- Electric Utilities

Historic building location based on 1956 architect's drawing, 1963 and 1964 utility and site layout drawings, and aerial photos from 1964 and 1966.

MSA – Martin State Airport
NPDES – National Pollutant and Discharge Elimination System
MTN – Main Terminal
REC – Recognized Environmental Condition

REC #	REC Name
REC 1	Strawberry Point Wooded Areas
REC 2	Fuel Storage Tank Farm
REC 3	Old Wastewater Treatment Plant
REC 4	Former Solvent Storage Area
REC 5	Transformer Pad
REC 6	Former Hangar (Building ND), Former Storage Building
REC 7	Facility Maintenance Area
REC 8	Former Induction Test, Former Engine Test, Former Jet Test Shed, Former Storage Building, Former Propulsion Test and Former Compressor Shed Buildings
REC 9	Former Propellant Storage, Former Acetylene Storage Shed, Former Furnace Building, Former Hyper-Therm Test Facilities and Former Vanguard Tower
REC 10	Former Coupon Test Shed and Former Block House
REC 11	Former Critical Test Building (KC), Former Radioisotope Lab (KJ) and Former Transformer Pad

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 250 500 Feet

N

DATE MODIFIED: 01/24/20

CREATED BY: JEE

TETRA TECH

Map Document: (P:\GIS\Lockheed_MSA\MapDocs\MXD\Current Structures Index_may2016.mxd)
01/24/20 -- JEE



FIGURE 3-1

GROUNDWATER ELEVATION CONTOUR MAP, JULY 2020
UPPER SURFICIAL AQUIFER
DUMP ROAD AREA

LEGEND

- GROUNDWATER MONITORING WELL
- SURFACE WATER SAMPLE LOCATION
- MARYLAND AIR NATIONAL GUARD BOUNDARY
- **0.27** GROUNDWATER ELEVATION (IN FEET, NORTH AMERICAN VERTICAL DATUM, 1988)
- GROUNDWATER ELEVATION CONTOUR (CONTOUR INTERVAL = 1 FOOT DASHED WHERE INFERRED)

2017 aerial photograph provided by the State of Maryland.

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 100 200 Feet

N

DATE MODIFIED: 10/20/20

CREATED BY: PFO

TETRA TECH

Map Document: (P:\GIS\Lockheed_MSA\MapDocs\MXD\dra_gw_contours_upper_oct2020.mxd)
10/20/20 -- PFO



FIGURE 3-2

GROUNDWATER ELEVATION CONTOUR MAP, JULY 2020
INTERMEDIATE SURFICIAL AQUIFER
DUMP ROAD AREA

LEGEND

- GROUNDWATER MONITORING WELL
- SURFACE WATER SAMPLE LOCATION
- MARYLAND AIR NATIONAL GUARD BOUNDARY
- **0.03** GROUNDWATER ELEVATION (IN FEET, NORTH AMERICAN VERTICAL DATUM, 1988)
- GROUNDWATER ELEVATION CONTOUR (CONTOUR INTERVAL = 1 FOOT DASHED WHERE INFERRED)

2017 aerial photograph provided by the State of Maryland.

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 100 200 Feet

N

DATE MODIFIED: 10/21/20

CREATED BY: PFO

TETRA TECH

Map Document: (P:\GIS\Lockheed_MSA\MapDocs\MXD\dra_gw_contours_intermediate_oct2020.mxd)
10/21/20 -- PFO



FIGURE 3-3

GROUNDWATER ELEVATION CONTOUR MAP, JULY 2020
UPPER SURFICIAL AQUIFER
GREATER STRAWBERRY POINT

LEGEND

- GROUNDWATER MONITORING WELL
- SURFACE WATER SAMPLE LOCATION
- **6.24** GROUNDWATER ELEVATION (IN FEET, NORTH AMERICAN VERTICAL DATUM, 1988)
- 2 GROUNDWATER ELEVATION CONTOUR (CONTOUR INTERVAL = 2 FOOT DASHED WHERE INFERRED)

2017 aerial photograph provided by the State of Maryland.

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 100 200 Feet

N

DATE MODIFIED: 10/21/20

CREATED BY: PFO

TETRA TECH

Map Document: (P:\GIS\Lockheed_MSA\MapDocs\MXD\gsp_gw_contours_upper_oct2020.mxd)
10/21/20 -- PFO



FIGURE 3-4

GROUNDWATER ELEVATION CONTOUR MAP, JULY 2020
INTERMEDIATE SURFICIAL AQUIFER
GREATER STRAWBERRY POINT

LEGEND

- GROUNDWATER MONITORING WELL
- SURFACE WATER SAMPLE LOCATION
- 4.88 GROUNDWATER ELEVATION (IN FEET, NORTH AMERICAN VERTICAL DATUM, 1988)
- GROUNDWATER ELEVATION CONTOUR (CONTOUR INTERVAL = 1 FOOT DASHED WHERE INFERRED)

2017 aerial photograph provided by the State of Maryland.

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 100 200 Feet

N

DATE MODIFIED: 10/21/20

CREATED BY: PFO

TETRA TECH

Map Document: (P:\GIS\Lockheed_MSA\MapDocs\MXD\gsp_gw_contours_intermediate_oct2020.mxd)
10/21/20 -- PFO



FIGURE 3-5

2020 ROUND 2 PFAS GROUNDWATER AND SURFACE WATER SAMPLING LOCATIONS DUMP ROAD AREA

LEGEND

- GROUNDWATER MONITORING WELL
- SURFACE WATER SAMPLE LOCATION
- MARYLAND AIR NATIONAL GUARD BOUNDARY

2017 aerial photograph provided by the State of Maryland.

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 75 150 Feet

N

DATE MODIFIED: 10/16/20

CREATED BY: JEE

TETRA TECH

Map Document: (P:\GIS\Lockheed_MSA\MapDocs\MXD\dra_pfas_samplocs_jun2020.mxd)
10/16/20 -- JEE



FIGURE 3-6

2020 ROUND 2 PFAS GROUNDWATER AND SURFACE WATER SAMPLING LOCATIONS, GREATER STRAWBERRY POINT

LEGEND

- GROUNDWATER MONITORING WELL
- SURFACE WATER SAMPLE LOCATION

2017 aerial photograph provided by the State of Maryland.

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 100 200 Feet

N

DATE MODIFIED: 10/16/20

CREATED BY: JEE

TETRA TECH

Map Document: (P:\GIS\Lockheed_MSA\MapDocs\MXD\gsp_pfas_samplocs_jun2020.mxd)
10/16/20 -- JEE



FIGURE 4-1

CONCENTRATIONS OF PERFLUOROOCTANOIC ACID (PFOA), PERFLUOROBUTANESULFONIC ACID (PFBS) AND PERFLUOROOCTANESULFONIC ACID (PFOS), JULY 2020 - UPPER SURFICIAL AQUIFER, DUMP ROAD AREA

LEGEND

- SURFICIAL AQUIFER GROUNDWATER MONITORING WELL
- DEEP CONFINED AQUIFER GROUNDWATER MONITORING WELL
- MARYLAND AIR NATIONAL GUARD BOUNDARY

All results in nanograms per liter (ng/L).
Exceedances are shown in **red bold** type.
Exceendace levels:
- PFOA: 40 ng/L
- PFBS: 40,000 ng/L
- PFOS: 40 ng/L

(DUP) = duplicate sample.
J = estimated sample.
Samples taken between June 29 - July 7, 2020.
2017 aerial photograph provided by the State of Maryland.

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 100 200 Feet

N

DATE MODIFIED: 10/21/20

CREATED BY: JEE

TETRA TECH

Map Document: (P:\GIS\Lockheed_MSA\MapDocs\MXD\dra_gw_tags_jun2020_upper_pfas.mxd)
10/21/20 -- JEE



FIGURE 4-2

CONCENTRATIONS OF PERFLUOROOCTANOIC ACID (PFOA), PERFLUOROBUTANESULFONIC ACID (PFBS) AND PERFLUOROOCTANESULFONIC ACID (PFOS), JUNE 2020 - INTERMEDIATE SURFICIAL AQUIFER, DUMP ROAD AREA

LEGEND

- SURFICIAL AQUIFER GROUNDWATER MONITORING WELL
- DEEP CONFINED AQUIFER GROUNDWATER MONITORING WELL
- MARYLAND AIR NATIONAL GUARD BOUNDARY

All results in nanograms per liter (ng/L).
Exceedances are shown in **red bold** type.
Exceendace levels:
- PFOA: 40 ng/L
- PFBS: 40,000 ng/L
- PFOS: 40 ng/L

(DUP) = duplicate sample.
J = estimated sample.
Samples taken between June 29 - July 7, 2020.
2017 aerial photograph provided by the State of Maryland.

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 100 200 Feet

N

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TETRA TECH

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10/21/20 -- JEE



FIGURE 4-3

CONCENTRATIONS OF PERFLUOROOCTANOIC ACID (PFOA), PERFLUOROBUTANESULFONIC ACID (PFBS) AND PERFLUOROOCTANESULFONIC ACID (PFOS), JUNE 2020 - GREATER STRAWBERRY POINT

LEGEND

GROUNDWATER MONITORING WELL

All results in nanograms per liter (ng/L).
Exceedances are shown in **red bold** type.
Exceedance levels:
- PFOA: 40 ng/L
- PFBS: 40,000 ng/L
- PFOS: 40 ng/L

(DUP) = duplicate sample.
J = estimated sample.
Samples taken between June 29 - July 7, 2020.
2017 aerial photograph provided by the State of Maryland.

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 100 200 Feet

N

DATE MODIFIED: 10/26/20

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TETRA TECH

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FIGURE 4-4

CONCENTRATIONS OF PERFLUOROOCTANOIC ACID (PFOA), PERFLUOROBUTANESULFONIC ACID (PFBS) AND PERFLUOROOCTANESULFONIC ACID (PFOS), JUNE 2020 - POND SAMPLE LOCATIONS, DUMP ROAD AREA

LEGEND

- POND WATER SAMPLE LOCATION
- MARYLAND AIR NATIONAL GUARD BOUNDARY

J = estimated sample.
U = Not detected.
Samples taken between June 29 - July 7, 2020.
All results in nanograms per liter (ng/L).
2017 aerial photograph provided by the State of Maryland.

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 100 200 Feet

N

DATE MODIFIED: 10/15/20

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FIGURE 4-5

CONCENTRATIONS OF PERFLUOROOCTANOIC ACID (PFOA), PERFLUOROBUTANESULFONIC ACID (PFBS) AND PERFLUOROOCTANESULFONIC ACID (PFOS), JUNE 2020 - SURFACE WATER SAMPLES, GREATER STRAWBERRY POINT

LEGEND

SURFACE WATER SAMPLE LOCATION

J = estimated sample.
Samples taken between June 29 - July 7, 2020.
All results in nanograms per liter (ng/L).
2017 aerial photograph provided by the State of Maryland.

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 100 200 Feet

N

DATE MODIFIED: 10/15/20

CREATED BY: JEE

TETRA TECH

Map Document: (P:\GIS\Lockheed_MSA\MapDocs\MXD\gsp_sw_pfas_tags_jun2020.mxd)
10/15/20 -- JEE

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Table 3-1

Groundwater Wells Sampled for the Per- and Polyfluoroalkyl Substances (PFAS) Investigation, Round 2—July 2020 Martin State Airport, Middle River, Maryland

Dump Road Area		Greater Strawberry Point Area	
Upper surficial aquifer	**Intermediate surficial aquifer**	**Upper surficial aquifer**	**Intermediate surficial aquifer**
MSA-DMW-04S	MSA-MW-05I	GSP-MW-07	GSP-MW/SB-023I
MSA-DMW-05S	MSA-MW-34I	GSP-MW-09	
MSA-DMW-06S	MSA-MW-40I	GSP-MW-10	
MSA-DMW-07S	MSA-MW-48I	GSP-MW-12	
MSA-MW-34S		GSP-MW-13	
MSA-MW-35S		GSP-MW-14	
MSA-MW-40S		GSP-MW-15	
MSA-MW-44S		GSP-MW-16	
MSA-MW-46S		GSP-MW-19	
MSA-MW-49S		GSP-MW-20	
MSA-MW-50S			
MSA-MW-51S			

Table 3-2

Surface Water Locations Sampled for the for the Per- and Polyfluoroalkyl Substances (PFAS) Investigation, Round 2 – July 2020
Per- and Polyfluoroalkyl Substances (PFAS) Investigation
Martin State Airport, Middle River, Maryland

Dump Road Area	Greater Strawberry Point Area
Pond #1	GSP-SWSD-C1
Pond #2	GSP-SWSD-C2
	GSP-SWSD-C3

Table 4-1
Groundwater Levels and Elevations - February 2020
Lockheed Martin Martin State Airport, Middle River, Maryland

Well ID	Aquifer Level	Elevation Top of Well Casing NAVD88 (feet)	Depth to Groundwater Top of Well Casing (feet)	Groundwater Elevation NAVD88[(1)] (feet)
Dump Road Area - Upper surficial aquifer				
DMW-04S	S	20.52	20.15	0.37
DMW-05S	S	21.34	21.00	0.34
DMW-06S	S	18.62	18.15	0.47
DMW-07S	S	21.84	21.25	0.59
MW-34S	S	7.44	5.78	1.66
MW-35S	S	12.63	9.62	3.01
MW-40S	S	17.48	16.85	0.63
MW-44S	S	9.21	2.19	7.02
MW-46S	S	11.26	10.83	0.43
MW-49S	S	19.84	19.57	0.27
MW-50S	S	12.55	11.85	0.70
MW-51S	S	9.69	9.05	0.64
Dump Road Area - Intermediate surficial aquifer				
DMW-05I	I	21.39	21.36	0.03
MW-34I	I	7.37	5.77	1.60
MW-40I	I	17.59	16.98	0.61
MW-48I	I	19.94	20.68	-0.74

Table 4-1
Groundwater Levels and Elevations - February 2020
Lockheed Martin Martin State Airport, Middle River, Maryland

Well ID	Aquifer Level	Elevation Top of Well Casing NAVD88 (feet)	Depth to Groundwater Top of Well Casing (feet)	Groundwater Elevation NAVD88[(1)] (feet)
Greater Strawberry Point - All wells				
GSP-MW-7	S	8.74	4.09	4.65
GSP-MW-9	S	14.17	10.55	3.62
GSP-MW-10	S	9.02	2.78	6.24
GSP-MW-12	S	13.89	5.10	8.79
GSP-MW-13	S	13.70	3.88	9.82
GSP-MW-14	S	13.48	3.55	9.93
GSP-MW-15	S	13.71	5.92	7.79
GSP-MW-16	S	13.13	4.53	8.60
GSP-MW-19	S	9.85	3.53	6.32
GSP-MW-20	S	12.41	5.60	6.81
GSP-MW-23I	I	10.44	5.56	4.88

Synoptic groundwater-level measurements were collected on February 17-18, 2020.
See Appendix C for full datalogger files for Pond 1, Pond 2, and Conrads Dock Sensor data
"--" - Not available; NM - not measured
S - Upper surficial aquifer
I - Intermediate surficial aquifer
D - Lower surficial aquifer
D1 - Aquitard beneath lower surficial aquifer
DD - Deep confined aquifer below the lower surficial aquifer
NAVD88 = North American Vertical Datum of 1988
NM - not measured

Table 4-2
Statistical Summary for PFAS in Dump Road Area Upper Surficial Aquifer Wells—July 2020, Round 2
Martin State Airport, Middle River, Maryland

Parameter	PFAS Detected in Dump Road Upper Surficial Aquifer Wells-June/July 2020										
	Frequency of detection		Minimum concentration (detects)	Maximum concentration (detects)	Location of maximum concentration detected	Minimum concentration (nondetects)	Maximum concentration (nondetects)	Average of detected results	Average of all results	Standard deviation	Sampling date
	Number	Percent									
Per- and polyfluoroalkyl substances (ng/L)											
6:2 Fluorotelomer sulfonate (6:2FTS)	3/12	25	30	180	MSA-DMW-06S	4.2	4.8	130.0000	34.1667	68.5806	20200701
8:2 Fluorotelomer sulfonate (8:2FTS)	2/12	17	25 J	26	MSA-MW-35S	2.5	2.9	25.5000	5.3625	9.4088	20200630
Perfluorooctanoic acid (PFOA)	12/12	100	4.6	2300	MSA-DMW-06S	NULL	NULL	321.3417	321.3417	648.0858	20200701
Perfluorobutanesulfonic acid (PFBS)	12/12	100	1.6 J	69	MSA-MW-34S	NULL	NULL	25.8833	25.8833	23.9729	20200629
Perfluoroheptanoic acid (PFHpA)	12/12	100	3.4	220	MSA-DMW-06S	NULL	NULL	42.8542	42.8542	63.0879	20200701
Perfluorohexanesulfonic acid (PFHxS)	12/12	100	4.2	4900	MSA-DMW-06S	NULL	NULL	835.0292	835.0292	1335.2381	20200701
Perfluorononanoic acid (PFNA)	11/12	92	0.75 J	25	MSA-DMW-06S	1.9	1.9	8.1045	7.5083	8.7406	20200701
Perfluorooctanesulfonic acid (PFOS)	12/12	100	11	7800	MSA-DMW-06S	NULL	NULL	1055.3750	1055.3750	2277.9527	20200701

For non-detects, one-half the sample quantitation limit was used as a proxy concentration for statistical calculations.
One-half the detection limit was used for B qualified data.
NULL - no applicable sample results
J - estimated concentration
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances

Table 4-3
Detected Analytes and Screening-Criteria Exceedances in Dump Road Area
Upper Surficial Aquifer Groundwater Samples—July 2020, Round 2
Martin State Airport, Middle River, Maryland

LOCATION	Screening criteria	MSA-DMW-04S	MSA-DMW-05S	MSA-DMW-06S	MSA-DMW-07S	MSA-MW-34S	MSA-MW-35S	MSA-MW-40S	MSA-MW-44S		MSA-MW-46S	MSA-MW-49S	MSA-MW-50S	MSA-MW-51S
SAMPLE ID		MSA-DMW-4S-063020	MSA-DMW-5S-063020	MSA-DMW-6S-070120	MSA-DMW-7S-062920	MSA-MW-34S-062920	MSA-MW-35S-063020	MSA-MW-40S-062920	MSA-MW-44S-063020	MSA-MW-44S-063020-D	MSA-MW-46S-063020	MSA-MW-49S-062920	MSA-MW-50S-070120	MSA-MW-51S-070120
SAMPLING DATE		20200630	20200630	20200701	20200629	20200629	20200630	20200629	20200630	20200630	20200630	20200629	20200701	20200701
Per- and polyfluoroalkyl substances (ng/L)														
6:2 Fluorotelomer sulfonate (6:2FTS)	NC	--	--	180	--	30	180	--	--	--	--	--	--	--
8:2 Fluorotelomer sulfonate (8:2FTS)	NC	--	--	25 J	--	--	26	--	--	--	--	--	--	--
Perfluorooctanoic acid (PFOA)	40	**46**	**95**	**2300**	**160**	**110**	**680**	**170**	15	14	**74**	4.6	**62**	**140**
Perfluorobutanesulfonic acid (PFBS)	40000	11	17	62	30 J	69	57 J	23	1.6 J	1.6 J	2.6	2.4	13	22
Perfluoroheptanoic acid (PFHpA)	NC	12	15	220	27	74	99	20	4.5	4.2	8.5	3.4	10	21
Perfluorohexanesulfonic acid (PFHxS)	NC	300	560	4900	800	530	1200	950	4.2	4.3	6.5	9.6	300	460
Perfluorononanoic acid (PFNA)	NC	4.9	3.4	25	3	15	24	4.4	2.7	2.5	3.3	--	0.75 J	2.8
Perfluorooctanesulfonic acid (PFOS)	40	**300**	**250**	**7800**	**210**	**500 J**	**3000**	**370**	28	25	27	11	30	**140**

Shading indicates screening level exceedance
-- - not detected
J - estimated concentration
NC - no criteria
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances

Table 4-4
Statistical Summary for PFAS in Dump Road Area
Intermediate Surficial Aquifer Wells—July 2020, Round 2
Martin State Airport, Middle River, Maryland

Parameter	PFAS Detected in Dump Road Intermediate Surficial Aquifer Wells-July 2020										
	Frequency of detection		Minimum concentration (detects)	Maximum concentration (detects)	Location of maximum concentration detected	Minimum concentration (nondetects)	Maximum concentration (nondetects)	Average of detected results	Average of all results	Standard deviation	Sampling date
	Number	Percent									
Per- and polyfluoroalkyl substances (ng/L)											
Perfluorooctanoic acid (PFOA)	4/4	100	2.6	240	MSA-MW-40I	NULL	NULL	72.425	72.425	113.2711	20200629
Perfluorobutanesulfonic acid (PFBS)	4/4	100	1.7 J	41 J	MSA-MW-40I	NULL	NULL	14.25	14.25	18.0677	20200629
Perfluoroheptanoic acid (PFHpA)	4/4	100	2.4	37	MSA-MW-40I	NULL	NULL	12.3	12.3	16.6345	20200629
Perfluorohexanesulfonic acid (PFHxS)	4/4	100	5.3	1400	MSA-MW-40I	NULL	NULL	408.575	408.575	667.5215	20200629
Perfluorononanoic acid (PFNA)	2/4	50	0.56 J	3.3	MSA-MW-40I	1.9	1.9	1.93	1.44	1.2536	20200629
Perfluorooctanesulfonic acid (PFOS)	4/4	100	9.1	220	MSA-MW-40I	NULL	NULL	66.425	66.425	102.7211	20200629

For non-detects, one-half the sample quantitation limit was used as a proxy concentration for statistical calculations.
One-half the detection limit was used for B qualified data.
NULL - no applicable sample results
J - estimated concentration
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances

Table 4-5
Detected Analytes and Screening-Criteria Exceedances in Dump Road Area
Intermediate Surficial Aquifer Groundwater Samples—July 2020, Round 2
Martin State Airport, Middle River, Maryland

LOCATION	Screening Criteria	MSA-DMW-05I	MSA-MW-34I	MSA-MW-40I	MSA-MW-48I
SAMPLE ID		MSA-DMW-5I-063020	MSA-MW-34I-062920	MSA-MW-40I-062920	MSA-MW-48I-062920
SAMPLE DATE		20200630	20200629	20200629	20200629
Per- and polyfluoroalkyl substances (ng/L)					
Perfluorooctanoic acid (PFOA)	40	**43**	2.6	**240**	4.1
Perfluorobutanesulfonic acid (PFBS)	40000	8.8	5.5	41 J	1.7 J
Perfluoroheptanoic acid (PFHpA)	NC	7.4	2.4	37	2.4
Perfluorohexanesulfonic acid (PFHxS)	NC	210	19	1400	5.3
Perfluorononanoic acid (PFNA)	NC	0.56 J	--	3.3	--
Perfluorooctanesulfonic acid (PFOS)	40	27	9.1	**220**	9.6

Shading indicates screening level exceedance

-- - not detected

J - estimated concentration

NC - no criteria

ng/L - nanograms per liter

PFAS - per- and polyfluoroalkyl substances

Table 4-6
Statistical Summary for PFAS in Greater Strawberry Point
Upper Surficial Aquifer Wells—July 2020, Round 2
Martin State Airport, Middle River, Maryland

Parameter	PFAS Detected in Greater Strawberry Point Upper Surficial Aquifer Wells - July 2020										
	Frequency of detection		Minimum concentration (detects)	Maximum concentration (detects)	Location of maximum concentration detected	Minimum concentration (nondetects)	Maximum concentration (nondetects)	Average of detected results	Average of all results	Standard deviation	Sampling date
	Number	Percent									
Per- and polyfluoroalkyl substances (ng/L)											
6:2 Fluorotelomer sulfonate (6:2FTS)	4/10	40	2.5 J	15	GSP-MW-15	4.5	50	6.9625	6.4600	7.6122	20200706
Perfluorooctanoic acid (PFOA)	10/10	100	0.84 J	66	GSP-MW-20	NULL	NULL	14.8670	14.8670	19.1484	20200702
Perfluorobutanesulfonic acid (PFBS)	10/10	100	0.67 J	67	GSP-MW-12	NULL	NULL	16.6220	16.6220	25.8272	20200702
Perfluoroheptanoic acid (PFHpA)	10/10	100	0.93 J	44	GSP-MW-20	NULL	NULL	10.1465	10.1465	13.1149	20200702
Perfluorohexanesulfonic acid (PFHxS)	9/10	90	1.4 J	280	GSP-MW-20	1.9	1.9	79.8111	71.9250	102.7507	20200702
Perfluorononanoic acid (PFNA)	8/10	80	1.2 J	5.9	GSP-MW-10	1.9	20	2.9563	3.4600	2.6909	20200706
Perfluorooctanesulfonic acid (PFOS)	9/10	90	5.6	170	GSP-MW-10	1.9	1.9	47.4778	42.8250	49.4491	20200706

For non-detects, one-half the sample quantitation limit was used as a proxy concentration for statistical calculations.
One-half the detection limit was used for B qualified data.
NULL - no applicable sample results
J - estimated concentration
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances

Table 4-7
Detected Analytes and Screening-Criteria Exceedances in Greater Strawberry Point
Upper Surficial Aquifer Groundwater Samples—July 2020, Round 2
Martin State Airport, Middle River, Maryland

LOCATION	Screening criteria	GSP-MW-07		GSP-MW-09	GSP-MW-10	GSP-MW-12	GSP-MW-13		GSP-MW-14	GSP-MW-15	GSP-MW-16	GSP-MW-19		GSP-MW-20
SAMPLE ID		GSP-MW-7-070620	GSP-MW-7-070620-D	GSP-MW-9-070120	GSP-MW-10-070620	GSP-MW-12-070220	GSP-MW-13-070720	GSP-MW-13-070720-D	GSP-MW-14-070220	GSP-MW-15-070620	GSP-MW-16-070720	GSP-MW-19-070120	GSP-MW-19-070120-D	GSP-MW-20-070220
SAMPLING DATE		20200706	20200706	20200701	20200706	20200702	20200707	20200707	20200702	20200706	20200707	20200701	20200701	20200702
Per- and polyfluoroalkyl substances (ng/L)														
6:2 Fluorotelomer sulfonate (6:2FTS)	NC	2.7 J	2.5 J	--	6.1	--	4.1 J	4.2 J	--	15	--	--	--	--
Perfluorooctanoic acid (PFOA)	40	13	13	6.6	24	13	3.4	3.9	3.3	7.1	11	1.2 J	0.84 J	**66**
Perfluorobutanesulfonic acid (PFBS)	40000	14	14	2	15	67	1.6 J	1.5 J	0.67 J	1.2 J	1.6 J	1.2 J	1.2 J	62
Perfluoroheptanoic acid (PFHpA)	NC	8.7	9.1	3.8	19	12	2.9	2.9	2.4	4	3.4	1.2 J	0.93 J	44
Perfluorohexanesulfonic acid (PFHxS)	NC	73	74	6.6	120	220	7	6.6	1.4 J	3.2	6.8	--	--	280
Perfluorononanoic acid (PFNA)	NC	2.8	2.9	2.8	5.9	3.4	1.6 J	1.6 J	1.2 J	2.6	3.3	--	--	--
Perfluorooctanesulfonic acid (PFOS)	40	**58**	**58**	25	**170**	**65**	24	25	5.6	33 J	38	--	--	8.2 J

Shading indicates screening level exceedance
-- - not detected
J - estimated concentration
NC - no criteria
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances

Table 4-8
Statistical Summary for PFAS in Greater Strawberry Point Intermediate Surficial Aquifer Wells—July 2020, Round 2
Martin State Airport, Middle River, Maryland

Parameter	PFAS Detected in Greater Strawberry Point Intermediate Surficial Aquifer Wells-July 2020										
	Frequency of detection		Minimum concentration (detects)	Maximum concentration (detects)	Location of maximum concentration detected	Minimum concentration (nondetects)	Maximum concentration (nondetects)	Average of detected results	Average of all results	Standard deviation	Sampling date
	Number	Percent									
Per- and polyfluoroalkyl substances (ng/L)											
Perfluorooctanoic acid (PFOA)	1/1	100	8.4	8.4	GSP-MW/SB-023I	NULL	NULL	8.4	8.4	NULL	20200702
Perfluorobutanesulfonic acid (PFBS)	1/1	100	4.4	4.4	GSP-MW/SB-023I	NULL	NULL	4.4	4.4	NULL	20200702
Perfluoroheptanoic acid (PFHpA)	1/1	100	6.7	6.7	GSP-MW/SB-023I	NULL	NULL	6.7	6.7	NULL	20200702
Perfluorohexanesulfonic acid (PFHxS)	1/1	100	27	27	GSP-MW/SB-023I	NULL	NULL	27	27	NULL	20200702
Perfluorononanoic acid (PFNA)	1/1	100	1.5 J	1.5 J	GSP-MW/SB-023I	NULL	NULL	1.5	1.5	NULL	20200702
Perfluorooctanesulfonic acid (PFOS)	1/1	100	29	29	GSP-MW/SB-023I	NULL	NULL	29	29	NULL	20200702

For non-detects, one-half the sample quantitation limit was used as a proxy concentration for statistical calculations.
One-half the detection limit was used for B qualified data.
NULL - no applicable sample results
J - estimated concentration
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances

Table 4-9
Detected Analytes and Screening-Criteria Exceedances in Greater Strawberry Point Intermediate Surficial Aquifer Groundwater Sample—July 2020, Round 2
Martin State Airport, Middle River, Maryland

LOCATION	Screening criteria	GSP-MW/SB-023I
SAMPLE ID		GSP-MW-23I-070220
SAMPLING DATE		20200702
Per- and polyfluoroalkyl substances (ng/L)		
Perfluorooctanoic acid (PFOA)	40	8.4
Perfluorobutanesulfonic acid (PFBS)	40000	4.4
Perfluoroheptanoic acid (PFHpA)	NC	6.7
Perfluorohexanesulfonic acid (PFHxS)	NC	27
Perfluorononanoic acid (PFNA)	NC	1.5 J
Perfluorooctanesulfonic acid (PFOS)	40	29

Shading indicates screening level exceedance

-- - not detected

J - estimated concentration

NC - no criteria

ng/L - nanograms per liter

PFAS - per- and polyfluoroalkyl substances

Table 4-10
Statistical Summary for PFAS in Dump Road Area
Surface Water Samples—July 2020, Round 2
Martin State Airport, Middle River, Maryland

Parameter	PFAS Detected in DRA Pond Surface Water Samples-July 2020										
	Frequency of detection		Minimum concentration (detects)	Maximum concentration (detects)	Location of maximum detected concentration	Minimum concentration (nondetects)	Maximum concentration (nondetects)	Average of detected results	Average of all results	Standard deviation	Sampling date
	Number	Percent									
Per- and polyfluoroalkyl substances (ng/L)											
Perfluorooctanoic acid (PFOA)	2/2	100	3.3	12	POND-2	NULL	NULL	7.65	7.65	6.1518	20200701
Perfluorobutanesulfonic acid (PFBS)	1/2	50	1.7 J	1.7 J	POND-2	1.9	1.9	1.7	1.325	0.5303	20200701
Perfluorobutanoic acid (PFBA)	2/2	100	8.4	13	POND-2	NULL	NULL	10.7	10.7	3.2527	20200701
Perfluorodecanoic acid (PFDA)	2/2	100	0.6 J	0.68 J	POND-2	NULL	NULL	0.64	0.64	0.0566	20200701
Perfluoroheptanoic acid (PFHpA)	2/2	100	2.7	6.2	POND-2	NULL	NULL	4.45	4.45	2.4749	20200701
Perfluorohexanesulfonic acid (PFHxS)	2/2	100	1.2 J	2	POND-2	NULL	NULL	1.6	1.6	0.5657	20200701
Perfluorohexanoic acid (PFHxA)	2/2	100	3.5	10	POND-2	NULL	NULL	6.75	6.75	4.5962	20200701
Perfluorononanoic acid (PFNA)	2/2	100	1.6 J	2.1	POND-2	NULL	NULL	1.85	1.85	0.3536	20200701
Perfluorooctanesulfonic acid (PFOS)	2/2	100	5.4	7.6	POND-2	NULL	NULL	6.5	6.5	1.5556	20200701
Perfluoropentanoic acid (PFPeA)	2/2	100	4.5	9.8	POND-2	NULL	NULL	7.15	7.15	3.7477	20200701

For non-detects, one-half the sample quantitation limit was used as a proxy concentration for statistical calculations.
One-half the detection limit was used for B qualified data.
NULL - no applicable sample results
J - estimated concentration
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances

Table 4-11
Detected Analytes and Screening-Criteria Exceedances in
Dump Road Area Surface Water Samples—July 2020, Round 2
Martin State Airport, Middle River, Maryland

LOCATION SAMPLE ID SAMPLING DATE	Screening criteria	POND-1 MSA-SWSD-POND 1-070120 20200701	POND-2 MSA-SWSD-POND 2-070120 20200701
Per- and polyfluoroalkyl substances (ng/L)			
Perfluorooctanoic acid (PFOA)	NC	3.3	12
Perfluorobutanesulfonic acid (PFBS)	NC	--	1.7 J
Perfluorobutanoic acid (PFBA)	NC	8.4	13
Perfluorodecanoic acid (PFDA)	NC	0.6 J	0.68 J
Perfluoroheptanoic acid (PFHpA)	NC	2.7	6.2
Perfluorohexanesulfonic acid (PFHxS)	NC	1.2 J	2
Perfluorohexanoic acid (PFHxA)	NC	3.5	10
Perfluorononanoic acid (PFNA)	NC	1.6 J	2.1
Perfluorooctanesulfonic acid (PFOS)	NC	5.4	7.6
Perfluoropentanoic acid (PFPeA)	NC	4.5	9.8

Shading indicates screening level exceedance

-- - not detected
J - estimated concentration
NC - no criteria
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances

Table 4-12
Statistical Summary for PFAS in Greater Strawberry Point Surface Water Samples—July 2020, Round 2
Martin State Airport, Middle River, Maryland

Parameter	PFAS Detected in GSP Surface Water Samples-July 2020										
	Frequency of Detection		Minimum concentration (detects)	Maximum concentration (detects)	Location of maximum detected concentration	Minimum concentration (nondetects)	Maximum concentration (nondetects)	Average of detected results	Average of all results	Standard deviation	Sampling date
	Number	Percent									
Per- and polyfluoroalkyl substances (ng/L)											
6:2 Fluorotelomer sulfonate (6:2FTS)	3/3	100	8.9	9.7	GSP-SWSD-C3	NULL	NULL	9.3	9.3	0.4	20200707
8:2 Fluorotelomer sulfonate (8:2FTS)	3/3	100	8.2	11	GSP-SWSD-C3	NULL	NULL	9.4667	9.4667	1.4189	20200707
Perfluorooctanoic acid (PFOA)	3/3	100	18	21	GSP-SWSD-C3	NULL	NULL	19.3333	19.3333	1.5275	20200707
Perfluorobutanesulfonic acid (PFBS)	3/3	100	0.81 J	1.1 J	GSP-SWSD-C3	NULL	NULL	0.97	0.97	0.1473	20200707
Perfluorobutanoic acid (PFBA)	3/3	100	14	15	GSP-SWSD-C1	NULL	NULL	14.6667	14.6667	0.5774	20200707
Perfluorodecanoic acid (PFDA)	3/3	100	3.2	3.3	GSP-SWSD-C2	NULL	NULL	3.2667	3.2667	0.0577	20200707
Perfluoroheptanoic acid (PFHpA)	3/3	100	17	20	GSP-SWSD-C3	NULL	NULL	18	18	1.7321	20200707
Perfluorohexanesulfonic acid (PFHxS)	3/3	100	1.5 J	2.2	GSP-SWSD-C3	NULL	NULL	1.7667	1.7667	0.3786	20200707
Perfluorohexanoic acid (PFHxA)	3/3	100	17	18	GSP-SWSD-C1	NULL	NULL	17.6667	17.6667	0.5774	20200707
Perfluorononanoic acid (PFNA)	3/3	100	7.5	9.3	GSP-SWSD-C3	NULL	NULL	8.3667	8.3667	0.9018	20200707
Perfluorooctanesulfonic acid (PFOS)	3/3	100	3.4	4.7	GSP-SWSD-C3	NULL	NULL	3.8333	3.8333	0.7506	20200707
Perfluoropentanoic acid (PFPeA)	3/3	100	26	27 J	GSP-SWSD-C2	NULL	NULL	26.6667	26.6667	0.5774	20200707

For non-detects, one-half the sample quantitation limit was used as a proxy concentration for statistical calculations.
One-half the detection limit was used for B qualified data.
NULL - no applicable sample results
J - estimated concentration
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances

Table 4-13
Detected Analytes and Screening-Criteria Exceedances in
Greater Strawberry Point Surface Water Samples—July 2020, Round 2
Martin State Airport, Middle River, Maryland

LOCATION	Screening Criteria	GSP-SWSD-C1	GSP-SWSD-C2	GSP-SWSD-C3
SAMPLE ID		GSP-SWSD-C1-070720	GSP-SWSD-C2-070720	GSP-SWSD-C3-070720
SAMPLING DATE		20200707	20200707	20200707
Per- and polyfluoroalkyl substances (ng/L)				
6:2 Fluorotelomer sulfonate (6:2FTS)	NC	8.9	9.3	9.7
8:2 Fluorotelomer sulfonate (8:2FTS)	NC	8.2	9.2	11
Perfluorooctanoic acid (PFOA)	NC	19	18	21
Perfluorobutanesulfonic acid (PFBS)	NC	0.81 J	1 J	1.1 J
Perfluorobutanoic acid (PFBA)	NC	15	15	14
Perfluorodecanoic acid (PFDA)	NC	3.2	3.3	3.3
Perfluoroheptanoic acid (PFHpA)	NC	17	17	20
Perfluorohexanesulfonic acid (PFHxS)	NC	1.6 J	1.5 J	2.2
Perfluorohexanoic acid (PFHxA)	NC	18	17	18
Perfluorononanoic acid (PFNA)	NC	7.5	8.3	9.3
Perfluorooctanesulfonic acid (PFOS)	NC	3.4	3.4	4.7
Perfluoropentanoic acid (PFPeA)	NC	26	27 J	27

Shading indicates screening level exceedance

-- - not detected
J - estimated concentration
NC - no criteria
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances

Table 4-14

Detected Analystes and Screening Criteria Exceedances in Process Water Samples-September 2019, Round 1

Martin State Airport, Middle River, Maryland

LOCATION	Screening criteria	PLANT INFLUENT	AIR STRIPPER EFFLUENT		LGAC (LGAC630) EFFLUENT	EQUIPMENT BLANK	FIELD REAGENT BLANK
			(original sample)	(duplicate sample)			
SAMPLE ID		SP-PLANTINF-PFAS-091319	SP-AST400EFF-PFAS-1901319	DUPLICATE-W-091319	SP-LGAC630EFF-PFAS-091319	EQB-PFAS-091319	FRB-PFAS-091319
SAMPLING DATE		9/13/2019	9/13/2019	9/13/2019	9/13/2019	9/13/2019	9/13/2019
Per- a'-- polyfluoroalkyl substances (ng/L)							
6:2-Fluorotelomersulfonic acid (6:2FTS)	NC	--	--	--	--	--	--
8:2-Fluorotelomersulfonic acid (8:2FTS)	NC	--	--	--	--	--	--
Perfluorobutanesulfonic acid (PFBS)	40,000	5.8	5.7	5.5	--	--	--
Perfluoroheptanoic acid (PFHpA)	NC	4.8	5.2	5	--	--	--
Perfluorohexanesulfonic acid (PFHxS)	NC	99	92	88	--	--	--
Perfluorononanoic acid (PFNA)	NC	0.56 J	0.51 J	0.53 J	--	--	--
Perfluorooctanesulfonic acid (PFOS)	40	19	16	17	--	--	--
Perfluorooctanoic acid (PFOA)	40	25	20	21	--	--	--

'-- - not detected
J - estimated concentration
LGAC - liquid-phase granular activated carbon vessel
NC - no criteria
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances

Table 4-15
Detected Analystes and Screening Criteria Exceedances in Process Water Samples - June 2020, Round 2 Martin State Airport, Middle River, Maryland

SAMPLE LOCATION		FIELD BLANK	EW-13I		EW-15S	EW-16S		EW-2I		EW-3S	PLANT INFLUENT	AIR STRIPPER EFFLUENT	LGAC-610 EFFLUENT	LGAC-620 EFFLUENT	LGAC-630 EFFLUENT
NSAMPLE	SCREENING CRITERIA	FIELDBLANK-062220	SP-13I-062220	SP-13I-062220-D	SP-15-062220	SP-16S-062220	SP-16S-062220DL	SP-2I-062220	SP-2I-062220-D	SP-3S-062220	SP-PLANT-INF-06220	SP-AS400-EFF-062220	SP-LGAC610-EFF-062220	SP-LGAC620-EFF-062220	SP-LGAC630-EFF-062220
DUP OF				SP-13I-062220					SP-2I-062220						
Per- and polyfluoroalkyl substances (ng/L)															
6:2 Fluorotelomer sulfonate (6:2FTS)	NC	--	--	--	--	3 J		--	--	--	--	--	--	--	--
8:2 Fluorotelomer sulfonate (8:2FTS)	NC	--	--	--	--	--		--	--	--	--	--	--	--	--
Perfluorooctanoic acid (PFOA)	40	--	**66**	**70**	25	**130**		3	3	23	29	17	12	--	--
Perfluorobutanesulfonic acid (PFBS)	40,000	--	17	19	--	27 J-		0.86 J	0.84 J	5.6	6.3	3.1	5.7	2.2	--
Perfluoroheptanoic acid (PFHpA)	NC	--	13	13	6.9 J	31		1.4 J	1.3 J	5.1	5.8	3.2	4.5	1.1 J	--
Perfluorohexanesulfonic acid (PFHxS)	NC	--	300	320	--		500	3.6	3.5	96	120	63	46	1.9	--
Perfluorononanoic acid (PFNA)	NC	--	0.76 J	0.98 J	--	1.9		--	--	0.5 J	0.63 J	0.47 J	--	--	--
Perfluorooctanesulfonic acid (PFOS)	40	--	36	**48**	--	**280**		1.7 J	1.6 J	26	34	27	7.8	--	--

Shading indicates screening level exceedance

All units are in nanograms per liter (ng/L); all samples were collected on June 22, 2020.

-- - not detected
J - estimated concentration
LGAC - liquid-phase granular activated carbon vessel
NC - no criteria
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances

APPENDICES

Appendix A—2018 PFAS Sampling Standard Operating Procedure

Appendix B—Equipment Calibration Form

Appendix C—QED PFC-Free Sampling Pump Information

Appendix D—Monitoring-Well Purging and Sampling Records

Appendix E—Data-Validation Reports Analysis Reports and Chain-of-Custody Forms

Appendix F—Waste Management Plan

Appendix G—Process Water Sampling Locations, Treatment Plant

APPENDIX A—2018 PFAS SAMPLING STANDARD OPERATING PROCEDURE

TETRA TECH	STANDARD OPERATING PROCEDURE	Number SA-1.8	Page 1 of 12
		Effective Date 01/25/2018	Revision 3
		Applicability Tetra Tech, Inc., NUS Operating Unit	
		Prepared Earth Sciences Department	
Subject SAMPLE ACQUISITION FOR PERFLUOROALKYL AND POLYFLUOROALKYL SUBSTANCES (PFAS) ANALYSIS		Approved T. Johnston	tom. johnston @tetratech.com Digitally signed by: tom. johnston@tetratech.com DN: CN = tom. johnston@tetratech.com Date: 2018.01.25 14:21:16 -05'00'

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1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the methods and protocols to be used for collecting and handling samples to be analyzed for polyfluoroalkyl and perfluoroalkyl substances (PFAS). PFAS are present in many consumer products including some typical sampling equipment and are widely present in the environment.

Low regulatory criteria and high contamination potential require special precautions to be implemented to avoid compromising sample integrity. Instructions are provided herein for collection of environmental samples without contaminating them. This SOP is designed to supplement but not replace existing sampling SOPs SA-1.1, SA-1.2, SA-1.3, SA-1.7, and SA-5.1. In addition, some clients and/or projects may have specific PFAS-related sampling requirements that extend beyond the procedures described in this SOP. Such additional requirements typically are documented in work plans or similar documents.

2.0 SCOPE AND APPLICABILITY

This document provides information on selection of proper sampling equipment and techniques for groundwater, surface water, sediment, soil, and water supply sampling for PFAS analysis. Sampling of air or biota is not addressed in this SOP, but the same principles would apply for those media.

3.0 BACKGROUND

PFAS have been used since the 1940s as manufacturer-applied oil and water repellants on products such as clothing, upholstery, paper, and carpets and in making fluoropolymers for non-stick cookware. They are found in textiles and leather products, mist suppressants for metal plating, materials used in the photography industry, photolithography, semi-conductors, paper and packaging, coatings, cleaning products, pesticides, and cosmetics. They have been used in well-known consumer products including Teflon, StainMaster, Scotchgard, and GoreTex. In the 1960s, aqueous film-forming foam (AFFF) containing PFASs was developed for fighting flammable liquid fires, particularly petroleum-fueled (Class B) fires (ATSDR, 2009). The two most researched and most prevalent PFAS in the environment are perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) (ATSDR, 2009).

Military uses of PFAS have been primarily related to fire fighting and electroplating. AFFF meeting MIL-F-24385 specifications was developed by various manufacturers for use in extinguishing fires at military bases, airports, commercial facilities, and fire-fighting training facilities throughout the United States. Beginning in the late 1960s the United States Department of Defense (DoD) used large quantities of AFFF for shipboard and shore facility fire-suppression systems, on fire-fighting vehicles, and at fire-training facilities. AFFF concentrate that contains PFAS may still be in use at DoD facilities, and large quantities of AFFF may have been released to the environment at some facilities.

PFAS are persistent in the environment, tend to bioaccumulate, and demonstrate toxicity in laboratory animals, enough to raise concerns about their presence in the environment. Some areas where PFAS may have been released to the environment include the following:

- Fire-fighting training areas
- Areas where fire-fighting products/materials are stored
- Aircraft crash sites
- Metal coating and plating facilities
- Water treatment systems and receiving water bodies
- Airport hangars and other facilities storing fire-fighting foams
- Fluorochemical manufacturing, use, and disposal facilities

PFAS are ubiquitous in consumer products and are present in or on some materials used in environmental sampling (e.g., Teflon tubing, waterproof logbooks, and GoreTex field clothing). Laboratory detection limits are low for PFAS, and contact of sample material or sampling equipment with any one of the multitude of PFAS sources could result in detectable contamination. In addition, PFAS tend to adsorb to glass and some plastics, so certain glass or plastic sample collection containers are inappropriate for use in PFAS sample collection. Adsorption to sample containers may result in a low bias for measured PFAS concentrations.

Collection and analysis of quality control blanks is an important aspect of verifying that samples have not been contaminated during sample collection and handling. Use of additional blanks or blanks of a different type than usual may be required in some circumstances, and the governing project planning documents should be consulted. Consult Section 7.7 of this SOP for instructions regarding collection of field reagent blanks (FRBs).

4.0 DEFINITIONS AND ABBREVIATIONS

AFFF – Aqueous film-forming foam.

Emerging Contaminant – An emerging contaminant is a chemical or material that is characterized by a perceived, potential, or real threat to human health or the environment or by a lack of published health standards (U.S. EPA, 2014). A contaminant may also be "emerging" because a new source or a new pathway for human exposure has been discovered or a new detection method or treatment technology has been developed (DoD, 2011).

FRB – Field Reagent Blank. A blank sample prepared in the field by transferring laboratory-supplied, chemically preserved, deionized water to an empty, laboratory-supplied, collection bottle. FRBs are typically analyzed only for PFAS and are treated as site samples in all respects, including shipment to the sampling site, exposure to sampling site conditions, storage, preservation, and all PFAS analytical procedures. The purpose of FRBs is to indicate whether PFAS measured in corresponding site samples may have been introduced during sample collection and handling.

PFAS – Per- and Polyfluoroalkyl Substances. A reference term currently in use, replacing "PFCs" in recent scientific and other technical literature. The term is inclusive of both perfluorinated chemicals like PFOA and PFOS and polyfluoroalkyl substances like fluorinated telomers.

PFCs – Perfluorinated Compounds or Chemicals. PFCs are a family of man-made chemicals that have been used for commercial, industrial, and military applications because they resist thermal degradation and repel oil, stains, grease, and water.

PFOA – Perfluorooctanoic Acid. PFOA is used as an aqueous dispersion agent and in the manufacture of fluoropolymers (including Teflon) used in industrial components such as electrical wire casings, fire- and chemical-resistant tubing, and plumbing seal tape. PFOA is used in surface treatment products to impart oil, stain, grease, and water resistance. PFOA can also be produced by the breakdown of some fluorinated telomers.

PFOS – Perfluorooctane Sulfonate. PFOS was a key ingredient in Scotchgard and used in the manufacture of Class B AFFF used per DoD military specifications. Phase out of AFFF by 3M occurred in 2002.

5.0 SAFETY PRECAUTIONS

Sample acquisition activities shall be conducted in accordance health and safety requirements identified in the project-specific Health and Safety Plan (HASP), Accident Prevention Plan (APP), and corporate health and safety policies. Alteration may be necessary to allow sample collection without cross contamination as dictated by site-specific conditions.

Caution

The use of personal protective equipment (PPE) containing PFAS (e.g., some insect repellants, sunscreens, traffic safety vests, etc.) should be avoided if possible or, if deemed necessary to control hazards, should be carefully considered as they can pose a potential cross-contamination risk for samples. Extra care (e.g., changing outer gloves) must be exercised to ensure that PFAS is not transferred directly or indirectly from PPE to samples or sample containers.

The Tetra Tech Project Manager (PM), in coordination with the Tetra Tech NUS Operating Unit Health and Safety Group, shall ensure that the development of project-specific plans balances the need to control exposure to safety hazards as well as address PFAS contamination risks.

6.0 PERSONNEL RESPONSIBILITIES, QUALIFICATIONS, AND TRAINING

Project Manager (PM) – The PM along with the management team are responsible for determining sampling objectives, initial sampling locations, and field procedures used in the collection of samples of environmental media. Additionally, in consultation with other project personnel (geologist, hydrogeologist, etc.), the PM is responsible for selecting and detailing the specific sampling techniques and equipment to be used and for providing detailed input in this regard to the project planning documents. The PM has the overall responsibility for ensuring that sampling activities are properly conducted by appropriately trained staff.

Site Safety and Health Officer (SSHO) – The SSHO (or a qualified designee) is responsible for providing the technical support necessary to implement the project HASP, APP, or equivalent. The SSHO or SSHO designee may also be required to advise the Field Operations Leader (FOL) on safety-related matters regarding sampling, such as measures to mitigate potential hazards, hazardous objects, or conditions.

Project Geologist/Sampler – The project geologist/sampler is responsible for proper acquisition of samples in accordance with this SOP or other project-specific documents. In addition, this individual is responsible for the completion of all required paperwork (e.g., sample log sheets, field notebook, boring logs, container labels, custody seals, and chain-of-custody forms) associated with the collection of those samples.

Field Operations Leader (FOL) – This individual is primarily responsible for the execution of the field sampling program in accordance with the project planning documents. This is accomplished through management of a field sampling team for the proper acquisition of samples.

Personnel implementing this SOP must read and understand this SOP prior to collection of samples designated for PFAS analysis.

7.0 PROCEDURES

The following sampling procedure establishes requirements for collection of samples designated for PFAS analysis while minimizing potential cross contamination of the samples and other materials.

7.1 Selection of Equipment

It is important to research available equipment and materials at the project planning stage to avoid last-minute problems in the field, for example, ensuring compatibility of high-density polyethylene (HDPE) tubing with fittings for use in a peristaltic or other pump, or ensuring that equipment (e.g., a bladder pump) does not contain Teflon.

Sampling Equipment:

Note: PFAS cross-contamination of samples can be minimized through decontamination or conditioning of equipment left in a well. Use of dedicated equipment also is helpful so that handling during decontamination is unnecessary.

- Decontamination – All reusable equipment used in sample acquisition should be adequately decontaminated prior to use.

- Unless project requirements indicate otherwise, use sampling equipment made of stainless steel, acetate, silicone, or HDPE. This applies to tubing, pumps and pump components, tape for plumbing fittings, trowels, mixing bowls, or other equipment that could contact the sample media. Gasket and O-ring components of sampling equipment may also contain fluoropolymers.

Note: PFAS on purchased or rented items is likely to occur predominantly in newly manufactured or rented items treated with chemicals containing PFAS. Therefore, all rental equipment that will make direct contact with the material being sampled must be thoroughly decontaminated prior to use, especially if the equipment items are new.

- Use sampling equipment that does not include or containing polytetrafluoroethylene (PTFE) or Teflon (DuPont brand name) or fluorinated ethylene propylene (FEP) during sample handling or mobilization/demobilization.

- Use products that are not made of low-density polyethylene products (LDPE) if contamination from those products can be transferred to environmental samples or QC samples.

- For collecting drinking water samples to be analyzed using United States Environmental Protection Agency (U.S. EPA) Method 537, use polypropylene sample bottles with a polypropylene screw cap; for all other samples, use HDPE containers with unlined plastic screw caps.

Non-Sampling Field Equipment:

- Non-waterproof loose-leaf paper or notebooks are acceptable. Avoid using waterproof field books or paper during sampling activities, although "Rite in the Rain" books have been found empirically to be acceptable. Do not use plastic clipboards, binders, or spiral hard-cover notebooks that may be coated; use Masonite or aluminum clipboards instead.

- Avoid using Post-it notes or similar removable notes during sample handling or mobilization/demobilization activities.

- Use ballpoint pens or pencils for note taking and sample bottle labeling. Avoid using Sharpies or similar indelible markers.

- Avoid the use of aluminum foil.

Field Personnel Clothing and Protective Gear:

- Wear clothing that has been washed at least six times without fabric softener to remove possible stain-resistant coatings. Clothing made of natural fibers such as cotton is preferred to other fabrics. Protective clothing must be washed in accordance with manufacturer recommendations to ensure that the protective properties necessary to control safety hazards (e.g., fire-retardant clothing) are not compromised.

- Avoid unnecessary contact with upholstery in vehicles because many such fabrics may be treated with stain-resistant materials that could contain PFAS. Typically, rental vehicles are newer and more likely to pose a contamination risk to samples. Well-washed towels or rags may be placed on the seats to prevent contact with car seats and other materials that could transfer PFAS to clothing worn by samplers. If practical, cover clothing and skin that has been in contact with such upholstery with non-fluorinated clothing.

- During wet weather, use rain gear made from polyurethane or wax-coated materials.

- Avoid wearing water-resistant (e.g., Gore-Tex or similar material) clothing or footwear (e.g., boots) immediately prior to or during sample collection and management.

- Avoid wearing coated Tyvek or similar coated PPE suits.

- Wear un-powdered nitrile gloves at all times while collecting and handling samples, and change gloves often. Anecdotal evidence indicates that changing gloves is one of the most effective methods of reducing or eliminating sample contamination potential; therefore, change to a new pair of gloves prior to collecting each sample.

- Avoid wearing cosmetics, shampoos, moisturizers, hand cream, or other similar personal care products on the day of sampling.

- When expected to be effective, use sunscreens and insect repellants that are made with 100-percent natural ingredients and that the Air Force Civil Engineer Center has identified as acceptable for use. ***These products must be used in accordance with manufacturer recommendations and in combination with controls in the project-specific HASP, APP, and corporate health and safety policies. Multiple applications of these products per work shift may be required to ensure their effectiveness.***

    - Sunscreens: Alba Organics Natural Sunscreen, Yes To Cucumbers, Aubrey Organics, Jason Natural Sun Block, Kiss My Face, baby sunscreens that are “free” or “natural.”

    - Sunscreen and insect repellant: Avon Skin So Soft Bug Guard Plus – SPF 30 Lotion

    - Insect Repellent: Jason Natural Quit Bugging Me, Repel Lemon Eucalyptus Insect Repellant, Herbal Armor, California Baby Natural Bug Spray, BabyGanics.

Note: The suitability of these items has not been independently verified. Products containing N-diethyl-meta-toluamide **(**DEET), picaridin, and IR3535 and some oil of lemon eucalyptus (OLE) and para-menthane-diol products are known to provide longer-lasting protection than others. One of the products recommended by the Air Force Civil Engineer Center and listed above, Repel Lemon Eucalyptus Insect Repellant, contains OLE and is most likely to be effective.

Sample Containers and Shipping Materials:

- Avoid the use of glass sample containers, which are believed to result in loss of PFAS through adsorption to the container inner walls.
- Collect samples in clean, laboratory-supplied, plastic bottles only, typically polypropylene for drinking water or HDPE for other matrices.
- Confirm that Teflon-lined caps are not used in sample containers; unlined polypropylene screw caps must be used. It is best to segregate sample containers with Teflon components (e.g., Teflon-lined septa) from PFAS sample containers.
- Avoid using Blue Ice or similar items to cool samples and avoid placing such items in sample coolers for shipping. Use commercially available (e.g., from convenience stores or supermarkets) double-bagged ice instead.

Caution: Samples designated for PFAS analysis must be cooled to achieve a storage temperature of less than 6 °C. Cooling to this temperature may take several hours, and sample temperatures may not achieve 6 °C by the time they arrive at the laboratory. If sample temperatures upon arrival at the laboratory are not less than 10 °C, the laboratory may conclude that sample preservation was compromised and may reject the samples. Therefore, place samples on ice as soon after collection as possible. On warm days, or when a representative from a nearby laboratory picks up the samples, take extra care (e.g., use more ice or delay shipment, if necessary) to ensure that sample temperatures will not exceed 10 °C when the samples arrive at the laboratory.

- Use of commercially available plastic bags (e.g., 3-mil-thick trash can liners) for lining coolers to prevent leakage and to separate potential melt water from chain-of-custody forms is allowed.

7.2 Other Precautions for Sample Handling

- Wash hands thoroughly before sampling and after handling fast food, carryout food, snacks, or other items that may contain PFAS. Do not carry pre-packaged food items such as candy bars or microwave popcorn into sampling areas.
- Assume that shipping tape used for securing coolers could contain PFAS; therefore, take care not to transfer PFAS from tape to samples.
- Minimize exposure of samples to light. This can be done by placing the collected samples into a cooler (with ice) and closing the cooler lid.
- If in doubt about a particular product or item that comes into contact with environmental media to be sampled or is in close proximity to sampling operations, consider collecting and analyzing a rinsate blank using laboratory-supplied PFAS-free water to test the item for contamination potential. Consult the Tetra Tech PM in these cases to verify whether collection of additional blanks is warranted.
- Support personnel that are within 2 to 3 meters of the sample processing area are considered subject to the same restrictions related to precautionary measures for clothing and food as applied to sampling personnel.

These precautions must be observed during sampling activities, especially during water sample collection (groundwater, water supply, and surface water), given the high solubilities of PFAS in water. Examples of

how these precautions may be applied to sampling of specific media are provided in the following sections.

7.3 Groundwater Sample Acquisition

The precautions and requirements identified in Sections 7.1 and 7.2 must be observed for groundwater sampling. Do not proceed any further without reviewing each of those precautions and requirements.

- Collect groundwater samples for PFAS analyses in accordance with this SOP, SOP SA-1.1, and/or project- or client-specific requirements.

- If non-dedicated non-disposable equipment is used between sampling locations, it should be decontaminated with Alconox or Liquinox, unless 1,4-dioxane (a potential component of Liquinox) is also a contaminant of concern. In that case, Liquinox should not be used. Products such as Decon 90, which contains fluorosurfactants, should not be used. Alconox or Liquinox rinses should be followed by a potable water rinse then deionized water rinse.

- If Teflon or LDPE materials are required for the non-PFAS analytes, use multiple sets of containers. Collect samples for PFAS analysis last to ensure adequate purging and conditioning of sampling equipment. If practical to do so, suitable PPE (especially gloves) may also be changed out for PFAS sampling. For example, purge and sample a monitoring well for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals using a peristaltic pump with HDPE and silicone tubing, then collect the material for PFAS analysis or switch to a stainless steel bailer to collect the PFAS samples. If either the proper sampling sequence or proper equipment is unclear, consult the FOL or Tetra Tech PM and record the actual sequence in the field notes.

- If sampling wells that have or had dedicated Teflon or FEP tubing that potentially contained PFAS, remove the dedicated tubing and, using silicone or HDPE tubing, remove at least one well volume from the target sampling interval prior to sampling. Accomplish this removal in a manner that is rigorous enough to remove the entire water column from the well and not just a limited vertical interval of the water column. This will minimize the potential for collecting a sample that was in contact with the Teflon/FEP tubing.

- The use of detergents must be avoided during decontamination of drilling equipment. All equipment must be scrubbed with a plastic brush or steam cleaned and rinsed thoroughly in potable water to clean away any debris or material on exposed surfaces and then triple-rinsed in distilled (American Society for Testing and Materials Grade 3 or better) or deionized water (or Millipore water).

- Sample(s) representing any water collected at the point of use (e.g., water truck or tank on site) used by the driller for drilling purposes must be analyzed for PFAS. See Section 7.8 for guidance on waste management.

- Collect drinking water samples to be analyzed using U.S. EPA Method 537 in clean polypropylene sample bottles with a polypropylene screw cap; for all other samples, use clean, laboratory-supplied, HDPE bottles with unlined plastic screw caps.

7.4 Soil Sample Acquisition

The precautions and requirements identified in Sections 7.1 and 7.2 must be observed for soil sampling. Do not proceed any further without reviewing each of those precautions and requirements.

- Collect soil samples for PFAS analyses in accordance with this SOP, SOP SA-1.3, and/or project- or client-specific requirements. Review client–specific (e.g., DoD component) guidance or previously approved Sampling and Analysis Plans (SAPs).

- Soil sampling equipment should not be constructed of or contain Teflon or other materials likely to contain or be coated with PFAS. Acceptable materials for sampling include stainless steel, acetate, and HDPE.

- If non-dedicated non-disposable equipment is used between sampling locations, it should be decontaminated with Alconox or Liquinox, unless 1,4-dioxane (a potential component of Liquinox) is also a contaminant of concern. In that case, Liquinox should not be used. Products such as Decon 90, which contains fluorosurfactants, should not be used. Alconox or Liquinox rinses should be followed by a potable water rinse then deionized water rinse.

- Collect samples in laboratory-provided HDPE containers specifically designated for PFAS analysis. Do not use glass jars typically used for soil sample collection because some PFAS may irreversibly adsorb to the glass and could create a negative bias in the measured PFAS concentrations. Also consult Section 7.6 if sampling a water supply.

7.5 Surface Water and Sediment Sample Acquisition

The precautions and requirements identified in Sections 7.1 and 7.2 must be observed for surface water and sediment sampling. Do not proceed any further without reviewing each of those precautions and requirements.

- Collect surface water and sediment samples for PFAS analysis in accordance with this SOP, SOP SA-1.2, and/or project- or client-specific requirements.

- Surface water and sediment sampling equipment should not be constructed of or contain Teflon or LDPE materials. Acceptable materials for sampling include HDPE, small amounts of silicone, stainless steel, and acetate. Do not use glass. The bottleware should be supplied clean by the laboratory and specifically designated for PFAS analysis. If transfer bottles are required for collection of surface water samples, the transfer bottles used should be of the same material as the containers designated for submission to the laboratory.

- For surface water sample collection, invert the capped sample bottle, with the opening pointing downward, at least 10 cm below the water surface, 10 cm above the bottom of the water body, and as close to the center of the channel or water body as practical. To collect the sample, uncap the bottle underneath the water surface and point the bottle upward so that gloved hands, sample container, and sampler are downstream of where the sample is being collected.

- For aquatic samples collected from the shoreline or via wading, ensure that waders are constructed of fabric that has not been treated with waterproofing coatings.

- If non-dedicated non-disposable sampling equipment is used between sampling locations, it should be decontaminated with Alconox or Liquinox, unless 1,4-dioxane (a potential component of Liquinox) is also a contaminant of concern. In that case, Liquinox should not be used. Products such as Decon 90, which contains fluorosurfactants, also should not be used. Alconox or Liquinox rinses should be followed by a potable water rinse then deionized water rinse.

7.6 Water Supply Sampling

This section applies to sampling from taps, spigots, faucets, or similar devices for PFAS analysis. The precautions and requirements identified in Sections 7.1 and 7.2 must be observed for water supply sampling. Do not proceed any further without reviewing each of those precautions and requirements.

- Collect water supply samples for PFAS analysis in accordance with applicable portions of SOP SA-1.7 and/or project- or client-specific requirements.

- Water supply sampling equipment (if needed) should not be constructed of or contain Teflon or LDPE materials. Acceptable materials for sampling include HDPE, polypropylene (drinking water sampling only), small amounts of silicone (e.g., short runs of silicone tubing used in peristaltic pumps), stainless steel, and acetate. Non-drinking water supply samples should be collected in clean, laboratory-supplied, HDPE bottleware specifically designated for PFAS analysis (not glass). Collect drinking water samples in clean polypropylene bottles supplied by the laboratory.

- Ensure that sample bottles used to collect chlorinated water samples contain the proper Trizma preservative (5 g/L to preserve and remove chlorine). Non-chlorinated water does not require chemical preservatives designed to remove chlorine.

- If non-dedicated non-disposable equipment is used between sample locations, it should be decontaminated with Alconox or Liquinox.

- Locate the sampling point. If a specific sampling point has already been designated (e.g., a kitchen tap), plan to collect the sample from that point. Otherwise, identify a location in the water supply line that is as close as possible to the water's point of origination (e.g., a well or other water source) and upstream of any local water treatment unit(s) that could affect PFAS levels (e.g., water softeners, activated carbon, or reverse osmosis treatment units). If a treatment unit is in use, a post-treatment sample may also be required in some cases, per project requirements.

  Note: If treatment that could affect PFAS levels (e.g., carbon filtration or reverse osmosis) is part of the water distribution system, often a spigot will be present in the plumbing line between the water source and the treatment unit, and this spigot should be used for sample collection.

- Remove any aerator/diffuser from the faucet, if possible. If removal is not possible, record this observation in the field notes.

- Allow the water to run freely from the tap until water quality parameter stabilization per project-specific requirements is achieved, or as otherwise required by project-specific requirements. This will often require purging for 3 to 5 minutes.

- Reduce the water flow rate to minimize aeration of the sample. The water stream should be no wider than the diameter of a pencil.

- Fill the sample bottle (typically 250 mL) directly from the tap to the bottom of the neck of the bottle, and cap the bottle immediately.

- After collecting the sample, cap the bottle and, if preservative is included, agitate by hand until the preservative is dissolved.

- Do not use filters when collecting samples because the filters may introduce PFAS contamination or absorb PFAS and thus reduce PFAS concentrations in the samples.

7.7 Field Reagent Blank Collection

Note: If PFAS are detected in site samples, FRBs may be analyzed to assess whether PFAS in site samples could be non-site-related contamination and whether resampling is necessary. U.S. EPA Method 537 and modifications thereof for PFAS analysis require an FRB to be handled along with each sample set. A sample set is described as samples collected from the same sample site and at the same time, but "sample site" and "same time" are not precisely defined. Therefore, it is important to verify that the correct number of FRBs will be collected. The intent is to be able to verify whether samples have been contaminated and to help identify the source of contamination. In general, collecting one FRB at each sampling point is recommended when sampling drinking water; fewer FRBs are recommended when sampling non-drinking water matrices. The actual number will depend on project needs. *Collection of an FRB at every sampling point may be required.*

- Verify the number of FRBs to be collected for the project and where those samples must be collected. This should be described in the project planning documents such as work plans or SAPs. If it is not, consult the PM.

- At the sampling site, when ready to collect an FRB, open the bottle of chemically preserved FRB reagent water provided by the laboratory and a corresponding clean empty bottle, also provided by the laboratory.

- Pour the preserved FRB reagent water into the empty sample bottle, close the cap, and label this filled bottle as the FRB.

- Pack and ship the FRB along with site samples and required documentation (e.g., chain-of-custody form) to the laboratory.

Note: Although chain-of-custody forms will indicate that FRBs must be analyzed for PFAS, analysis of an FRB will be required only if site samples contain PFAS greater than a certain concentration. If an FRB is analyzed and any PFAS concentration in the FRB exceeds one-third of the laboratory minimum reporting limit (or equivalent), all samples collected with that FRB may be considered invalid and may require recollection and reanalysis. Consult the project planning documents governing sample collection for specifics as to whether resampling is necessary. Care in collection and handling of site samples and FRBs in a way that avoids contamination cannot be overemphasized.

Note: It will be necessary to associate individual FRBs with corresponding site samples; otherwise, decisions about which samples to recollect (if recollection is indicated) could be compromised. Associations between FRBs and corresponding site samples may be accomplished by marking chain-of-custody forms with the associations, but other methods also may be useful. Consult the governing planning document or the PM for guidance, if necessary.

7.8 Disposal of Investigation-Derived Waste Potentially Containing PFAS

PFAS are not hazardous wastes as defined in the Resource Conservation and Recovery Act and Comprehensive Environmental Response, Compensation, and Liability Act. It may be possible to dispose of PFAS-containing solid waste as non-hazardous, but sampling solid waste material for PFAS analysis is not advised. Consult the client PM or on-site point of contact to verify their current disposal acceptance criteria, and indicate on waste manifests that the waste potentially contains PFAS. Waste water potentially containing PFAS should be analyzed for PFAS to determine the appropriate disposal option. If the sum of PFOS and PFOA concentrations is less than 70 µg/L the water may be disposed of without special handling if no other enforceable regulations apply; otherwise, the water should be treated to reduce the PFOA + PFOS concentration to an acceptable level or should be directed to an appropriate

treatment facility for disposal. On-site treatment (e.g., granular activated carbon filtration) may be appropriate. Consult the client PM or on-site point of contact for direction regarding disposal.

Note: If aqueous investigation-derived waste (IDW) is expected to contain much greater than 70 ng/L (e.g., captured residual from an accidental release in a hangar), special actions may be necessary and the client PM should be consulted. For wastes that are dewatered and potentially contain PFAS, containerize the waste water and analyze it for PFAS prior to disposal.

8.0 REFERENCES

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APPENDIX B—EQUIPMENT CALIBRATION LOG

Tetra Tech

EQUIPMENT CALIBRATION LOG

PROJECT NAME : 2020 PFAS MSA/GSP

INSTRUMENT NAME/MODEL: Lamotte 2020e

SITE NAME: MSA Dump Road Area

MANUFACTURER: Lamotte

PROJECT No.: 112IC08735

SERIAL NUMBER: 032788

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Parameter	Post-Cal	Pre- calibration	Post-calibration		
2/27/2020	032788	SL	turbidity	0.00	0.21	0		
2/27/2020	032788	SL	turbidity	10	9.36	10		
2/28/2020	032788	SL	turbidity	0.00	0.36	0		
2/28/2020	032788	SL	turbidity	10	9.5	10		
3/2/2020	032788	PFO	turbidity	0.00	0.11	0		
3/2/2020	032788	PFO	turbidity	10	7.98	10		
3/3/2020	032788	PFO	turbidity	0.00	0.12	0		
3/3/2020	032788	PFO	turbidity	10	9.81	10		
3/4/2020	032788	PFO	turbidity	0.00	0.23	0		
3/4/2020	032788	PFO	turbidity	10	10.65	10		
3/5/2020	032788	PFO	turbidity	0.00	0.25	0		
3/5/2020	032788	PFO	turbidity	10	10.25	10		
3/6/2020	032788	PFO	turbidity	0.00	0.2	0		
3/6/2020	032788	PFO	turbidity	10	9.36	10		
3/9/2020	032788	WP	turbidity	0.00	0.02	0		
3/9/2020	032788	WP	turbidity	10	9.57	10		

Tetra Tech

EQUIPMENT CALIBRATION LOG

PROJECT NAME : 2020 PFAS MSA/GSP

INSTRUMENT NAME/MODEL: Horiba U-52

SITE NAME: MSA Dump Road Area

MANUFACTURER: HORIBA

PROJECT No.: 112IC08735

SERIAL NUMBER: 22186

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Parameter	Post-Cal	Pre- calibration	Post-calibration		
2/27/2020	22180	SL	pH	4.00	4.15	4		
2/27/2020	22180	SL	scond	4.49	4.78	4.49		
2/27/2020	22180	SL	Turb	0.0	3.1	0.4		
2/27/2020	22180	SL	DO	N/A	11.9	9.69		
2/28/2020	22180	SL	pH	4.00	3.97	4		
2/28/2020	22180	SL	scond	4.49	4.62	4.56		
2/28/2020	22180	SL	Turb	0.0	0.1	0		
2/28/2020	22180	SL	DO	N/A	11.78	10.48		
3/2/2020	22180	SL	pH	4.00	3.99	4		
3/2/2020	22180	SL	scond	4.49	4.47	4.49		
3/2/2020	22180	SL	Turb	0.0	0.1	0		
3/2/2020	22180	SL	DO	N/A	9.32	9.39		
3/3/2020	22180	PFO	pH	4.00	4.05	4		
3/3/2020	22180	PFO	scond	4.49	4.68	4.55		
3/3/2020	22180	PFO	Turb	0.0	0	0		
3/3/2020	22180	PFO	DO	N/A	11.59	9.12		
3/4/2020	22180	PFO	pH	4.00	4.06	4		
3/4/2020	22180	PFO	scond	4.49	4.49	4.49		
3/4/2020	22180	PFO	Turb	0.0	331	0		
3/4/2020	22180	PFO	DO	N/A	7.62	9.51		
3/5/2020	22180	PFO	pH	4.00	4.48	4		
3/5/2020	22180	PFO	scond	4.49	4.87	4.51		
3/5/2020	22180	PFO	Turb	0.0	250	0		
3/5/2020	22180	PFO	DO	N/A	12.41	8.96		
3/6/2020	22180	PFO	pH	4.00	4.64	4.01		
3/6/2020	22180	PFO	scond	4.49	3.54	4.48		
3/6/2020	22180	PFO	Turb	0.0	31.2	0		
3/6/2020	22180	PFO	DO	N/A	9.54	8		
3/9/2020	22180	WP	pH	4.00	4.02	4		
3/9/2020	22180	WP	scond	4.49	4.42	4.49		
3/9/2020	22180	WP	Turb	0.0	0.2	0		
3/9/2020	22180	WP	DO	N/A	9.23	8.54		

APPENDIX C—QED PFC-FREE SAMPLING PUMP INFORMATION

PORTABLE GROUNDWATER SAMPLING PUMP

The Most Reliable Portable Sampling Pump is PFC-Free

Sample Pro®

The Original PFC-Free Bladder Pump



The Sample Pro pump and tubing are and have always been PFC-Free*

The Sample Pro® Portable Pump, the first pump developed specifically to bring the advantages of low-flow sampling to sites requiring portable pumps, has been shown to be PFC-Free. Sample analysis by an independent laboratory showed no detections for 24 different perfluorinated compounds at detection limits much lower than the US EPA Health Advisory of 70 nanograms per liter (parts per trillion)*.

The Sample Pro Pump not only delivers consistent low-flow rates, it's easy to disassemble without tools, simple to clean and truly field rugged.

The Sample Pro portable pump combines the unparalleled sample accuracy and high reliability of a bladder pump in an easy-to-use design. It runs cool and can run dry without damage, and can be operated using any of QED's MicroPurge controller options - 12-volt integral compressor, a Honda-powered gasoline-driven compressor, an external compressed air cylinder, or a lightweight backpack with integral CO_2 cylinder.

The Sample Pro pump's reliability and low maintenance make it more economical to use. Its twist-open design makes it easy to change the disposable bladder in seconds. The compact 14.75" length fits in a bucket for easy cleaning between uses.

Other innovations include interchangeable tubing connection options - conventional compression fittings or a "push to lock" head that eliminates fittings, perfect for use with disposable tubing. The Sample Pro pump's rugged, all-stainless construction will stand up to tough portable use. With thousands in service and nearly two decades of proven performance, the Sample Pro pump is the most reliable portable sampling pump ever made.

*See details on the testing procedure and results on the back page.

PFC FREE

Ideal for PFC Sampling
Tested for purity



Simple to Service
Twist-open design with disposable bladders



Nearly Unbreakable
Stainless steel construction stands up to tough use

QED®

Innovative Environmental Products

(800) 624-2026 • www.qedenv.com
P.O. Box 3726 Ann Arbor, MI 48106-3726 USA • (734) 995-2547 • Fax (734) 995-1170 • info@qedenv.com

PFC-Free Groundwater Sampling



Specifications:

MATERIALS

Body	303 Stainless Steel
Inlet and Discharge Housing	303 Stainless Steel
Bladder	Polyethylene
O-Rings*	Viton® or Buna-N

DIMENSIONS

Diameter	1.75 in. (44.5 mm)
Length	14.75 in. (37.5 cm) w/ Push-In Fittings 16.5 in. (41.9 cm) w/ Compression Fittings 12.12 in. (30.8 cm) Bottom of pump to centerline of inlet
Weight	4.25 lbs. (1.93 kg)

FITTINGS (Stainless Steel Compression or Push-In Type)

Air	1/4 in. (6.4 mm) OD x 3/16 in. (4.7 mm) ID
Discharge	3/8 in. (9.5 mm) OD x 1/4 in. (6.4 mm) ID or 1/4 in. (6.4 mm) OD x 3/16 (4.7 mm) ID
Maximum Lift	250 ft. (76 m)
Flow Rates	3/8 in. OD Discharge Tubing, 10 ft. submergence: 1.6 Lpm @ 25 ft. 0.75 Lpm @ 100 ft. 1/4 in. OD Discharge Tubing, 10 ft. submergence: 1.25 Lpm @ 25 ft. 0.55 Lpm @ 100 ft.
Pump Volume	100 mL / 0.1 L / 0.026 gal. / 3.38 oz.

* For applications where materials specifications prohibit the use of Viton O-rings, QED has Buna-n (nitrile) O-ring kits for the Sample Pro portable bladder pump. The kit contains 10 complete sets of O-rings, and can be ordered using Part Number 38362-B.

Sampling Consultant's Kit

The Sample Pro Consultant's Kit includes accessories and supplies in a rugged case that also carries and protects the pump.



The kit includes all supplies, accessories, and replacement parts necessary to sample 10 wells, packed in a 9x9x20" heavy-duty structural foam tool box for easy portability on-site.

Testing of QED Sample Pro® for Perfluorinated Compounds

Introduction

Perfluorinated compounds (PFCs, also called perfluorinated alkylated substances or PFAS) have been identified as an emerging contaminant in ground water. Site owners and their environmental consultants are being tasked with sampling for the presence of these chemicals at extremely low concentration levels, down to several parts per trillion (or nanograms per liter). As part of this sampling, concerns have been raised that any sampling equipment that contains fluoropolymers of polytetrafluoroethylene (e.g., *Teflon®, such as PTFE, FEP and PFA) and fluoropolymer elastomers (e.g., Viton® or FKM) could leach PFCs into ground water samples. This has already led some users to exclude the use of any sampling equipment containing fluoropolymers or fluoroelastomers when sampling for PFCs.

QED conducted a test of the Sample Pro® 1.75" Portable Bladder Pump to determine if any PFCs would leach from materials in the pump. We also tested our commonly used sample tubing materials for the same purpose.

Test Method and Results

The Sample Pro 1.75-inch portable bladder pump was tested as a complete assembly (pump body, housing and check balls, polyethylene bladder and Viton O-rings). The test was conducted by soaking for 24 hours in a stainless steel test fixture (5 gallons / 20 liters volume) and collecting samples from the stand tube. The samples were analyzed for 24 different perfluorinated compounds using US EPA Method 537M, with method detection limits below 1 ng/L and reporting limits of 5 ng/L for most PFCs. In addition, QED also tested all of our twin-bonded tubing materials – polyethylene (PE), Teflon-lined PE and all Teflon tubing – by soaking each tubing material for 48-72 hours directly in sample bottles.

The results for the Sample Pro pump and all three tubing materials were non-detect for all 24 PFCs above the stated Method Detection Limits (MDLs). Based on this, our QED Sample Pro pump and any standard QED tubing should not contribute any PFCs to ground water samples taken with these products.

**Teflon® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates. It is used herein to describe a range of various fluorocarbon plastic resin formulations.*

For more detailed information visit:
www.qedenv.com/PFCtesting

QED®
Innovative Environmental Products

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APPENDIX D—MONITORING-WELL PURGING AND SAMPLING RECORDS

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O'Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:** 7/6/20
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
1050	6.49	200	Clear	5.33	0.343	0.43	6.00	20.25	258	0.2	
1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
1110	8.21	200	Clear	5.46	0.335	0.04	3.84	19.47	255	0.2	
1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	—	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
1050	6.49	200	Clear	5.33	0.343	0.43	6.00	20.25	258	0.2	
1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
1110	8.21	200	Clear	5.46	0.335	0.04	3.84	19.47	255	0.2	
1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:



Photo Description:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
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1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
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1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:

Photo Description:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
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1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
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1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:



Photo Description:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
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1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:



Photo Description:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
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1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:



Photo Description:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
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1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
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FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:



Photo Description:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
1050	6.49	200	Clear	5.33	0.343	0.43	6.00	20.25	258	0.2	
1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
1110	8.21	200	Clear	5.46	0.335	0.04	3.84	19.47	255	0.2	
1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:

Photo Description:

GROUNDWATER SAMPLE LOG SHEET

Tetra Tech, Inc.

Event:	MSA Annual Groundwater 2020
Project Site Name:	MSA Dump Road Area
Project No.:	112IC09023

Sample ID:	GSP-MW-20-070220	**Sampled By:**	Walt.Pryor
QA/QC Duplicate ID:	No	**Sample Date:**	07/02/20
MS/MSD Collected:	No	**Sample Time:**	1044

WELL INFORMATION:

Well ID :	GSP-MW-20	**Purge Date:**	07/02/20
Well Diameter (in):	2" PVC	**Static Water Level (ft-BTOR):**	5.60
Top of Screen (ft-BTOR):		**PID Monitor Reading:**	N/A
Bottom of Screen (ft-BTOR):		**Purge Method:**	Geopump II Peristaltic Pump
Total Well Depth (ft-BTOR):		**Sample Method:**	Low Flow - Direct Fill

MONITORING WELL INSPECTION

Condition of Seal:

Well Photograph - See next page

( ) None (x) Good ( ) Cracked

Condition of Protective Casing:

(x) Good ( ) Damaged ( ) Loose ( ) None Present

Inner Casing: (x) PVC ( ) Steel ( ) None

Condition: (x) Good ( ) Cracked/Broken

EQUIPMENT INFORMATION:

Water Quality Instrument:	Horiba U-52	**Pump Controller:**	Geopump II Peristaltic Pump
Turbidity Meter:	LaMotte 2020e		

PURGE DATA:

Time (Hrs)	Water Level (ft. below TOC)	Flow mL / min.	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	Comments
909	6	300	6	1	8	12	19	17	0	PFAS
914	5.85	250	5.84	0.525	6.80	6.41	18.69	3	0	
919	6.22	200	5.81	0.522	5.70	5.44	18.62	3	0	
929	6.55	100	5.85	0.521	5.80	3.94	18.80	-2	0	
939	7.35	100	5.97	0.542	6.90	3.01	19.16	-9	0	
944	8.05	100	5.99	5.480	8.72	2.67	19.44	-9	0	
949	8.35	100	6	0.550	7.24	2.38	19.57	-8	0	
954	8.65	100	6	0.555	6.42	2.08	19.62	-7	0	
959	8.98	100	6	0.55	5.720	1.80	19.8	-6	0	
1009	9.3	100	5.99	0.55	5.180	1.32	20.0	-6	0	
1019	10.05	100	5.97	0.51	5.470	0.95	21.2	-8	0	
1029	10.5	100	5.9	0.46	6.650	0.72	21.0	-9	0	
1039	11.1	100	5.87	0.44	6.680	0.50	21.0	-10	0	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal.)	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	
909	1039	90	2.5	5.87	0.440	6.68	0.5	20.95	-10	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Quantity	Vol.	Bottle Type	Collected
PFAS		None	1	250	Plastic	Yes

OBSERVATIONS / NOTES:

NAA Parameter (if applicable) Ferrous Iron Kit:

Duplicate information:	Signature(s):
	Walt.Pryor

WELL PHOTOGRAPH

WELL ID: GSP-MW-20

Comments/Repairs Needed:

GROUNDWATER SAMPLE LOG SHEET

Tetra Tech, Inc.

Event:	MSA Annual Groundwater 2020
Project Site Name:	MSA Dump Road Area
Project No.:	112IC09023

Sample ID:	GSP-MW-23I-070220	**Sampled By:**	Walt.Pryor
QA/QC Duplicate ID:	No	**Sample Date:**	07/02/20
MS/MSD Collected:	No	**Sample Time:**	1150

WELL INFORMATION:

Well ID :	GSP-MW-23I	**Purge Date:**	07/02/20
Well Diameter (in):	2" PVC	**Static Water Level (ft-BTOR):**	5.56
Top of Screen (ft-BTOR):		**PID Monitor Reading:**	N/A
Bottom of Screen (ft-BTOR):		**Purge Method:**	Geopump II Peristaltic Pump
Total Well Depth (ft-BTOR):		**Sample Method:**	Low Flow - Direct Fill

MONITORING WELL INSPECTION

Condition of Seal:

Well Photograph - See next page

( ) None (x) Good ( ) Cracked

Condition of Protective Casing:

(x) Good ( ) Damaged ( ) Loose ( ) None Present

Inner Casing: (x) PVC ( ) Steel ( ) None

Condition: (x) Good ( ) Cracked/Broken

EQUIPMENT INFORMATION:

Water Quality Instrument:	Horiba U-52	**Pump Controller:**	Geopump II Peristaltic Pump
Turbidity Meter:	LaMotte 2020e		

PURGE DATA:

Time (Hrs)	Water Level (ft. below TOC)	Flow mL / min.	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	Comments
1100	6	300	6	0	159	13	19	49	0	PFAS
1105	5.80	300	5.67	0.281	95.40	8.90	18.63	63	0	
1110	5.80	300	5.61	0.271	47.20	7.11	18.36	70	0	
1120	5.80	300	5.6	0.251	45.70	5.33	18.19	76	0	
1130	5.80	300	5.58	0.235	8.36	3.86	18.22	81	0	
1135	5.80	300	5.58	0.230	7.23	3.23	18.18	83	0	
1140	5.80	300	5.58	0.228	7.15	3.20	18.23	83	0	
1145	5.80	300	5.58	0.226	7.10	3.16	18.27	84	0	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal.)	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	
1100	1145	45	2.5	5.58	0.226	7.10	3.2	18.27	84	0.1	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Quantity	Vol.	Bottle Type	Collected
PFAS		None	1	250	Plastic	Yes

OBSERVATIONS / NOTES:

NAA Parameter (if applicable) Ferrous Iron Kit:

Duplicate information:	Signature(s):
	Walt.Pryor

WELL PHOTOGRAPH

WELL ID: GSP-MW-23I

Comments/Repairs Needed:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
1050	6.49	200	Clear	5.33	0.343	0.43	6.00	20.25	258	0.2	
1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
1110	8.21	200	Clear	5.46	0.335	0.04	3.84	19.47	255	0.2	
1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	—	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:



Photo Description:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
1050	6.49	200	Clear	5.33	0.343	0.43	6.00	20.25	258	0.2	
1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
1110	8.21	200	Clear	5.46	0.335	0.04	3.84	19.47	255	0.2	
1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	—	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:



Photo Description:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
1050	6.49	200	Clear	5.33	0.343	0.43	6.00	20.25	258	0.2	
1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
1110	8.21	200	Clear	5.46	0.335	0.04	3.84	19.47	255	0.2	
1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	—	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

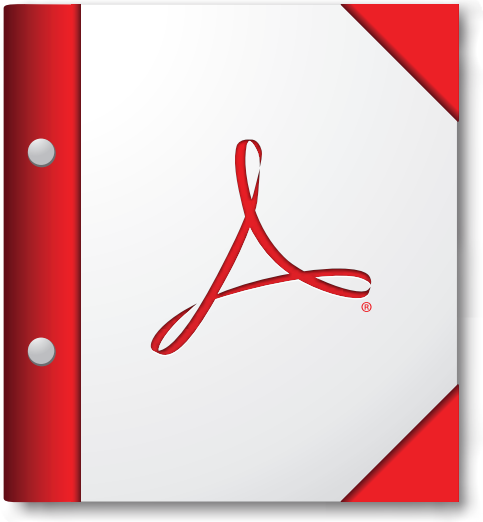
GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:

Photo Description:



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GROUNDWATER SAMPLE LOG SHEET

Tetra Tech, Inc.

Event:	MSA Annual Groundwater 2020
Project Site Name:	MSA Dump Road Area
Project No.:	112IC09023

Sample ID:	MSA-DMW-4S-063020	**Sampled By:**	Walt.Pryor
QA/QC Duplicate ID:	No	**Sample Date:**	06/30/20
MS/MSD Collected:	No	**Sample Time:**	1425

WELL INFORMATION:

Well ID :	MSA-DMW-4S	**Purge Date:**	06/30/20
Well Diameter (in):	2" PVC	**Static Water Level (ft-BTOR):**	20.15
Top of Screen (ft-BTOR):		**PID Monitor Reading:**	N/A
Bottom of Screen (ft-BTOR):		**Purge Method:**	Geopump II Peristaltic Pump
Total Well Depth (ft-BTOR):		**Sample Method:**	Low Flow - Direct Fill

MONITORING WELL INSPECTION

Condition of Seal:

Well Photograph - See next page

( ) None (x) Good ( ) Cracked

Condition of Protective Casing:

(x) Good ( ) Damaged ( ) Loose ( ) None Present

Inner Casing: (x) PVC ( ) Steel ( ) None

Condition: (x) Good ( ) Cracked/Broken

EQUIPMENT INFORMATION:

Water Quality Instrument:	Horiba U-52	**Pump Controller:**	Geopump II Peristaltic Pump
Turbidity Meter:	LaMotte 2020e		

PURGE DATA:

Time (Hrs)	Water Level (ft. below TOC)	Flow mL / min.	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	Comments
1335	20.15	300	6.15	0.897	111.00	1.05	22.60	22	0.4	PFAS
1340	20.21	300	6.55	0.948	69.70	0.00	18.00	-21	0.5	
1345	20.21	300	6.57	0.973	27.50	0.00	17.80	-31	0.5	
1355	20.21	300	6.56	1.030	12.50	0.00	16.70	-32	0.5	
1405	20.21	300	6.56	1.040	5.60	0.00	16.89	-35	0.5	
1410	20.21	300	6.57	1.040	5.00	0.00	16.94	-36	0.5	
1415	20.21	300	6.57	1.050	4.70	0.00	16.96	-37	0.5	
1420	20.21	300	6.58	1.050	4.50	0.00	16.94	-39	0.5	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal.)	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	
1335	1420	45	2.5	6.58	1.050	4.50	0.0	16.94	-39	0.5	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Quantity	Vol.	Bottle Type	Collected
PFAS		None	1	250	Plastic	Yes

OBSERVATIONS / NOTES:

NAA Parameter (if applicable) Ferrous Iron Kit:

Duplicate information:	Signature(s):
	Walt.Pryor

WELL PHOTOGRAPH

WELL ID: MSA-DMW-4S

Comments/Repairs Needed:

GROUNDWATER SAMPLE LOG SHEET

Tetra Tech, Inc.

Event:	MSA Annual Groundwater 2020
Project Site Name:	MSA Dump Road Area
Project No.:	112IC09023

Sample ID:	MSA-DMW-5I-063020	**Sampled By:**	Walt.Pryor
QA/QC Duplicate ID:	No	**Sample Date:**	06/30/20
MS/MSD Collected:	No	**Sample Time:**	1257

WELL INFORMATION:

Well ID :	MSA-DMW-5I	**Purge Date:**	06/30/20
Well Diameter (in):	2" PVC	**Static Water Level (ft-BTOR):**	21.36
Top of Screen (ft-BTOR):		**PID Monitor Reading:**	N/A
Bottom of Screen (ft-BTOR):		**Purge Method:**	Geopump II Peristaltic Pump
Total Well Depth (ft-BTOR):		**Sample Method:**	Low Flow - Direct Fill

MONITORING WELL INSPECTION

Condition of Seal:

( ) None (x) Good ( ) Cracked

Well Photograph - See next page

Condition of Protective Casing:

(x) Good ( ) Damaged ( ) Loose ( ) None Present

Inner Casing: (x) PVC ( ) Steel ( ) None

Condition: (x) Good ( ) Cracked/Broken

EQUIPMENT INFORMATION:

Water Quality Instrument:	Horiba U-52	**Pump Controller:**	Geopump II Peristaltic Pump
Turbidity Meter:	LaMotte 2020e		

PURGE DATA:

Time (Hrs)	Water Level (ft. below TOC)	Flow mL / min.	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	Comments
1207	21.36	300	3.49	0.996	5.20	7.84	17.92	500	0.5	PFAS
1212	21.45	300	3.22	1.020	4.10	6.85	17.55	536	0.5	
1217	21.45	300	3.21	1.020	3.00	6.76	17.62	542	0.5	
1227	21.45	300	3.2	1.080	2.40	6.63	17.62	547	0.5	
1237	21.45	300	3.2	1.080	2.40	6.64	17.87	548	0.5	
1242	21.45	300	3.21	1.080	1.90	6.47	17.96	548	0.5	
1247	21.45	300	3.21	1.090	1.90	6.53	18.00	551	0.5	
1252	21.45	300	3.21	1.090	1.90	6.40	18.09	550	0.5	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal.)	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	
1207	1252	45	2.5	3.21	1.090	1.90	6.4	18.09	550	0.5	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Quantity	Vol.	Bottle Type	Collected
PFAS		None	1	250	Plastic	Yes

OBSERVATIONS / NOTES:

NAA Parameter (if applicable) Ferrous Iron Kit:

Duplicate information:	Signature(s):
	Walt.Pryor

WELL PHOTOGRAPH

WELL ID: MSA-DMW-5I

Comments/Repairs Needed:

GROUNDWATER SAMPLE LOG SHEET

Tetra Tech, Inc.

Event:	MSA Annual Groundwater 2020
Project Site Name:	MSA Dump Road Area
Project No.:	112IC09023

Sample ID:	MSA-DMW-5S-063020	**Sampled By:**	Walt.Pryor
QA/QC Duplicate ID:	No	**Sample Date:**	06/30/20
MS/MSD Collected:	No	**Sample Time:**	1200

WELL INFORMATION:

Well ID :	MSA-DMW-5S	**Purge Date:**	06/30/20
Well Diameter (in):	2" PVC	**Static Water Level (ft-BTOR):**	21.00
Top of Screen (ft-BTOR):		**PID Monitor Reading:**	N/A
Bottom of Screen (ft-BTOR):		**Purge Method:**	Geopump II Peristaltic Pump
Total Well Depth (ft-BTOR):		**Sample Method:**	Low Flow - Direct Fill

MONITORING WELL INSPECTION

Condition of Seal:

Well Photograph - See next page

( ) None (x) Good ( ) Cracked

Condition of Protective Casing:

(x) Good ( ) Damaged ( ) Loose ( ) None Present

Inner Casing: (x) PVC ( ) Steel ( ) None

Condition: (x) Good ( ) Cracked/Broken

EQUIPMENT INFORMATION:

Water Quality Instrument:	Horiba U-52	**Pump Controller:**	Geopump II Peristaltic Pump
Turbidity Meter:	LaMotte 2020e		

PURGE DATA:

Time (Hrs)	Water Level (ft. below TOC)	Flow mL / min.	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	Comments
1110	21.00	300	6.4	1.250	300.00	3.01	18.55	-10	0.6	PFAS
1115	21.65	300	6.3	1.210	103.00	3.05	18.52	-7	0.6	
1120	21.95	250	6.3	1.240	54.20	0.30	17.55	-10	0.6	
1130	22.02	200	6.36	1.260	25.20	0.00	17.36	-19	0.6	
1140	22.10	200	6.41	1.260	10.20	0.00	17.50	-24	0.6	
1145	22.15	200	6.43	1.260	5.65	0.00	17.34	-25	0.6	
1150	22.15	200	6.43	1.260	5.59	0.00	17.40	-25	0.6	
1155	22.15	200	6.43	1.260	5.47	0.00	17.47	-24	0.6	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal.)	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	
1110	1155	45	2	6.43	1.260	5.47	0.0	17.47	-24	0.6	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Quantity	Vol.	Bottle Type	Collected
PFAS		None	1	250	Plastic	Yes

OBSERVATIONS / NOTES:

NAA Parameter (if applicable) Ferrous Iron Kit:

Duplicate information:	Signature(s):
	Walt.Pryor

WELL PHOTOGRAPH

WELL ID: MSA-DMW-5S

Comments/Repairs Needed:

GROUNDWATER SAMPLE LOG SHEET

Tetra Tech, Inc.

Event:	MSA Annual Groundwater 2020
Project Site Name:	MSA Dump Road Area
Project No.:	112IC09023

Sample ID:	MSA-DMW-6S-070120	**Sampled By:**	Walt.Pryor
QA/QC Duplicate ID:	No	**Sample Date:**	07/01/20
MS/MSD Collected:	No	**Sample Time:**	1243

WELL INFORMATION:

Well ID :	MSA-DMW-6S	**Purge Date:**	07/01/20
Well Diameter (in):	2" PVC	**Static Water Level (ft-BTOR):**	18.15
Top of Screen (ft-BTOR):		**PID Monitor Reading:**	N/A
Bottom of Screen (ft-BTOR):		**Purge Method:**	Geopump II Peristaltic Pump
Total Well Depth (ft-BTOR):		**Sample Method:**	Low Flow - Direct Fill

MONITORING WELL INSPECTION

Condition of Seal:

( ) None (x) Good ( ) Cracked

Well Photograph - See next page

Condition of Protective Casing:

(x) Good ( ) Damaged ( ) Loose ( ) None Present

Inner Casing: (x) PVC ( ) Steel ( ) None

Condition: (x) Good ( ) Cracked/Broken

EQUIPMENT INFORMATION:

Water Quality Instrument:	Horiba U-52	**Pump Controller:**	Geopump II Peristaltic Pump
Turbidity Meter:	LaMotte 2020e		

PURGE DATA:

Time (Hrs)	Water Level (ft. below TOC)	Flow mL / min.	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	Comments
1153	18.15	300	6.45	0.959	46.10	2.51	18.20	-83	0.5	PFAS
1158	18.25	250	6.4	0.961	43.50	0.00	17.02	-89	0.5	
1203	18.25	250	6.41	0.934	38.80	0.00	17.08	-90	0.5	
1213	18.25	250	6.42	0.909	35.70	0.00	17.30	-87	0.5	
1223	18.25	250	6.42	0.902	4.05	0.00	17.35	-85	0.5	
1228	18.25	250	6.42	0.907	2.00	0.00	17.06	-84	0.5	
1233	18.25	250	6.41	0.910	1.95	0.00	16.94	-82	0.5	
1238	18.25	250	6.41	0.909	1.86	0.00	16.90	-83	0.5	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal.)	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	
1153	1238	45	2.5	6.41	0.909	1.86	0.0	16.9	-83	0.5	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Quantity	Vol.	Bottle Type	Collected
PFAS		None	1	250	Plastic	Yes

OBSERVATIONS / NOTES:

NAA Parameter (if applicable) Ferrous Iron Kit:

Duplicate information:	Signature(s):
	Walt.Pryor

WELL PHOTOGRAPH

WELL ID: MSA-DMW-6S

Comments/Repairs Needed:

GROUNDWATER SAMPLE LOG SHEET

Tetra Tech, Inc.

Event:	MSA Annual Groundwater 2020
Project Site Name:	MSA Dump Road Area
Project No.:	112IC09023

Sample ID:	MSA-DMW-7S-062920	**Sampled By:**	Walt.Pryor
QA/QC Duplicate ID:	No	**Sample Date:**	06/29/20
MS/MSD Collected:	No	**Sample Time:**	1435

WELL INFORMATION:

Well ID :	MSA-DMW-7S	**Purge Date:**	06/29/20
Well Diameter (in):	2" PVC	**Static Water Level (ft-BTOR):**	21.25
Top of Screen (ft-BTOR):		**PID Monitor Reading:**	N/A
Bottom of Screen (ft-BTOR):		**Purge Method:**	Geopump II Peristaltic Pump
Total Well Depth (ft-BTOR):		**Sample Method:**	Low Flow - Direct Fill

MONITORING WELL INSPECTION

Condition of Seal: **Well Photograph - See next page**

( ) None (x) Good ( ) Cracked

Condition of Protective Casing:

(x) Good ( ) Damaged ( ) Loose ( ) None Present

Inner Casing: (x) PVC ( ) Steel ( ) None

Condition: (x) Good ( ) Cracked/Broken

EQUIPMENT INFORMATION:

Water Quality Instrument:	Horiba U-52	**Pump Controller:**	Geopump II Peristaltic Pump
Turbidity Meter:	LaMotte 2020e		

PURGE DATA:

Time (Hrs)	Water Level (ft. below TOC)	Flow mL / min.	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	Comments
1300	21.25	300	6.1	1.300	677.00	5.54	26.42	55	0.6	PFAS
1305	21.45	250	6.02	1.380	560.00	2.39	21.88	58	0.7	
1310	21.40	250	5.97	1.350	448.00	1.86	22.35	63	0.7	
1320	21.40	250	5.96	1.300	325.00	1.00	24.39	70	0.6	
1330	21.40	250	5.94	1.280	270.00	0.23	26.26	79	0.6	
1340	21.40	250	6	1.300	177.00	0.16	27.37	89	0.6	
1350	21.40	250	5.98	1.310	170.00	0.11	28.20	99	0.7	
1400	21.40	250	5.96	1.340	164.00	0.07	28.80	107	0.7	
1410	21.40	250	5.93	1.49	60.100	0.00	24.5	110	0.7	
1420	21.40	250	5.9	1.61	5.760	0.00	21.0	114	0.8	
1425	21.40	250	5.88	1.63	3.820	0.00	20.3	118	0.8	
1430	21.40	250	5.84	1.70	3.170	0.00	19.4	123	0.9	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal.)	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	
1300	1430	90	5	5.84	1.700	3.17	0.0	19.44	123	0.9	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Quantity	Vol.	Bottle Type	Collected
PFAS		None	1	250	Plastic	Yes

OBSERVATIONS / NOTES:

NAA Parameter (if applicable) Ferrous Iron Kit:

Duplicate information:	Signature(s):
	Walt.Pryor

WELL PHOTOGRAPH

WELL ID: MSA-DMW-7S

Comments/Repairs Needed:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
1050	6.49	200	Clear	5.33	0.343	0.43	6.00	20.25	258	0.2	
1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
1110	8.21	200	Clear	5.46	0.335	0.04	3.84	19.47	255	0.2	
1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
1050	6.49	200	Clear	5.33	0.343	0.43	6.00	20.25	258	0.2	
1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
1110	8.21	200	Clear	5.46	0.335	0.04	3.84	19.47	255	0.2	
1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:



Photo Description:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
1050	6.49	200	Clear	5.33	0.343	0.43	6.00	20.25	258	0.2	
1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
1110	8.21	200	Clear	5.46	0.335	0.04	3.84	19.47	255	0.2	
1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:



Photo Description:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
1050	6.49	200	Clear	5.33	0.343	0.43	6.00	20.25	258	0.2	
1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
1110	8.21	200	Clear	5.46	0.335	0.04	3.84	19.47	255	0.2	
1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:

Photo Description:

GROUNDWATER SAMPLE LOG SHEET

Tetra Tech, Inc.

Event:	MSA Annual Groundwater 2020
Project Site Name:	MSA Dump Road Area
Project No.:	112IC09023

Sample ID:	MSA-MW-40S-062920	**Sampled By:**	Walt.Pryor
QA/QC Duplicate ID:	No	**Sample Date:**	06/29/20
MS/MSD Collected:	No	**Sample Time:**	1035

WELL INFORMATION:

Well ID :	MSA-MW-40S	**Purge Date:**	06/29/20
Well Diameter (in):	2" PVC	**Static Water Level (ft-BTOR):**	16.65
Top of Screen (ft-BTOR):		**PID Monitor Reading:**	N/A
Bottom of Screen (ft-BTOR):		**Purge Method:**	Geopump II Peristaltic Pump
Total Well Depth (ft-BTOR):		**Sample Method:**	Low Flow - Direct Fill

MONITORING WELL INSPECTION

Condition of Seal: **Well Photograph - See next page**

( ) None (x) Good ( ) Cracked

Condition of Protective Casing:

(x) Good ( ) Damaged ( ) Loose ( ) None Present

Inner Casing: (x) PVC ( ) Steel ( ) None

Condition: (x) Good ( ) Cracked/Broken

EQUIPMENT INFORMATION:

Water Quality Instrument:	Horiba U-52	**Pump Controller:**	Geopump II Peristaltic Pump
Turbidity Meter:	LaMotte 2020e		

PURGE DATA:

Time (Hrs)	Water Level (ft. below TOC)	Flow mL / min.	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	Comments
945	17	300	6	1	3	2	17	-14	1	PFAS
950	17.31	300	6.47	1.470	1.40	0.41	16.03	-38	1	
955	17.80	300	6.47	1.470	1.40	0.02	15.54	-39	1	
1005	17.95	300	6.48	1.470	2.50	0.00	15.28	-36	1	
1015	18.00	250	6.49	1.470	2.50	0.00	15.32	-36	1	
1020	18.02	250	6.5	1.470	2.50	0.00	15.27	-37	1	
1025	18.02	250	6.54	1.470	2.50	0.00	15.25	-39	1	
1030	18.02	250	6.57	1.470	2.50	0.00	15.23	-42	1	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal.)	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	
945	1030	45	2.5	6.57	1.470	2.50	0.0	15.23	-42	0.7	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Quantity	Vol.	Bottle Type	Collected
PFAS		None	1	250	Plastic	Yes

OBSERVATIONS / NOTES:

NAA Parameter (if applicable) Ferrous Iron Kit:

Duplicate information:	Signature(s):
	Walt.Pryor

WELL PHOTOGRAPH

WELL ID: MSA-MW-40S

Comments/Repairs Needed:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
1050	6.49	200	Clear	5.33	0.343	0.43	6.00	20.25	258	0.2	
1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
1110	8.21	200	Clear	5.46	0.335	0.04	3.84	19.47	255	0.2	
1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:



Photo Description:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
1050	6.49	200	Clear	5.33	0.343	0.43	6.00	20.25	258	0.2	
1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
1110	8.21	200	Clear	5.46	0.335	0.04	3.84	19.47	255	0.2	
1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:

Photo Description:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
1050	6.49	200	Clear	5.33	0.343	0.43	6.00	20.25	258	0.2	
1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
1110	8.21	200	Clear	5.46	0.335	0.04	3.84	19.47	255	0.2	
1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:



Photo Description:

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH

Event: MSA PFAS GW Round 2
Project Site Name: MSA
Project No.: 112IC09023

Sample ID: GSP-MW-7-070620	**Sampled By:** P. O•Brien
QA/QC Duplicate ID: MSA-DUP-04-070620	**Sample Date:**
MS/MSD Collected: YES ☐ NO ☑	**Sample Time:** 1120

WELL INFORMATION:

Well ID : GSP-MW-07	**Purge Date:** 7/6/20
Well Diameter (in): 2	**Static Water Level (ft-BTOR):** 4.09
Top of Screen (ft-BTOR):	**PID Monitor Reading:** N/A
Bottom of Screen (ft-BTOR):	**Purge Method:** Low flow
Total Well Depth (ft-BTOR):	**Sample Method:** Grab

EQUIPMENT INFORMATION:

Water Quality Instrument: Horiba U-52	**Pump Controller:** Geotech peristaltic
Turbidity Meter: LaMotte	

PURGE DATA:

Time (Hrs)	H_20 Level (ft-BTOR)	Flow mL / min.	Color	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	4.09	200	Clear	START	PURGE	-	-	-	-	-	-
1050	6.49	200	Clear	5.33	0.343	0.43	6.00	20.25	258	0.2	
1055	7.05	200	Clear	5.35	0.339	0.26	9.25	20.09	258	0.2	
1100	7.56	200	Clear	5.40	0.338	0.19	5.90	19.87	257	0.2	
1105	7.92	200	Clear	5.43	0.336	0.10	4.75	19.31	256	0.2	
1110	8.21	200	Clear	5.46	0.335	0.04	3.84	19.47	255	0.2	
1115	8.44	200	Clear	5.49	0.334	0.00	3.03	19.74	254	0.2	
1120	8.62	200	Clear	5.51	0.334	0.00	2.88	19.51	253	0.2	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal. / L.)	pH (S.U.)	S.C. (mS/cm)	DO (mg/L)	Turbidity (NTU)	Temp. (C°)	ORP (mV)	Salinity (% or ppt)	Other
1040	1120	40	2.11	5.51	0.334	0.00	2.88	19.51	253	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
PFAS	537	„	2	250	HDPE	2

OBSERVATIONS / NOTES:

Coordinates:	N	E	Signature(s):

GROUNDWATER SAMPLE LOG SHEET

TETRA TECH



Photo Description:



Photo Description:

GROUNDWATER SAMPLE LOG SHEET

Tetra Tech, Inc.

Event:	MSA Annual Groundwater 2020
Project Site Name:	MSA Dump Road Area
Project No.:	112IC09023

Sample ID:	MSA-MW-50S-070120	**Sampled By:**	Walt.Pryor
QA/QC Duplicate ID:	No	**Sample Date:**	07/01/20
MS/MSD Collected:	No	**Sample Time:**	1015

WELL INFORMATION:

Well ID :	MSA-MW-50S	**Purge Date:**	07/01/20
Well Diameter (in):	2" PVC	**Static Water Level (ft-BTOR):**	11.85
Top of Screen (ft-BTOR):		**PID Monitor Reading:**	N/A
Bottom of Screen (ft-BTOR):		**Purge Method:**	Geopump II Peristaltic Pump
Total Well Depth (ft-BTOR):		**Sample Method:**	Low Flow - Direct Fill

MONITORING WELL INSPECTION

Condition of Seal:

Well Photograph - See next page

( ) None (x) Good ( ) Cracked

Condition of Protective Casing:

(x) Good ( ) Damaged ( ) Loose ( ) None Present

Inner Casing: (x) PVC ( ) Steel ( ) None

Condition: (x) Good ( ) Cracked/Broken

EQUIPMENT INFORMATION:

Water Quality Instrument:	Horiba U-52	**Pump Controller:**	Geopump II Peristaltic Pump
Turbidity Meter:	LaMotte 2020e		

PURGE DATA:

Time (Hrs)	Water Level (ft. below TOC)	Flow mL / min.	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	Comments
920	11.85	300	3.94	1.360	0.00	14.11	16.31	297	0.7	PFAS
925	12.00	300	3.78	1.260	0.00	10.10	15.26	319	0.6	
930	12.00	300	3.77	1.230	0.00	9.01	14.94	324	0.6	
940	12.00	300	3.78	1.210	0.00	8.17	14.68	326	0.6	
950	12.00	300	3.85	1.200	0.00	7.63	14.66	305	0.6	
955	12.00	300	3.86	1.200	4.92	7.38	14.71	302	0.6	
1000	12.00	300	3.88	1.550	4.88	7.09	14.71	297	0.6	
1005	12.00	300	3.9	1.580	4.80	7.00	14.71	294	0.7	
1010	12.00	300	3.91	1.60	4.760	6.90	14.7	291	0.7	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal.)	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	
1335	1420	45	2.5	6.58	1.050	4.50	0.0	16.94	-39	0.5	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Quantity	Vol.	Bottle Type	Collected
PFAS		None	1	250	Plastic	Yes

OBSERVATIONS / NOTES:

NAA Parameter (if applicable) Ferrous Iron Kit:

Duplicate information:	Signature(s):
	Walt.Pryor

WELL PHOTOGRAPH

WELL ID: MSA-MW-50S

Comments/Repairs Needed:

GROUNDWATER SAMPLE LOG SHEET

Tetra Tech, Inc.

Event:	MSA Annual Groundwater 2020
Project Site Name:	MSA Dump Road Area
Project No.:	112IC09023

Sample ID:	MSA-MW-51S-070120	**Sampled By:**	Walt.Pryor
QA/QC Duplicate ID:	No	**Sample Date:**	07/01/20
MS/MSD Collected:	No	**Sample Time:**	1122

WELL INFORMATION:

Well ID :	MSA-MW-51S	**Purge Date:**	07/01/20
Well Diameter (in):	2" PVC	**Static Water Level (ft-BTOR):**	9.05
Top of Screen (ft-BTOR):		**PID Monitor Reading:**	N/A
Bottom of Screen (ft-BTOR):		**Purge Method:**	Geopump II Peristaltic Pump
Total Well Depth (ft-BTOR):		**Sample Method:**	Low Flow - Direct Fill

MONITORING WELL INSPECTION

Condition of Seal:

Well Photograph - See next page

( ) None (x) Good ( ) Cracked

Condition of Protective Casing:

(x) Good ( ) Damaged ( ) Loose ( ) None Present

Inner Casing: (x) PVC ( ) Steel ( ) None

Condition: (x) Good ( ) Cracked/Broken

EQUIPMENT INFORMATION:

Water Quality Instrument:	Horiba U-52	**Pump Controller:**	Geopump II Peristaltic Pump
Turbidity Meter:	LaMotte 2020e		

PURGE DATA:

Time (Hrs)	Water Level (ft. below TOC)	Flow mL / min.	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	Comments
1032	9.05	300	6.04	1.620	0.00	0.00	19.07	99	0.8	PFAS
1037	9.41	300	6.25	1.610	0.00	0.00	19.14	116	0.8	
1042	9.41	300	6.32	1.610	0.00	0.00	19.16	139	0.8	
1052	9.41	300	6.32	1.600	0.00	0.00	19.16	140	0.8	
1102	9.41	300	6.32	1.600	0.00	0.00	19.26	173	0.8	
1107	9.41	300	6.32	1.610	0.00	0.00	19.29	178	0.8	
1112	9.41	300	6.31	1.610	0.00	0.00	19.35	184	0.8	
1117	9.41	300	6.3	1.620	0.00	0.00	19.37	188	0.8	

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal.)	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	
1032	1117	45	2.5	6.30	1.620	0.00	0.0	19.37	188	0.8	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Quantity	Vol.	Bottle Type	Collected
PFAS		None	1	250	Plastic	Yes

OBSERVATIONS / NOTES:

NAA Parameter (if applicable) Ferrous Iron Kit:

Duplicate information:	Signature(s):
	Walt.Pryor

WELL PHOTOGRAPH

WELL ID: MSA-MW-51S

Comments/Repairs Needed:

GROUNDWATER SAMPLE LOG SHEET

Tetra Tech, Inc.

Event:	MSA Annual Groundwater 2020
Project Site Name:	MSA Dump Road Area
Project No.:	112IC09023

Sample ID:	MSA-Pond1-070120	**Sampled By:**	Walt.Pryor
QA/QC Duplicate ID:	No	**Sample Date:**	07/01/20
MS/MSD Collected:	No	**Sample Time:**	1430

WELL INFORMATION:

Well ID :	MSA-Pond1	**Purge Date:**	07/01/20
Well Diameter (in):	2" PVC	**Static Water Level (ft-BTOR):**	NA
Top of Screen (ft-BTOR):		**PID Monitor Reading:**	N/A
Bottom of Screen (ft-BTOR):		**Purge Method:**	Geopump II Peristaltic Pump
Total Well Depth (ft-BTOR):		**Sample Method:**	Low Flow - Direct Fill

MONITORING WELL INSPECTION

Condition of Seal:

Well Photograph - See next page

( ) None ( ) Good ( ) Cracked

Condition of Protective Casing:

( ) Good ( ) Damaged ( ) Loose ( ) None Present

Inner Casing: () PVC ( ) Steel ( ) None

Condition: ( ) Good ( ) Cracked/Broken

EQUIPMENT INFORMATION:

Water Quality Instrument:	Horiba U-52	**Pump Controller:**	Geopump II Peristaltic Pump
Turbidity Meter:	LaMotte 2020e		

PURGE DATA:

Time (Hrs)	Water Level (ft. below TOC)	Flow mL / min.	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	Comments
1430	NA	NA	7.1	0.17	17.5	1.44	26.09	-46	0.1	PFAS

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal.)	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	
NA	NA	NA	NA	7.10	0.170	17.50	1.4	26.09	-46	0.1	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Quantity	Vol.	Bottle Type	Collected
PFAS		None	1	250	Plastic	Yes

OBSERVATIONS / NOTES:

NAA Parameter (if applicable) Ferrous Iron Kit:

Duplicate information:	Signature(s):
	Walt.Pryor

WELL PHOTOGRAPH

WELL ID: MSA-Pond1

Comments/Repairs Needed:

GROUNDWATER SAMPLE LOG SHEET

Tetra Tech, Inc.

Event:	MSA Annual Groundwater 2020
Project Site Name:	MSA Dump Road Area
Project No.:	112IC09023

Sample ID:	MSA-Pond2-070120	**Sampled By:**	Walt.Pryor
QA/QC Duplicate ID:	No	**Sample Date:**	07/01/20
MS/MSD Collected:	No	**Sample Time:**	1400

WELL INFORMATION:

Well ID :	MSA-Pond2	**Purge Date:**	07/01/20
Well Diameter (in):	2" PVC	**Static Water Level (ft-BTOR):**	NA
Top of Screen (ft-BTOR):		**PID Monitor Reading:**	N/A
Bottom of Screen (ft-BTOR):		**Purge Method:**	Geopump II Peristaltic Pump
Total Well Depth (ft-BTOR):		**Sample Method:**	Low Flow - Direct Fill

MONITORING WELL INSPECTION

Condition of Seal:

Well Photograph - See next page

( ) None ( ) Good ( ) Cracked

Condition of Protective Casing:

( ) Good ( ) Damaged ( ) Loose ( ) None Present

Inner Casing: () PVC ( ) Steel ( ) None

Condition: ( ) Good ( ) Cracked/Broken

EQUIPMENT INFORMATION:

Water Quality Instrument:	Horiba U-52	**Pump Controller:**	Geopump II Peristaltic Pump
Turbidity Meter:	LaMotte 2020e		

PURGE DATA:

Time (Hrs)	Water Level (ft. below TOC)	Flow mL / min.	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	Comments
1400	NA	NA	7.24	0.417	20.00	1.92	27.31	76	0.2	PFAS

FINAL PURGE / SAMPLE DATA:

Start Purge	End Purge	Total (min.)	Total Vol. (gal.)	pH (S.U.)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (C°)	ORP (mV)	Salinity (ppt)	
NA	NA	NA	NA	7.29	0.417	20.00	1.9	27.31	76	0.2	

ANALYSIS, PRESERVATION AND BOTTLE REQUIRMENTS

Analysis	Method	Preservative	Quantity	Vol.	Bottle Type	Collected
PFAS		None	1	250	Plastic	Yes

OBSERVATIONS / NOTES:

NAA Parameter (if applicable) Ferrous Iron Kit:

Duplicate information:	Signature(s):
	Walt.Pryor

WELL PHOTOGRAPH

WELL ID: MSA-Pond2

Comments/Repairs Needed:

APPENDIX E—DATA-VALIDATION REPORTS ANALYSIS REPORTS AND CHAIN-OF-CUSTODY FORMS

TETRA TECH

INTERNAL CORRESPONDENCE

TO: **S. BRENNER** **DATE:** **OCTOBER 14, 2020**

FROM: **GLORIA SCHIFINO** **COPIES:** **DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS)**
MARTIN STATE AIRPORT
SAMPLE DELIVERY GROUP (SDG) 410-6246-1

SAMPLES: 7/Aqueous

MSA-DMW-7S-062920	MSA-MW-34I-062920
MSA-MW-34S-062920	MSA-MW-40I-062920
MSA-MW-40S-062920	MSA-MW-48I-062920
MSA-MW-49S-062920	

1/Field Blanks (FRBs)
MSA-FB-062920

1/Equipment Blank/PFAS
EQB-WL-062920

Overview

The sample set for NAS JRB Willow Grove, SDG 410-6246-1, consisted of seven (7) aqueous samples, one (1) field blank sample and one (1) equipment blank. All samples were analyzed for perfluorinated alkyl acids.

The samples were collected by Tetra Tech on June 29, 2020 and analyzed by Eurofins Lancaster Laboratories. PFAS groundwater analyses were conducted in accordance with EPA method 537 modified analytical and reporting protocols.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, mass calibration, mass spectral acquisition rate, instrument sensitivity check, peak asymmetry factor, initial/continuing calibrations, ion transitions, laboratory method results, internal standard recoveries, laboratory control sample results, and recoveries, chromatographic resolution, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

Major

No major issues were identified.

Minor

The following samples contained extracted internal standard recoveries above quality control limits:

Sample	Labeled Standard	Compounds Affected	Data Qualification
MSA-MW-34S-062920	13C8-PFOS	PFOS	J
MSA-MW-40I-062920	13C3-PFBS	PFBS	J
MSA-DMW-7S-062920	13C3-PFBS	PFBS	J

The detected results reported below were qualified as estimated (J).

The following compound was detected in the equipment blank at a concentration below the reporting limit (RL)

Compound	Concentration	Action Level RL > or <
PFNA	0.59 ng/L	< RL

The detected result for PFNA below the RL in sample MSA-MW-49S-062920 was raised to the RL and was qualified as nondetected (U).

Detected results reported below the RL but above the detection limit (DL) were qualified as estimated (J).

Notes

The following samples contained extracted internal standard recoveries which were above quality control limits: MSA-MW-48I-062920 (6:2 FTS & 8:2FTS), MSA-MW-40S-062920 (6:2 FTS & 8:2FTS), MSA-DMW-7S-062920(6:2 FTS & 8:2FTS), and MSA-MW-40I-062920 (6:2 FTS). No action was required in the aforementioned samples because the associated results were nondetected.

Samples MSA-DMW-7S-062920, MSA-MW-34S-062920 and MSA-MW-40S-062920 was diluted and analyzed at 10x dilution for compounds PFHxS and/or PFOS.

Samples MSA-MW-40I-062920 was diluted and analyzed at 100x dilution for compound PFHxS.

Non-detected results were reported to the reporting limit.

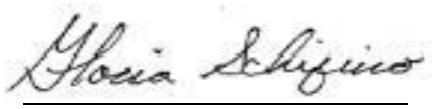
The buffering agent Trizma was added to all drinking water samples.

Executive Summary

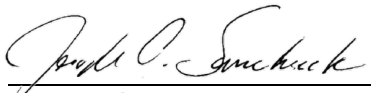
Laboratory Performance: Several extracted internal standard recoveries were above the quality control limits. One analyte was present in the equipment blank.

Other Factors Affecting Data Quality: Results below the RL were estimated.

The data for these analyses were reviewed with reference to the Environmental Protection Agency document EPA 910-R-18-001 “Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537”, (November 2018). The text of this report has been formulated to address only those areas affecting data quality.



Tetra Tech, Inc.
Gloria Schifino
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

Data Qualifier Definitions

The following definitions provide brief explanations of the validation qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted detection limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value is the estimated concentration in the sample.
R	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
UR	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

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: 09023	NSAMPLE	EQB-WL-062920			MSA-DMW-7S-062920			MSA-DMW-7S-062920DL			MSA-FB-062920		
SDG: 410-6246-1	LAB_ID	410-6246-1			410-6246-10			410-6246-10			410-6246-4		
FRACTION: PFAS	SAMP_DATE	6/29/2020			6/29/2020			6/29/2020			6/29/2020		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/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
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		4.6	U		4.3	U					4.7	U	
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		2.8	U		2.6	U					2.8	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)		1.8	U		160						1.9	U	
PERFLUOROBUTANESULFONIC ACID (PFBS)		1.8	U		30	J	N				1.9	U	
PERFLUOROHEPTANOIC ACID (PFHPA)		1.8	U		27						1.9	U	
PERFLUOROHEXANESULFONIC ACID (PFHXS)		1.8	U					800			1.9	U	
PERFLUORONONANOIC ACID (PFNA)		0.59	J	P	3						1.9	U	
PERFLUOROOCTANESULFONIC ACID (PFOS)		1.8	U		210						1.9	U	

PROJ_NO: 09023	NSAMPLE	MSA-MW-34I-062920			MSA-MW-34S-062920			MSA-MW-34S-062920DL			MSA-MW-40I-062920		
SDG: 410-6246-1	LAB_ID	410-6246-6			410-6246-5			410-6246-5			410-6246-9		
FRACTION: PFAS	SAMP_DATE	6/29/2020			6/29/2020			6/29/2020			6/29/2020		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/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
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		4.7	U		30						4.3	U	
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		2.8	U		2.8	U					2.6	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)		2.6			110						240		
PERFLUOROBUTANESULFONIC ACID (PFBS)		5.5			69						41	J	N
PERFLUOROHEPTANOIC ACID (PFHPA)		2.4			74						37		
PERFLUOROHEXANESULFONIC ACID (PFHXS)		19						530					
PERFLUORONONANOIC ACID (PFNA)		1.9	U		15						3.3		
PERFLUOROOCTANESULFONIC ACID (PFOS)		9.1						500	J	N	220		

PROJ_NO: 09023	NSAMPLE	MSA-MW-40I-062920DL			MSA-MW-40S-062920			MSA-MW-40S-062920DL			MSA-MW-48I-062920		
SDG: 410-6246-1	LAB_ID	410-6246-9			410-6246-8			410-6246-8			410-6246-2		
FRACTION: PFAS	SAMP_DATE	6/29/2020			6/29/2020			6/29/2020			6/29/2020		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/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
6:2 FLUOROTELOMER SULFONATE (6:2FTS)					4.4	U					4.7	U	
8:2 FLUOROTELOMER SULFONATE (8:2FTS)					2.6	U					2.8	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)					170						4.1		
PERFLUOROBUTANESULFONIC ACID (PFBS)					23						1.7	J	P
PERFLUOROHEPTANOIC ACID (PFHPA)					20						2.4		
PERFLUOROHEXANESULFONIC ACID (PFHXS)		1400						950			5.3		
PERFLUORONONANOIC ACID (PFNA)					4.4						1.9	U	
PERFLUOROOCTANESULFONIC ACID (PFOS)								370			9.6		

PROJ_NO: 09023	NSAMPLE	MSA-MW-49S-062920		
SDG: 410-6246-1	LAB_ID	410-6246-3		
FRACTION: PFAS	SAMP_DATE	6/29/2020		
MEDIA: WATER	QC_TYPE	NM		
	UNITS	NG/L		
	PCT_SOLIDS	0.0		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		4.8	U	
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		2.9	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)		4.6		
PERFLUOROBUTANESULFONIC ACID (PFBS)		2.4		
PERFLUOROHEPTANOIC ACID (PFHPA)		3.4		
PERFLUOROHEXANESULFONIC ACID (PFHXS)		9.6		
PERFLUORONONANOIC ACID (PFNA)		1.9	U	B
PERFLUOROOCTANESULFONIC ACID (PFOS)		11		

Appendix B

Results as Reported by the Laboratory

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: EQB-WL-062920 Lab Sample ID: 410-6246-1

Matrix: Water Lab File ID: 20JUL04-29.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 08:30

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 272.2(mL) Date Analyzed: 07/04/2020 12:55

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 19162 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	ND		1.8	0.46
335-67-1	Perfluorooctanoic acid	ND		1.8	0.46
375-95-1	Perfluorononanoic acid	0.59	J	1.8	0.46
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.6	1.8
375-73-5	Perfluorobutanesulfonic acid	ND		1.8	0.46
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.92
355-46-4	Perfluorohexanesulfonic acid	ND		1.8	0.46
1763-23-1	Perfluorooctanesulfonic acid	ND		1.8	0.46

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	104		33-140
STL01052	13C8 PFOA	109		52-124
STL02578	13C9 PFNA	113		48-130
STL02337	13C3 PFBS	107		23-175
STL02581	13C3 PFHxS	103		35-143
STL01054	13C8 PFOS	106		52-121
STL02279	M2-6:2 FTS	130		29-182
STL02280	M2-8:2 FTS	125		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: MSA-MW-48I-062920 Lab Sample ID: 410-6246-2

Matrix: Water Lab File ID: 20JUL04-30.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 10:30

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 267.3(mL) Date Analyzed: 07/04/2020 13:04

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 19162 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	2.4		1.9	0.47
335-67-1	Perfluorooctanoic acid	4.1		1.9	0.47
375-95-1	Perfluorononanoic acid	ND		1.9	0.47
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.7	1.9
375-73-5	Perfluorobutanesulfonic acid	1.7	J	1.9	0.47
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.94
355-46-4	Perfluorohexanesulfonic acid	5.3		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	9.6		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	108		33-140
STL01052	13C8 PFOA	115		52-124
STL02578	13C9 PFNA	113		48-130
STL02337	13C3 PFBS	146		23-175
STL02581	13C3 PFHxS	100		35-143
STL01054	13C8 PFOS	103		52-121
STL02279	M2-6:2 FTS	201	*5	29-182
STL02280	M2-8:2 FTS	193	*5	37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: MSA-MW-49S-062920 Lab Sample ID: 410-6246-3

Matrix: Water Lab File ID: 20JUL04-31.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 11:30

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 260(mL) Date Analyzed: 07/04/2020 13:13

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 19162 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	3.4		1.9	0.48
335-67-1	Perfluorooctanoic acid	4.6		1.9	0.48
375-95-1	Perfluorononanoic acid	1.2	J	1.9	0.48
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.8	1.9
375-73-5	Perfluorobutanesulfonic acid	2.4		1.9	0.48
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.9	0.96
355-46-4	Perfluorohexanesulfonic acid	9.6		1.9	0.48
1763-23-1	Perfluorooctanesulfonic acid	11		1.9	0.48

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	111		33-140
STL01052	13C8 PFOA	119		52-124
STL02578	13C9 PFNA	115		48-130
STL02337	13C3 PFBS	126		23-175
STL02581	13C3 PFHxS	106		35-143
STL01054	13C8 PFOS	110		52-121
STL02279	M2-6:2 FTS	162		29-182
STL02280	M2-8:2 FTS	142		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: MSA-FB-062920 Lab Sample ID: 410-6246-4

Matrix: Water Lab File ID: 20JUL04-33.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 13:55

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 263.8(mL) Date Analyzed: 07/04/2020 13:31

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 19162 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	ND		1.9	0.47
335-67-1	Perfluorooctanoic acid	ND		1.9	0.47
375-95-1	Perfluorononanoic acid	ND		1.9	0.47
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.7	1.9
375-73-5	Perfluorobutanesulfonic acid	ND		1.9	0.47
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.95
355-46-4	Perfluorohexanesulfonic acid	ND		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	ND		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	106		33-140
STL01052	13C8 PFOA	115		52-124
STL02578	13C9 PFNA	103		48-130
STL02337	13C3 PFBS	105		23-175
STL02581	13C3 PFHxS	105		35-143
STL01054	13C8 PFOS	102		52-121
STL02279	M2-6:2 FTS	127		29-182
STL02280	M2-8:2 FTS	129		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: MSA-MW-34S-062920 Lab Sample ID: 410-6246-5

Matrix: Water Lab File ID: 20JUL04-34.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 13:30

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 263.2(mL) Date Analyzed: 07/04/2020 13:40

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 19162 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	74		1.9	0.47
335-67-1	Perfluorooctanoic acid	110		1.9	0.47
375-95-1	Perfluorononanoic acid	15		1.9	0.47
27619-97-2	6:2 Fluorotelomer sulfonic acid	30		4.7	1.9
375-73-5	Perfluorobutanesulfonic acid	69		1.9	0.47
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.95

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	108		33-140
STL01052	13C8 PFOA	116		52-124
STL02578	13C9 PFNA	129		48-130
STL02337	13C3 PFBS	140		23-175
STL02581	13C3 PFHxS	108		35-143
STL01054	13C8 PFOS	117		52-121
STL02279	M2-6:2 FTS	149		29-182
STL02280	M2-8:2 FTS	128		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: MSA-MW-34S-062920 DL Lab Sample ID: 410-6246-5 DL

Matrix: Water Lab File ID: 20JUL13-125.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 13:30

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 263.2(mL) Date Analyzed: 07/14/2020 07:35

Con. Extract Vol.: 1(mL) Dilution Factor: 10

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 21920 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
355-46-4	Perfluorohexanesulfonic acid	530		19	4.7
1763-23-1	Perfluorooctanesulfonic acid	500		19	4.7

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02581	13C3 PFHxS	123		35-143
STL01054	13C8 PFOS	127	*5	52-121

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: MSA-MW-34I-062920 Lab Sample ID: 410-6246-6

Matrix: Water Lab File ID: 20JUL04-35.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 14:40

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 267(mL) Date Analyzed: 07/04/2020 13:49

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 19162 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	2.4		1.9	0.47
335-67-1	Perfluorooctanoic acid	2.6		1.9	0.47
375-95-1	Perfluorononanoic acid	ND		1.9	0.47
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.7	1.9
375-73-5	Perfluorobutanesulfonic acid	5.5		1.9	0.47
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.94
355-46-4	Perfluorohexanesulfonic acid	19		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	9.1		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	96		33-140
STL01052	13C8 PFOA	102		52-124
STL02578	13C9 PFNA	104		48-130
STL02337	13C3 PFBS	129		23-175
STL02581	13C3 PFHxS	98		35-143
STL01054	13C8 PFOS	101		52-121
STL02279	M2-6:2 FTS	124		29-182
STL02280	M2-8:2 FTS	131		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: MSA-MW-40S-062920 Lab Sample ID: 410-6246-8

Matrix: Water Lab File ID: 20JUL04-36.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 10:35

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 286.6(mL) Date Analyzed: 07/04/2020 13:58

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 19162 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	20		1.7	0.44
335-67-1	Perfluorooctanoic acid	170		1.7	0.44
375-95-1	Perfluorononanoic acid	4.4		1.7	0.44
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.4	1.7
375-73-5	Perfluorobutanesulfonic acid	23		1.7	0.44
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.6	0.87

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	95		33-140
STL01052	13C8 PFOA	109		52-124
STL02578	13C9 PFNA	120		48-130
STL02337	13C3 PFBS	167		23-175
STL02581	13C3 PFHxS	89		35-143
STL01054	13C8 PFOS	105		52-121
STL02279	M2-6:2 FTS	212	*5	29-182
STL02280	M2-8:2 FTS	179	*5	37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: MSA-MW-40S-062920 DL Lab Sample ID: 410-6246-8 DL

Matrix: Water Lab File ID: 20JUL13-126.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 10:35

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 286.6(mL) Date Analyzed: 07/14/2020 07:44

Con. Extract Vol.: 1(mL) Dilution Factor: 10

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 21920 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
355-46-4	Perfluorohexanesulfonic acid	950		17	4.4
1763-23-1	Perfluorooctanesulfonic acid	370		17	4.4

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02581	13C3 PFHxS	109		35-143
STL01054	13C8 PFOS	106		52-121

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: MSA-MW-40I-062920 Lab Sample ID: 410-6246-9

Matrix: Water Lab File ID: 20JUL04-37.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 11:50

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 292.9(mL) Date Analyzed: 07/04/2020 14:07

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 19162 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	37		1.7	0.43
335-67-1	Perfluorooctanoic acid	240		1.7	0.43
375-95-1	Perfluorononanoic acid	3.3		1.7	0.43
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.3	1.7
375-73-5	Perfluorobutanesulfonic acid	41		1.7	0.43
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.6	0.85
1763-23-1	Perfluorooctanesulfonic acid	220		1.7	0.43

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	78		33-140
STL01052	13C8 PFOA	108		52-124
STL02578	13C9 PFNA	117		48-130
STL02337	13C3 PFBS	178	*5	23-175
STL02581	13C3 PFHxS	72		35-143
STL01054	13C8 PFOS	104		52-121
STL02279	M2-6:2 FTS	190	*5	29-182
STL02280	M2-8:2 FTS	163		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: MSA-MW-40I-062920 RA Lab Sample ID: 410-6246-9 RA

Matrix: Water Lab File ID: 20JUL10-12.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 11:50

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 292.9(mL) Date Analyzed: 07/10/2020 10:45

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 21216 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	*Perfluoroheptanoic acid*	*40*		*1.7*	*0.43*
335-67-1	*Perfluorooctanoic acid*	*270*		*1.7*	*0.43*
375-95-1	*Perfluorononanoic acid*	*3.2*		*1.7*	*0.43*
27619-97-2	*6:2 Fluorotelomer sulfonic acid*	*ND*		*4.3*	*1.7*
375-73-5	*Perfluorobutanesulfonic acid*	*48*		*1.7*	*0.43*
39108-34-4	*8:2 Fluorotelomer sulfonic acid*	*ND*		*2.6*	*0.85*
355-46-4	*Perfluorohexanesulfonic acid*	*1400*	*E*	*1.7*	*0.43*
1763-23-1	*Perfluorooctanesulfonic acid*	*210*		*1.7*	*0.43*

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	82		33-140
STL01052	13C8 PFOA	107		52-124
STL02578	13C9 PFNA	155	*5	48-130
STL02337	13C3 PFBS	270	*5	23-175
STL02581	13C3 PFHxS	80		35-143
STL01054	13C8 PFOS	128	*5	52-121
STL02279	M2-6:2 FTS	201	*5	29-182
STL02280	M2-8:2 FTS	173	*5	37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: MSA-MW-40I-062920 DL Lab Sample ID: 410-6246-9 DL

Matrix: Water Lab File ID: 20JUL13-127.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 11:50

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 292.9(mL) Date Analyzed: 07/14/2020 07:53

Con. Extract Vol.: 1(mL) Dilution Factor: 100

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 21920 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
355-46-4	Perfluorohexanesulfonic acid	1400		170	43

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02581	13C3 PFHxS	127		35-143

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: MSA-DMW-7S-062920 Lab Sample ID: 410-6246-10

Matrix: Water Lab File ID: 20JUL04-38.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 14:35

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 288.5(mL) Date Analyzed: 07/04/2020 14:16

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 19162 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	27		1.7	0.43
335-67-1	Perfluorooctanoic acid	160		1.7	0.43
375-95-1	Perfluorononanoic acid	3.0		1.7	0.43
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.3	1.7
375-73-5	Perfluorobutanesulfonic acid	30		1.7	0.43
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.6	0.87
1763-23-1	Perfluorooctanesulfonic acid	210		1.7	0.43

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	88		33-140
STL01052	13C8 PFOA	103		52-124
STL02578	13C9 PFNA	125		48-130
STL02337	13C3 PFBS	176	*5	23-175
STL02581	13C3 PFHxS	82		35-143
STL01054	13C8 PFOS	105		52-121
STL02279	M2-6:2 FTS	188	*5	29-182
STL02280	M2-8:2 FTS	185	*5	37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: MSA-DMW-7S-062920 RA Lab Sample ID: 410-6246-10 RA

Matrix: Water Lab File ID: 20JUL10-13.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 14:35

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 288.5(mL) Date Analyzed: 07/10/2020 10:54

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 21216 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	*Perfluoroheptanoic acid*	*26*		*1.7*	*0.43*
335-67-1	*Perfluorooctanoic acid*	*190*		*1.7*	*0.43*
375-95-1	*Perfluorononanoic acid*	*2.6*		*1.7*	*0.43*
27619-97-2	*6:2 Fluorotelomer sulfonic acid*	*ND*		*4.3*	*1.7*
375-73-5	*Perfluorobutanesulfonic acid*	*42*		*1.7*	*0.43*
39108-34-4	*8:2 Fluorotelomer sulfonic acid*	*ND*		*2.6*	*0.87*
355-46-4	*Perfluorohexanesulfonic acid*	*860*	*E*	*1.7*	*0.43*
1763-23-1	*Perfluorooctanesulfonic acid*	*200*		*1.7*	*0.43*

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	87		33-140
STL01052	13C8 PFOA	96		52-124
STL02578	13C9 PFNA	146	*5	48-130
STL02337	13C3 PFBS	271	*5	23-175
STL02581	13C3 PFHxS	76		35-143
STL01054	13C8 PFOS	113		52-121
STL02279	M2-6:2 FTS	188	*5	29-182
STL02280	M2-8:2 FTS	171	*5	37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: MSA-DMW-7S-062920 DL Lab Sample ID: 410-6246-10 DL

Matrix: Water Lab File ID: 20JUL13-128.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/29/2020 14:35

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 288.5(mL) Date Analyzed: 07/14/2020 08:02

Con. Extract Vol.: 1(mL) Dilution Factor: 10

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 21920 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
355-46-4	Perfluorohexanesulfonic acid	800		17	4.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02581	13C3 PFHxS	105		35-143

Appendix C

Support Documentation

Baltimore #201

n of Custody Record 321394

410-6246 Chain of Custody

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Samantha Brenner	Site Contact: Patrick O'Brien	Date: 6/29/20	COC No:
Company Name: Tetra Tech	Tel/Fax: 301-528-3556	Lab Contact:	Carrier: Fedex	1 of 1 COCs
Address: 10251 Century Blvd., Suite 200	Analysis Turnaround Time			Sampler:
City/State/Zip: Germantown, MD 20874	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 301-528-5552	TAT if different from Below			Walk-in Client:
Fax: 301-528-5080	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day — Standard			Lab Sampling:
Project Name: MSA PFAS GW Round 2				Job / SDG No.:
Site: MSA				
PO# 112E109023				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	PFAS (Method 537)	Sample Specific Notes:
EQB-WL-062920	6/29/20	0830	G	GW	2	N	N	X	
MSA-MW-48I-062920	6/29/20	1030	G	GW	2	N	N	X	
MSA-MW-49S-062920	6/29/20	1130	G	GW	2	N	N	X	
MSA-FB-062920	6/29/20	1355	G	GW	2	N	N	X	Trizma preserved FRB
MSA-MW-34S-062920	6/29/20	1330	G	GW	2	N	N	X	
MSA-MW-34I-062920	6/29/20	1440	G	GW	2	N	N	X	
EQB-WL-062920	6/29/20	0800	G	GW	2	N	N	X	
MSA-MW-40S-062920		1035	G		2			X	
MSA-MW-40I-062920		1150	G		2			X	
MSA-DMW-7S-062920		1435	G		2			X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: 0.8 Corr'd: 0.8	Therm ID No.: DT42-03

	Company	Date/Time	Received by:	Company	Date/Time
Relinquished by:	Tetra Tech	6/29/20		ETA	6/29/20 1535
Relinquished by:	~~6/29/20 1900~~	6/30/20 1130		ELLE	6/30/20 11:30
Relinquished by:	ELLE	6/30/20 1610	Received in Laboratory by:	ELLE	6-30-20 1630

Job Narrative
410-6246-1

Comments
No additional comments.

Receipt
The samples were received on 6/30/2020 4:30 PM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.8º C.

Receipt Exceptions

The Field Sampler was not listed on the Chain of Custody.

The following samples were listed on the Chain of Custody (COC); however, no samples were received: EQB-WL-062920 (collected 06/29/20 08:00)EQB-WL-062920 (410-6246-1), MSA-MW-48I-062920 (410-6246-2), MSA-MW-49S-062920 (410-6246-3), MSA-FB-062920 (410-6246-4), MSA-MW-34S-062920 (410-6246-5), MSA-MW-34I-062920 (410-6246-6), MSA-MW-40S-062920 (410-6246-8), MSA-MW-40I-062920 (410-6246-9) and MSA-DMW-7S-062920 (410-6246-10). Client confirmed this sample should have been crossed off of the COC before it was sent.

LCMS
Method 537 (modified): Due to the sample matrix, Isotope Dilution Analyte (IDA) recovery is above QC acceptance criteria as noted on the QC summary for the following samples: MSA-MW-48I-062920 (410-6246-2), MSA-MW-34S-062920 (410-6246-5), MSA-MW-40S-062920 (410-6246-8), MSA-MW-40I-062920 (410-6246-9) and MSA-DMW-7S-062920 (410-6246-10).

Method 537 (modified): The internal standard response for 13C3-PFBA for the following samples were outside acceptance criteria: MSA-MW-40I-062920 (410-6246-9) and MSA-DMW-7S-062920 (410-6246-10). The sample was reinjected and the internal standard response was again outside acceptance criteria.

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

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

Definitions/Glossary

Client: Tetra Tech, Inc. Job ID: 410-6246-1
Project/Site: MSA PFAS GW Round 2

Qualifiers

LCMS

Qualifier	Qualifier Description
*5	Isotope dilution analyte is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method Summary

Client: Tetra Tech, Inc. Job ID: 410-6246-1
Project/Site: MSA PFAS GW Round 2

Method	Method Description	Protocol	Laboratory
EPA 537 (Mod)	EPA 537 Isotope Dilution	EPA	ELLE
EPA 537 (mod)	EPA 537 Isotope Dilution	EPA	ELLE

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: Tetra Tech, Inc.
Job ID: 410-6246-1
Project/Site: MSA PFAS GW Round 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
410-6246-1	EQB-WL-062920	Water	06/29/20 08:30	06/30/20 16:30	
410-6246-2	MSA-MW-48I-062920	Water	06/29/20 10:30	06/30/20 16:30	
410-6246-3	MSA-MW-49S-062920	Water	06/29/20 11:30	06/30/20 16:30	
410-6246-4	MSA-FB-062920	Water	06/29/20 13:55	06/30/20 16:30	
410-6246-5	MSA-MW-34S-062920	Water	06/29/20 13:30	06/30/20 16:30	
410-6246-6	MSA-MW-34I-062920	Water	06/29/20 14:40	06/30/20 16:30	
410-6246-8	MSA-MW-40S-062920	Water	06/29/20 10:35	06/30/20 16:30	
410-6246-9	MSA-MW-40I-062920	Water	06/29/20 11:50	06/30/20 16:30	
410-6246-10	MSA-DMW-7S-062920	Water	06/29/20 14:35	06/30/20 16:30	

Method PFC IDA

Fluorinated Hydrocarbons by Method PFAS IDA

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6246-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C3PFBS #	C3PFHS #	C4PFHA #	M262FTS #	C8PFOA #	C8PFOS #	C9PFNA #	M282FTS #
EQB-WL-062920	410-6246-1	107	103	104	130	109	106	113	125
MSA-MW-48I-062920	410-6246-2	146	100	108	201 *5	115	103	113	193 *5
MSA-MW-49S-062920	410-6246-3	126	106	111	162	119	110	115	142
MSA-FB-062920	410-6246-4	105	105	106	127	115	102	103	129
MSA-MW-34S-062920	410-6246-5	140	108	108	149	116	117	129	128
MSA-MW-34I-062920	410-6246-6	129	98	96	124	102	101	104	131
MSA-MW-40S-062920	410-6246-8	167	89	95	212 *5	109	105	120	179 *5
MSA-MW-40I-062920	410-6246-9	178 *5	72	78	190 *5	108	104	117	163
MSA-MW-40I-062920 RA	410-6246-9 RA	270 *5	80	82	201 *5	107	128 *5	155 *5	173 *5
MSA-DMW-7S-062920	410-6246-10	176 *5	82	88	188 *5	103	105	125	185 *5
MSA-DMW-7S-062920 RA	410-6246-10 RA	271 *5	76	87	188 *5	96	113	146 *5	171 *5
	MB 410-18452/1-A	98	106	101	120	112	95	96	124
	LCS 410-18452/2-A	106	116	111	128	117	111	113	131
	LCSD 410-18452/3-A	104	102	98	114	107	107	112	125

	QC LIMITS
C3PFBS = 13C3 PFBS	23-175
C3PFHS = 13C3 PFHxS	35-143
C4PFHA = 13C4 PFHpA	33-140
M262FTS = M2-6:2 FTS	29-182
C8PFOA = 13C8 PFOA	52-124
C8PFOS = 13C8 PFOS	52-121
C9PFNA = 13C9 PFNA	48-130
M282FTS = M2-8:2 FTS	37-169

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6246-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C3PFHS #
MSA-MW-40I-062920 DL	410-6246-9 DL	127
MSA-DMW-7S-062920 DL	410-6246-10 DL	105

	QC LIMITS
C3PFHS = 13C3 PFHxS	35-143

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6246-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C3PFHS #	C8PFOS #
MSA-MW-34S-062920 DL	410-6246-5 DL	123	127 *5
MSA-MW-40S-062920 DL	410-6246-8 DL	109	106

	QC LIMITS
C3PFHS = 13C3 PFHxS	35-143
C8PFOS = 13C8 PFOS	52-121

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6246-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL04-20.d

Lab ID: LCS 410-18452/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluoroheptanoic acid	25.6	24.8	97	69-144	
Perfluorooctanoic acid	25.6	22.0	86	67-139	
Perfluorononanoic acid	25.6	24.1	94	66-144	
6:2 Fluorotelomer sulfonic acid	24.3	22.5	93	56-140	
Perfluorobutanesulfonic acid	22.6	22.1	98	67-135	
8:2 Fluorotelomer sulfonic acid	24.5	22.1	90	58-143	
Perfluorohexanesulfonic acid	24.2	20.9	86	63-132	
Perfluorooctanesulfonic acid	24.5	19.9	81	53-129	
13C4 PFHpA	40.0	44.4	111	33-140	
13C8 PFOA	40.0	46.9	117	52-124	
13C9 PFNA	40.0	45.0	113	48-130	
13C3 PFBS	37.4	39.6	106	23-175	
13C3 PFHxS	37.8	43.9	116	35-143	
13C8 PFOS	38.3	42.4	111	52-121	
M2-6:2 FTS	38.0	48.6	128	29-182	
M2-8:2 FTS	38.3	50.2	131	37-169	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6246-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL04-21.d

Lab ID: LCSD 410-18452/3-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCSD CONCENTRATION (ng/L)	LCSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
Perfluoroheptanoic acid	25.6	25.8	101	4	30	69-144	
Perfluorooctanoic acid	25.6	21.9	86	0	30	67-139	
Perfluorononanoic acid	25.6	23.8	93	1	30	66-144	
6:2 Fluorotelomer sulfonic acid	24.3	21.6	89	4	30	56-140	
Perfluorobutanesulfonic acid	22.6	20.9	92	6	30	67-135	
8:2 Fluorotelomer sulfonic acid	24.5	21.0	86	5	30	58-143	
Perfluorohexanesulfonic acid	24.2	21.6	89	3	30	63-132	
Perfluorooctanesulfonic acid	24.5	18.9	77	5	30	53-129	
13C4 PFHpA	40.0	39.4	98			33-140	
13C8 PFOA	40.0	42.9	107			52-124	
13C9 PFNA	40.0	44.9	112			48-130	
13C3 PFBS	37.4	39.1	104			23-175	
13C3 PFHxS	37.8	38.6	102			35-143	
13C8 PFOS	38.3	40.8	107			52-121	
M2-6:2 FTS	38.0	43.3	114			29-182	
M2-8:2 FTS	38.3	47.8	125			37-169	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6246-1

SDG No.:

Lab File ID: 20JUL04-19.d Lab Sample ID: MB 410-18452/1-A

Matrix: Water Date Extracted: 07/01/2020 08:22

Instrument ID: 30731 Date Analyzed: 07/04/2020 11:24

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 410-18452/2-A	20JUL04-20.d	07/04/2020 11:34
	LCSD 410-18452/3-A	20JUL04-21.d	07/04/2020 11:43
EQB-WL-062920	410-6246-1	20JUL04-29.d	07/04/2020 12:55
MSA-MW-48I-062920	410-6246-2	20JUL04-30.d	07/04/2020 13:04
MSA-MW-49S-062920	410-6246-3	20JUL04-31.d	07/04/2020 13:13
MSA-FB-062920	410-6246-4	20JUL04-33.d	07/04/2020 13:31
MSA-MW-34S-062920	410-6246-5	20JUL04-34.d	07/04/2020 13:40
MSA-MW-34I-062920	410-6246-6	20JUL04-35.d	07/04/2020 13:49
MSA-MW-40S-062920	410-6246-8	20JUL04-36.d	07/04/2020 13:58
MSA-MW-40I-062920	410-6246-9	20JUL04-37.d	07/04/2020 14:07
MSA-DMW-7S-062920	410-6246-10	20JUL04-38.d	07/04/2020 14:16
MSA-MW-40I-062920 RA	410-6246-9 RA	20JUL10-12.d	07/10/2020 10:45
MSA-DMW-7S-062920 RA	410-6246-10 RA	20JUL10-13.d	07/10/2020 10:54
MSA-MW-34S-062920 DL	410-6246-5 DL	20JUL13-125.d	07/14/2020 07:35
MSA-MW-40S-062920 DL	410-6246-8 DL	20JUL13-126.d	07/14/2020 07:44
MSA-MW-40I-062920 DL	410-6246-9 DL	20JUL13-127.d	07/14/2020 07:53
MSA-DMW-7S-062920 DL	410-6246-10 DL	20JUL13-128.d	07/14/2020 08:02

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Client Sample ID: Lab Sample ID: MB 410-18452/1-A

Matrix: Water Lab File ID: 20JUL04-19.d

Analysis Method: EPA 537 (Mod) Date Collected:

Extraction Method: EPA 537 (mod) Date Extracted: 07/01/2020 08:22

Sample wt/vol: 250(mL) Date Analyzed: 07/04/2020 11:24

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 19162 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	ND		2.0	0.50
335-67-1	Perfluorooctanoic acid	ND		2.0	0.50
375-95-1	Perfluorononanoic acid	ND		2.0	0.50
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		5.0	2.0
375-73-5	Perfluorobutanesulfonic acid	ND		2.0	0.50
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		3.0	1.0
355-46-4	Perfluorohexanesulfonic acid	ND		2.0	0.50
1763-23-1	Perfluorooctanesulfonic acid	ND		2.0	0.50

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	101		33-140
STL01052	13C8 PFOA	112		52-124
STL02578	13C9 PFNA	96		48-130
STL02337	13C3 PFBS	98		23-175
STL02581	13C3 PFHxS	106		35-143
STL01054	13C8 PFOS	95		52-121
STL02279	M2-6:2 FTS	120		29-182
STL02280	M2-8:2 FTS	124		37-169

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Instrument ID: 27632 Calibration Start Date: 07/07/2020 06:09

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/07/2020 07:04

Calibration ID: 6558

		13C3PFBA		13PFOA		PFOS	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1597106	3.31	1137249	4.99	522554	5.32
UPPER LIMIT		2395659	3.51	1705874	5.19	783831	5.52
LOWER LIMIT		798553	3.11	568625	4.79	261277	5.12
LAB SAMPLE ID	CLIENT SAMPLE ID						
CCB 410-19789/8		1424308	3.31	1032870	4.99	472102	5.32
ICV 410-19789/9		1877341	3.32	1266074	5.00	609798	5.32
CCV 410-21216/1		1576458	3.32	1062539	4.99	474220	5.33
410-6246-9 RA	MSA-MW-40I-062920 RA	431240*3	3.32	1072942	5.00	389912	5.34
410-6246-10 RA	MSA-DMW-7S-062920 RA	435574*3	3.32	1194673	5.00	427639	5.33
CCV 410-21216/13		1707951	3.32	1193332	5.00	533377	5.33

13C3PFBA = 13C3-PFBA
13PFOA = 13C2 PFOA
PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Instrument ID: 27632 Calibration Start Date: 07/07/2020 06:09

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/07/2020 07:04

Calibration ID: 6558

		PFDA					
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		915468	5.65				
UPPER LIMIT		1373202	5.85				
LOWER LIMIT		457734	5.45				
LAB SAMPLE ID	CLIENT SAMPLE ID						
CCB 410-19789/8		783238	5.65				
ICV 410-19789/9		1098344	5.65				
CCV 410-21216/1		866056	5.65				
410-6246-9 RA	MSA-MW-40I-062920 RA	914064	5.67				
410-6246-10 RA	MSA-DMW-7S-062920 RA	997866	5.65				
CCV 410-21216/13		893561	5.66				

PFDA = 13C2 PFDA

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Instrument ID: 27632 Calibration Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/13/2020 13:55

Calibration ID: 6740

		13C3PFBA		13PFOA		PFOS	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1443380	3.35	1134281	5.05	475947	5.38
UPPER LIMIT		2165070	3.55	1701422	5.25	713921	5.58
LOWER LIMIT		721690	3.15	567141	4.85	237974	5.18
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-21880/8		1259622	3.35	1019246	5.05	427114	5.37
ICV 410-21880/9		1729800	3.34	1337683	5.04	557572	5.37
CCV 410-21920/102		1614616	3.31	1207357	5.00	545403	5.34
CCV 410-21920/113		1615300	3.32	1175479	5.00	505579	5.33
410-6246-5 DL	MSA-MW-34S-062920 DL	1405832	3.31	1018962	5.00	437877	5.33
410-6246-8 DL	MSA-MW-40S-062920 DL	1297134	3.31	1102338	4.99	473369	5.33
410-6246-9 DL	MSA-MW-40I-062920 DL	1533452	3.32	1090315	5.00	477433	5.34
410-6246-10 DL	MSA-DMW-7S-062920 DL	1253584	3.31	1156894	5.00	489070	5.34

13C3PFBA = 13C3-PFBA
13PFOA = 13C2 PFOA
PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Instrument ID: 27632 Calibration Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/13/2020 13:55

Calibration ID: 6740

		PFDA					
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		862620	5.71				
UPPER LIMIT		1293930	5.91				
LOWER LIMIT		431310	5.51				
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-21880/8		734089	5.71				
ICV 410-21880/9		1045892	5.71				
CCV 410-21920/102		969162	5.65				
CCV 410-21920/113		932882	5.66				
410-6246-5 DL	MSA-MW-34S-062920 DL	795131	5.65				
410-6246-8 DL	MSA-MW-40S-062920 DL	882193	5.65				
410-6246-9 DL	MSA-MW-40I-062920 DL	852461	5.66				
410-6246-10 DL	MSA-DMW-7S-062920 DL	873174	5.66				

PFDA = 13C2 PFDA

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Instrument ID: 30731 Calibration Start Date: 05/26/2020 12:43

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 05/26/2020 13:37

Calibration ID: 4400

		13C3PFBA		13PFOA		PFOS	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1196188	3.58	2292333	5.33	1586072	5.65
UPPER LIMIT		1794282	3.78	3438500	5.53	2379108	5.85
LOWER LIMIT		598094	3.38	1146167	5.13	793036	5.45
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-9225/8		1042103	3.57	2145753	5.33	1450498	5.65

13C3PFBA = 13C3-PFBA
13PFOA = 13C2 PFOA
PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Instrument ID: 30731 Calibration Start Date: 05/26/2020 12:43

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 05/26/2020 13:37

Calibration ID: 4400

		PFDA					
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		2003072	5.97				
UPPER LIMIT		3004608	6.17				
LOWER LIMIT		1001536	5.77				
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-9225/8		1749692	5.98				

PFDA = 13C2 PFDA

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Instrument ID: 30731 Calibration Start Date: 06/30/2020 15:33

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 06/30/2020 16:27

Calibration ID: 6396

		13C3PFBA		13PFOA		PFOS	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1135076	3.54	1867746	5.27	1343212	5.59
UPPER LIMIT		1702614	3.74	2801619	5.47	2014818	5.79
LOWER LIMIT		567538	3.34	933873	5.07	671606	5.39
LAB SAMPLE ID	CLIENT SAMPLE ID						
CCB 410-18152/8		1201302	3.53	2198316	5.27	1460095	5.60
ICV 410-18152/9		1226112	3.54	2096996	5.27	1490461	5.60
CCV 410-19162/14		1283723	3.61	2206154	5.37	1632427	5.70
MB 410-18452/1-A		1168979	3.58	2083263	5.37	1627461	5.69
LCS 410-18452/2-A		1144926	3.59	1995785	5.35	1478292	5.68
410-6246-1	EQB-WL-062920	1196121	3.58	2177683	5.37	1608677	5.69
410-6246-2	MSA-MW-48I-062920	797210	3.60	2087893	5.35	1471080	5.68
410-6246-3	MSA-MW-49S-062920	959908	3.60	2062395	5.36	1528535	5.68
CCV 410-19162/28		1287836	3.60	2235007	5.36	1523445	5.69
410-6246-4	MSA-FB-062920	1162566	3.61	2114888	5.36	1579728	5.69
410-6246-5	MSA-MW-34S-062920	924822	3.59	2039542	5.36	1296295	5.69
410-6246-6	MSA-MW-34I-062920	973393	3.60	2267635	5.36	1513109	5.68
410-6246-8	MSA-MW-40S-062920	599305	3.60	1808075	5.35	1280463	5.68
410-6246-9	MSA-MW-40I-062920	564803*3	3.59	1871152	5.36	1380254	5.69
410-6246-10	MSA-DMW-7S-062920	522973*3	3.59	1958486	5.37	1302492	5.69
CCV 410-19162/35		1299806	3.59	2389116	5.36	1581886	5.69

13C3PFBA = 13C3-PFBA
13PFOA = 13C2 PFOA
PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6246-1

SDG No.:

Instrument ID: 30731 Calibration Start Date: 06/30/2020 15:33

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 06/30/2020 16:27

Calibration ID: 6396

		PFDA					
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1691642	5.92				
UPPER LIMIT		2537463	6.12				
LOWER LIMIT		845821	5.72				
LAB SAMPLE ID	CLIENT SAMPLE ID						
CCB 410-18152/8		1844622	5.92				
ICV 410-18152/9		1845682	5.92				
CCV 410-19162/14		1984922	6.02				
MB 410-18452/1-A		1924182	6.02				
LCS 410-18452/2-A		1832154	6.01				
410-6246-1	EQB-WL-062920	1897384	6.01				
410-6246-2	MSA-MW-48I-062920	1944346	6.01				
410-6246-3	MSA-MW-49S-062920	1878458	6.01				
CCV 410-19162/28		2086457	6.01				
410-6246-4	MSA-FB-062920	1948172	6.01				
410-6246-5	MSA-MW-34S-062920	1985430	6.01				
410-6246-6	MSA-MW-34I-062920	1841303	6.00				
410-6246-8	MSA-MW-40S-062920	1922248	6.00				
410-6246-9	MSA-MW-40I-062920	1917059	6.01				
410-6246-10	MSA-DMW-7S-062920	1977317	6.02				
CCV 410-19162/35		1972941	6.01				

PFDA = 13C2 PFDA

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 19789

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/07/2020 06:09 Calibration End Date: 07/07/2020 07:04 Calibration ID: 6558

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-19789/1	20JUL07MCAL-01.d
Level 2	IC 410-19789/2	20JUL07MCAL-02.d
Level 3	IC 410-19789/3	20JUL07MCAL-03.d
Level 4	IC 410-19789/4	20JUL07MCAL-04.d
Level 5	ICISAV 410-19789/5	20JUL07MCAL-05.d
Level 6	IC 410-19789/6	20JUL07MCAL-06.d
Level 7	IC 410-19789/7	20JUL07MCAL-07.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid	1.0827 0.8209	0.9001 0.8012	0.8296	0.8079	0.8679	LID1F		0.8152							0.9990		0.9900
Perfluoropentanoic acid	1.1932 0.9085	1.0081 0.8381	0.9503	0.8448	0.9736	LID1F		0.8750							0.9970		0.9900
Perfluorobutanesulfonic acid	1.0774 1.0245	1.0703 0.9650	1.0007	0.9203	1.0462	LID1F		0.9893							0.9990		0.9900
4:2 Fluorotelomer sulfonic acid	1.8073 1.7091	1.7050 1.6345	1.8595	1.8246	1.8253	LID1F		1.6875							0.9980		0.9900
Perfluorohexanoic acid	0.8862 0.7856	0.7768 0.7372	0.7608	0.7761	0.8247	LID1F		0.7625							0.9980		0.9900
Perfluoropentanesulfonic acid	0.5165 0.4529	0.4746 0.4198	0.4641	0.4331	0.4717	LID1F		0.4360							0.9980		0.9900
HFPODA	2.2970 2.8600	2.2845 2.5535	2.4765	2.2230	2.3783	LID1F		2.6024							0.9950		0.9900
Perfluoroheptanoic acid	1.4376 1.2221	1.3400 1.1158	1.2789	1.2182	1.2753	LID1F		1.1702							0.9970		0.9900
Perfluorohexanesulfonic acid	1.1668 0.9563	0.9825 1.0145	0.9844	0.9653	0.9862	LID1F		0.9928							0.9990		0.9900
DONA	1.5254 1.4168	1.4325 1.3453	1.4898	1.4054	1.4981	LID1F		1.3867							0.9990		0.9900
6:2 Fluorotelomer sulfonic acid	1.7442 1.6247	1.6156 1.6437	1.6828	1.7285	1.7110	LID1F		1.6501							1.0000		0.9900
Perfluoroheptanesulfonic acid	0.9731 0.8688	0.8634 0.9236	0.8606	0.8873	0.9078	LID1F		0.9043							0.9990		0.9900
Perfluorooctanoic acid	0.8878 0.6651	0.7650 0.6852	0.7204	0.6558	0.7316	LID1F		0.6843							0.9990		0.9900
Perfluorooctanesulfonic acid	1.2453 0.9915	1.1089 1.0528	0.9936	0.9907	1.0987	LID1F		1.0379							0.9990		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 19789

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/07/2020 06:09 Calibration End Date: 07/07/2020 07:04 Calibration ID: 6558

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorononanoic acid	0.9342 0.8678	0.8786 0.8398	0.9013	0.8224	0.9310	LID1F		0.8577							0.9990		0.9900
9Cl-PF3ONS	2.4920 2.3260	2.4035 2.3478	2.1287	2.3051	2.3995	LID1F		2.3435							1.0000		0.9900
Perfluorononanesulfonic acid	0.7301 0.6680	0.7678 0.6928	0.6545	0.6728	0.7331	LID1F		0.6893							0.9990		0.9900
Perfluorodecanoic acid	0.5791 0.5508	0.5561 0.5238	0.5085	0.5211	0.5065	LID1F		0.5292							0.9990		0.9900
8:2 Fluorotelomer sulfonic acid	1.6068 1.6142	1.5538 1.4317	1.5990	1.7245	1.5907	LID1F		1.5151							0.9960		0.9900
Perfluorooctanesulfonamide	1.0259 1.0047	1.0105 0.9729	0.9755	0.9895	1.0474	LID1F		0.9909							0.9990		0.9900
NMeFOSAA	1.0950 0.9874	0.9121 0.9239	0.9394	0.9186	1.0537	LID1F		0.9559							0.9980		0.9900
Perfluorodecanesulfonic acid	0.5580 0.5191	0.5611 0.5109	0.5185	0.5164	0.5656	LID1F		0.5198							0.9990		0.9900
Perfluoroundecanoic acid	0.5128 0.4711	0.4376 0.5095	0.5006	0.4822	0.5101	LID1F		0.4975							0.9990		0.9900
NEtFOSAA	1.1474 0.9458	1.0883 1.0192	1.0502	1.0088	1.0222	LID1F		0.9995							0.9990		0.9900
11Cl-PF3OUdS	1.9674 1.8142	1.7044 1.7545	1.7016	1.6944	1.9626	LID1F		1.7909							0.9980		0.9900
Perfluorododecanoic acid	0.6408 0.5643	0.5491 0.5315	0.5770	0.5202	0.5776	LID1F		0.5459							0.9990		0.9900
10:2 FTS	2.5533 2.2279	2.3913 2.0395	2.1603	2.1349	2.5951	LID1F		2.1602							0.9930		0.9900
NMeFOSE	0.7249 0.9227	0.8686 0.9716	0.8926	0.8815	0.8887	LID1F		0.9435							0.9990		0.9900
NMeFOSA	0.9576 0.9701	1.1013 1.0198	1.0599	0.9927	1.0141	LID1F		1.0048							0.9990		0.9900
Perfluorododecanesulfonic acid	0.3227 0.2479	0.2813 0.2731	0.2493	0.2598	0.2822	LID1F		0.2664							0.9980		0.9900
NEtFOSE	0.6410 0.7682	0.7619 0.7635	0.7791	0.7023	0.7441	LID1F		0.7599							1.0000		0.9900
NEtFOSA	1.0160 1.0198	1.1522 1.0377	0.9991	0.9815	1.1296	LID1F		1.0403							0.9990		0.9900
Perfluorotridecanoic acid	0.9005 0.7980	0.8209 +++++	0.8180	0.7447	0.8458	LID1F		0.8055							0.9990		0.9900
Perfluorotetradecanoic acid	1.1366 0.8768	1.0925 +++++	0.9513	0.9325	0.9610	LID1F		0.9070							0.9980		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 19789

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/07/2020 06:09 Calibration End Date: 07/07/2020 07:04 Calibration ID: 6558

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorohexadecanoic acid	0.5934 0.4619	0.5131 0.4117	0.5070	0.4362	0.4655	LID1F		0.4342							0.9960		0.9900
Perfluorooctadecanoic acid	0.4817 0.4468	0.4870 0.4013	0.4715	0.4340	0.4748	LID1F		0.4246							0.9960		0.9900
13C4 PFBA	1.0915 1.0674	1.1097 1.0407	1.1418	1.0877	1.0861	Ave		1.0893				2.9		20.0			
13C5 PFPeA	0.8094 0.8506	0.9014 0.7751	0.9062	0.8001	0.7932	Ave		0.8337				6.4		20.0			
13C3 PFBS	0.4267 0.4465	0.4329 0.4776	0.4409	0.4488	0.4430	Ave		0.4452				3.6		20.0			
M2-4:2 FTS	0.1166 0.1048	0.1119 0.1119	0.1059	0.1117	0.1041	Ave		0.1095				4.3		20.0			
13C5 PFHxA	1.6268 1.4051	1.6005 1.3930	1.5583	1.5033	1.4298	Ave		1.5024				6.4		20.0			
13C3 HFPO-DA	0.3072 0.2088	0.2887 0.2324	0.2482	0.2664	0.2571	Ave		0.2584				12.8		20.0			
13C4 PFHpA	1.1409 1.0318	1.1134 0.9942	1.0770	1.0664	1.0027	Ave		1.0609				5.2		20.0			
13C3 PFHxS	0.4853 0.4470	0.5132 0.4136	0.4928	0.4680	0.4496	Ave		0.4671				7.2		20.0			
M2-6:2 FTS	0.0904 0.0708	0.0910 0.0692	0.0783	0.0767	0.0733	Ave		0.0785				11.3		20.0			
13C8 PFOA	1.4951 1.3351	1.4947 1.2667	1.4484	1.4594	1.3026	Ave		1.4003				6.9		20.0			
13C8 PFOS	1.0129 0.9574	0.9802 0.9497	1.0426	0.9904	0.9545	Ave		0.9840				3.5		20.0			
13C9 PFNA	2.1304 1.9756	2.1261 2.0910	2.1082	2.1378	2.0842	Ave		2.0933				2.7		20.0			
13C6 PFDA	1.6314 1.5379	1.6895 1.4123	1.6981	1.7065	1.5463	Ave		1.6031				6.8		20.0			
M2-8:2 FTS	0.1157 0.1013	0.1169 0.0962	0.1237	0.1117	0.1043	Ave		0.1100				8.9		20.0			
13C8 FOSA	1.2506 1.2094	1.2677 1.0985	1.2825	1.2491	1.1855	Ave		1.2205				5.2		20.0			
d3-NMeFOSAA	0.4266 0.4288	0.4271 0.4147	0.4464	0.4476	0.4094	Ave		0.4287				3.4		20.0			
13C7 PFUnA	1.7031 1.6114	1.6798 1.3332	1.7270	1.7001	1.5750	Ave		1.6185				8.5		20.0			
d5-NEtFOSAA	0.3260 0.3137	0.3443 0.2702	0.3286	0.3182	0.2949	Ave		0.3137				7.8		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 19789

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/07/2020 06:09 Calibration End Date: 07/07/2020 07:04 Calibration ID: 6558

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
13C2-PFDoDA	1.9389 1.8480	1.9935 1.7639	1.9944	1.9770	1.8753	Ave		1.9130				4.6		20.0			
d7-N-MeFOSE-M	0.2316 0.2333	0.2247 0.2162	0.2347	0.2293	0.2425	Ave		0.2303				3.6		20.0			
d3-NMePFOSA	0.1181 0.1206	0.1116 0.1137	0.1196	0.1143	0.1150	Ave		0.1161				2.9		20.0			
d9-N-EtFOSE-M	0.2523 0.2333	0.2518 0.2276	0.2593	0.2473	0.2416	Ave		0.2447				4.6		20.0			
d5-NEtPFOSA	0.0993 0.0929	0.0973 0.0876	0.0998	0.0977	0.0898	Ave		0.0949				5.1		20.0			
13C2 PFTeDA	1.8126 1.8236	1.8021 1.7767	1.8046	1.8552	1.7714	Ave		1.8066				1.6		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 19789

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/07/2020 06:09 Calibration End Date: 07/07/2020 07:04 Calibration ID: 6558

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-19789/1	20JUL07MCAL-01.d
Level 2	IC 410-19789/2	20JUL07MCAL-02.d
Level 3	IC 410-19789/3	20JUL07MCAL-03.d
Level 4	IC 410-19789/4	20JUL07MCAL-04.d
Level 5	ICISAV 410-19789/5	20JUL07MCAL-05.d
Level 6	IC 410-19789/6	20JUL07MCAL-06.d
Level 7	IC 410-19789/7	20JUL07MCAL-07.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid		LID1F	78491 12984722	162976 22879944	608811	2435147	6390262	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanoic acid		LID1F	64141 11450454	148289 17826566	553524	1873315	5235398	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorobutanesulfonic acid		LID1F	27021 5998109	66911 11193585	250984	1013071	2780380	0.177 44.3	0.443 88.5	1.77	7.08	17.7
4:2 Fluorotelomer sulfonic acid		LID1F	8807 1866165	19848 3607860	83716	358599	880631	0.187 46.7	0.467 93.4	1.87	7.47	18.7
Perfluorohexanoic acid		LID1F	64511 12314947	138515 21691713	539468	2198646	5853086	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanesulfonic acid		LID1F	13729 2810608	31450 5161081	123378	505308	1328752	0.188 46.9	0.469 93.8	1.88	7.50	18.8
HFPODA		LID1F	31579 6662498	73467 12534197	279708	1116096	3035389	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoroheptanoic acid		LID1F	73390 14067005	166209 23432396	626690	2448089	6347606	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexanesulfonic acid		LID1F	23109 4348465	51230 8082286	201288	776401	2007458	0.182 45.6	0.456 91.2	1.82	7.30	18.2
DONA		LID1F	73589 15410536	167906 26698659	689896	2668914	7046473	0.189 47.3	0.473 94.5	1.89	7.56	18.9
6:2 Fluorotelomer sulfonic acid		LID1F	6688 1216581	15530 2276091	56816	236952	590161	0.190 47.4	0.474 94.8	1.90	7.58	19.0
Perfluoroheptanesulfonic acid		LID1F	20118 4123995	46993 7680859	183703	744998	1928969	0.190 47.6	0.476 95.2	1.90	7.62	19.0
Perfluorooctanoic acid		LID1F	59399 9906339	127388 18332294	474752	1803432	4730454	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctanesulfonic acid		LID1F	25775 4705711	56677 8944368	213542	827304	2188725	0.185 46.3	0.463 92.6	1.85	7.40	18.5
Perfluorononanoic acid		LID1F	43944 9182338	105245 16972609	423203	1601655	4375454	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 19789

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/07/2020 06:09 Calibration End Date: 07/07/2020 07:04 Calibration ID: 6558

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
9Cl-PF3ONS		LID1F	51831 11092984	123448 20042650	459714	1934234	4803236	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorononanesulfonic acid		LID1F	15674 3288680	40705 6105096	145904	582726	1514797	0.192 48.0	0.480 96.0	1.92	7.68	19.2
Perfluorodecanoic acid		LID1F	35901 7250578	86434 12636137	310438	1364457	3039989	0.200 50.0	0.500 100	2.00	8.00	20.0
8:2 Fluorotelomer sulfonic acid		LID1F	6770 1340590	16010 2254122	68104	283147	616824	0.192 47.9	0.479 95.8	1.92	7.66	19.2
Perfluorooctanesulfonamide		LID1F	48752 10402189	117846 18254786	449813	1896504	4819932	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSAA		LID1F	17751 3624766	35833 6544122	150790	630916	1674399	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorodecanesulfonic acid		LID1F	12031 2565918	29872 4521254	116075	449141	1173644	0.193 48.2	0.482 96.4	1.93	7.71	19.3
Perfluoroundecanoic acid		LID1F	33185 6498613	67625 11602491	310844	1258041	3118756	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSAA		LID1F	14215 2539933	34472 4703629	124083	492550	1170116	0.200 50.0	0.500 100	2.00	8.00	20.0
11Cl-PF3OUdS		LID1F	40920 8652139	87542 14978170	367485	1421771	3928706	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorododecanoic acid		LID1F	47211 8927654	100702 16013395	413786	1578121	4204199	0.200 50.0	0.500 100	2.00	8.00	20.0
10:2 FTS		LID1F	10825 1861928	24794 3231253	92587	352731	1012590	0.193 48.2	0.482 96.4	1.93	7.71	19.3
NMeFOSE		LID1F	6380 1842446	17952 3588224	75333	310123	836496	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSA		LID1F	4297 1001818	11307 1980115	45584	174141	452534	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorododecanesulfonic acid		LID1F	6985 1230700	15040 2426912	56030	226876	587892	0.194 48.4	0.484 96.8	1.94	7.74	19.4
NEtFOSE		LID1F	6146 1533865	17650 2968060	72628	266468	697809	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSA		LID1F	3833 810560	10309 1552300	35835	147221	393590	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotridecanoic acid		LID1F	66343 12624272	150546 +++++	586581	2259177	6156696	0.200 50.0	0.500 +++++	2.00	8.00	20.0
Perfluorotetradecanoic acid		LID1F	78283 13687149	181119 +++++	617233	2654732	6607670	0.200 50.0	0.500 +++++	2.00	8.00	20.0
Perfluorohexadecanoic acid		LID1F	40871 7210747	85068 12494686	328962	1241915	3200792	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctadecanoic acid		LID1F	33179 6974158	80736 12178835	305918	1235574	3264746	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 19789

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/07/2020 06:09 Calibration End Date: 07/07/2020 07:04 Calibration ID: 6558

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	13C3 PFBA	Ave	3624634 3163460	3621319 2855849	3669396	3767798	3681354	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C5 PFPeA	13C3 PFBA	Ave	2687813 2520861	2941817 2127094	2912404	2771711	2688641	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFBS	13C3 PFBA	Ave	1326269 1238420	1322403 1226824	1326311	1455228	1405375	9.36 9.36	9.36 9.36	9.36	9.36	9.36
M2-4:2 FTS	13PF OA	Ave	243651 218383	232818 220737	225107	245671	241226	9.34 9.34	9.34 9.34	9.34	9.34	9.34
13C5 PFHxA	13PF OA	Ave	3639668 3134972	3566135 2942487	3545288	3541020	3548738	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 HFPO-DA	13PF OA	Ave	687384 465902	643165 490871	564724	627589	638149	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C4 PFHpA	13PF OA	Ave	2552499 2302055	2480657 2100051	2450209	2511928	2488684	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFHxS	13PF OA	Ave	1027155 943387	1081691 826370	1060526	1042864	1055707	9.46 9.46	9.46 9.46	9.46	9.46	9.46
M2-6:2 FTS	13PF OA	Ave	192121 150078	192660 138763	169172	171714	172828	9.50 9.50	9.50 9.50	9.50	9.50	9.50
13C8 PFOA	13PF OA	Ave	3345111 2978838	3330346 2675639	3295285	3437697	3233070	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C8 PFOS	PFOS	Ave	1069568 980987	1056488 878010	1110581	1078755	1029416	9.57 9.57	9.57 9.57	9.57	9.57	9.57
13C9 PFNA	PFOS	Ave	2351936 2116232	2395660 2021121	2347755	2434383	2349941	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C6 PFDA	PFDA	Ave	3099493 2632925	3108357 2412255	3052660	3273210	3001112	10.0 10.0	10.0 10.0	10.0	10.0	10.0
M2-8:2 FTS	PFDA	Ave	210664 166104	206078 157446	212958	205239	193885	9.58 9.58	9.58 9.58	9.58	9.58	9.58
13C8 FOSA	PFDA	Ave	2376115 2070635	2332316 1876307	2305506	2395881	2300809	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMeFOSAA	PFDA	Ave	810511 734192	785751 708310	802590	858486	794496	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C7 PFUnA	PFDA	Ave	3235712 2758871	3090567 2277095	3104649	3261030	3056772	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtFOSAA	PFDA	Ave	619456 537087	633483 461493	590749	610304	572343	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2-PFDoDA	PFDA	Ave	3683859 3163931	3667671 3012735	3585389	3792089	3639607	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d7-N-MeFOSE-M	PFDA	Ave	440070 399358	413356 369309	421978	439786	470613	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMePFOSA	PFDA	Ave	224354 206533	205334 194161	215041	219288	223129	10.0 10.0	10.0 10.0	10.0	10.0	10.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 19789

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/07/2020 06:09 Calibration End Date: 07/07/2020 07:04 Calibration ID: 6558

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
d9-N-EtFOSE-M	PFDA	Ave	479373 399352	463338 388766	466118	474290	468894	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtPFOSA	PFDA	Ave	188633 158972	178952 149597	179328	187492	174212	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2 PFTeDA	PFDA	Ave	3443755 3122128	3315638 3034623	3244240	3558536	3438002	10.0 10.0	10.0 10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD
LID1F = Linear 1/Conc IsoDil FZ

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 19789

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/07/2020 06:09 Calibration End Date: 07/07/2020 07:04 Calibration ID: 6558

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-19789/1	20JUL07MCAL-01.d
Level 2	IC 410-19789/2	20JUL07MCAL-02.d
Level 3	IC 410-19789/3	20JUL07MCAL-03.d
Level 4	IC 410-19789/4	20JUL07MCAL-04.d
Level 5	ICISAV 410-19789/5	20JUL07MCAL-05.d
Level 6	IC 410-19789/6	20JUL07MCAL-06.d
Level 7	IC 410-19789/7	20JUL07MCAL-07.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanoic acid	32.8 -1.7	10.4	1.8	-0.9	6.5	0.7	50 30	30	30	30	30	30
Perfluoropentanoic acid	36.4 -4.2	15.2	8.6	-3.4	11.3	3.8	50 30	30	30	30	30	30
Perfluorobutanesulfonic acid	8.9 -2.5	8.2	1.2	-7.0	5.8	3.6	50 30	30	30	30	30	30
4:2 Fluorotelomer sulfonic acid	7.1 -3.1	1.0	10.2	8.1	8.2	1.3	50 30	30	30	30	30	30
Perfluorohexanoic acid	16.2 -3.3	1.9	-0.2	1.8	8.1	3.0	50 30	30	30	30	30	30
Perfluoropentanesulfonic acid	18.4 -3.7	8.8	6.4	-0.7	8.2	3.9	50 30	30	30	30	30	30
HFPODA	-11.7 -1.9	-12.2	-4.8	-14.6	-8.6	9.9	50 30	30	30	30	30	30
Perfluoroheptanoic acid	22.9 -4.6	14.5	9.3	4.1	9.0	4.4	50 30	30	30	30	30	30
Perfluorohexanesulfonic acid	17.5 2.2	-1.0	-0.9	-2.8	-0.7	-3.7	50 30	30	30	30	30	30
DONA	10.0 -3.0	3.3	7.4	1.3	8.0	2.2	50 30	30	30	30	30	30
6:2 Fluorotelomer sulfonic acid	5.7 -0.4	-2.1	2.0	4.8	3.7	-1.5	50 30	30	30	30	30	30
Perfluoroheptanesulfonic acid	7.6 2.1	-4.5	-4.8	-1.9	0.4	-3.9	50 30	30	30	30	30	30
Perfluorooctanoic acid	29.7 0.1	11.8	5.3	-4.2	6.9	-2.8	50 30	30	30	30	30	30
Perfluorooctanesulfonic acid	20.0 1.4	6.8	-4.3	-4.5	5.9	-4.5	50 30	30	30	30	30	30
Perfluorononanoic acid	8.9 -2.1	2.4	5.1	-4.1	8.5	1.2	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 19789

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/07/2020 06:09 Calibration End Date: 07/07/2020 07:04 Calibration ID: 6558

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
9Cl-PF3ONS	6.3 0.2	2.6	-9.2	-1.6	2.4	-0.7	50 30	30	30	30	30	30
Perfluorononanesulfonic acid	5.9 0.5	11.4	-5.1	-2.4	6.3	-3.1	50 30	30	30	30	30	30
Perfluorodecanoic acid	9.4 -1.0	5.1	-3.9	-1.5	-4.3	4.1	50 30	30	30	30	30	30
8:2 Fluorotelomer sulfonic acid	6.1 -5.5	2.6	5.5	13.8	5.0	6.5	50 30	30	30	30	30	30
Perfluorooctanesulfonamide	3.5 -1.8	2.0	-1.6	-0.1	5.7	1.4	50 30	30	30	30	30	30
NMeFOSAA	14.6 -3.4	-4.6	-1.7	-3.9	10.2	3.3	50 30	30	30	30	30	30
Perfluorodecanesulfonic acid	7.4 -1.7	8.0	-0.2	-0.6	8.8	-0.1	50 30	30	30	30	30	30
Perfluoroundecanoic acid	3.1 2.4	-12.0	0.6	-3.1	2.5	-5.3	50 30	30	30	30	30	30
NEtFOSAA	14.8 2.0	8.9	5.1	0.9	2.3	-5.4	50 30	30	30	30	30	30
11Cl-PF3OUdS	9.9 -2.0	-4.8	-5.0	-5.4	9.6	1.3	50 30	30	30	30	30	30
Perfluorododecanoic acid	17.4 -2.6	0.6	5.7	-4.7	5.8	3.4	50 30	30	30	30	30	30
10:2 FTS	18.2 -5.6	10.7	0.0	-1.2	20.1	3.1	50 30	30	30	30	30	30
NMeFOSE	-23.2 3.0	-7.9	-5.4	-6.6	-5.8	-2.2	50 30	30	30	30	30	30
NMeFOSA	-4.7 1.5	9.6	5.5	-1.2	0.9	-3.5	50 30	30	30	30	30	30
Perfluorododecanesulfonic acid	21.1 2.5	5.6	-6.4	-2.5	5.9	-6.9	50 30	30	30	30	30	30
NEtFOSE	-15.6 0.5	0.3	2.5	-7.6	-2.1	1.1	50 30	30	30	30	30	30
NEtFOSA	-2.3 -0.3	10.8	-4.0	-5.6	8.6	-2.0	50 30	30	30	30	30	30
Perfluorotridecanoic acid	11.8 +++++	1.9	1.6	-7.5	5.0	-0.9	50	30	30	30	30	30
Perfluorotetradecanoic acid	25.3 +++++	20.5	4.9	2.8	6.0	-3.3	50	30	30	30	30	30
Perfluorohexadecanoic acid	36.7 -5.2	18.2	16.8	0.5	7.2	6.4	50 30	30	30	30	30	30
Perfluorooctadecanoic acid	13.5 -5.5	14.7	11.0	2.2	11.8	5.2	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 19789

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/07/2020 06:09 Calibration End Date: 07/07/2020 07:04 Calibration ID: 6558

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
13C4 PFBA	0.2 -4.5	1.9	4.8	-0.1	-0.3	-2.0	30 30	30	30	30	30	30
13C5 PFPeA	-2.9 -7.0	8.1	8.7	-4.0	-4.9	2.0	30 30	30	30	30	30	30
13C3 PFBS	-4.2 7.3	-2.8	-1.0	0.8	-0.5	0.3	30 30	30	30	30	30	30
M2-4:2 FTS	6.4 2.1	2.1	-3.3	1.9	-5.0	-4.3	30 30	30	30	30	30	30
13C5 PFHxA	8.3 -7.3	6.5	3.7	0.1	-4.8	-6.5	30 30	30	30	30	30	30
13C3 HFPO-DA	18.9 -10.1	11.7	-3.9	3.1	-0.5	-19.2	30 30	30	30	30	30	30
13C4 PFHpA	7.5 -6.3	4.9	1.5	0.5	-5.5	-2.7	30 30	30	30	30	30	30
13C3 PFHxS	3.9 -11.5	9.9	5.5	0.2	-3.7	-4.3	30 30	30	30	30	30	30
M2-6:2 FTS	15.1 -11.9	15.9	-0.3	-2.3	-6.7	-9.8	30 30	30	30	30	30	30
13C8 PFOA	6.8 -9.5	6.7	3.4	4.2	-7.0	-4.7	30 30	30	30	30	30	30
13C8 PFOS	2.9 -3.5	-0.4	6.0	0.7	-3.0	-2.7	30 30	30	30	30	30	30
13C9 PFNA	1.8 -0.1	1.6	0.7	2.1	-0.4	-5.6	30 30	30	30	30	30	30
13C6 PFDA	1.8 -11.9	5.4	5.9	6.4	-3.5	-4.1	30 30	30	30	30	30	30
M2-8:2 FTS	5.2 -12.5	6.3	12.4	1.6	-5.2	-7.9	30 30	30	30	30	30	30
13C8 FOSA	2.5 -10.0	3.9	5.1	2.3	-2.9	-0.9	30 30	30	30	30	30	30
d3-NMeFOSAA	-0.5 -3.3	-0.4	4.2	4.4	-4.5	0.0	30 30	30	30	30	30	30
13C7 PFUnA	5.2 -17.6	3.8	6.7	5.0	-2.7	-0.4	30 30	30	30	30	30	30
d5-NEtFOSAA	3.9 -13.9	9.8	4.8	1.4	-6.0	0.0	30 30	30	30	30	30	30
13C2-PFDoDA	1.4 -7.8	4.2	4.3	3.3	-2.0	-3.4	30 30	30	30	30	30	30
d7-N-MeFOSE-M	0.6 -6.1	-2.5	1.9	-0.5	5.3	1.3	30 30	30	30	30	30	30
d3-NMePFOSA	1.7 -2.1	-3.9	3.0	-1.6	-1.0	3.9	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 19789

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/07/2020 06:09 Calibration End Date: 07/07/2020 07:04 Calibration ID: 6558

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
d9-N-EtFOSE-M	3.1 -7.0	2.9	5.9	1.0	-1.3	-4.7	30 30	30	30	30	30	30
d5-NEtPFOSA	4.6 -7.7	2.5	5.1	3.0	-5.4	-2.1	30 30	30	30	30	30	30
13C2 PFTeDA	0.3 -1.7	-0.2	-0.1	2.7	-1.9	0.9	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-21880/1	20JUL13MCAL-09.d
Level 2	IC 410-21880/2	20JUL13MCAL-10.d
Level 3	IC 410-21880/3	20JUL13MCAL-11.d
Level 4	IC 410-21880/4	20JUL13MCAL-12.d
Level 5	ICISAV 410-21880/5	20JUL13MCAL-13.d
Level 6	IC 410-21880/6	20JUL13MCAL-14.d
Level 7	IC 410-21880/7	20JUL13MCAL-15.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid	1.0942 0.8086	0.9410 0.8004	0.8708	0.8075	0.8744	LID1F		0.8127							0.9990		0.9900
Perfluoropentanoic acid	1.1649 0.8961	1.0268 0.8773	0.9175	0.9240	0.9672	LID1F		0.8957							0.9990		0.9900
Perfluorobutanesulfonic acid	1.0096 1.0254	1.0012 0.9953	0.9754	0.9483	1.0668	LID1F		1.0093							0.9990		0.9900
4:2 Fluorotelomer sulfonic acid	1.8279 1.5584	1.8753 1.6923	1.9107	1.6686	1.8203	LID1F		1.6714							0.9970		0.9900
Perfluorohexanoic acid	0.8889 0.7545	0.7911 0.7041	0.8037	0.7438	0.8042	LID1F		0.7324							0.9980		0.9900
Perfluoropentanesulfonic acid	0.5329 0.4398	0.5039 0.4706	0.4603	0.4526	0.4917	LID1F		0.4637							0.9990		0.9900
HFPODA	2.7281 2.5663	2.4548 2.1385	2.2600	2.0309	2.2211	LID1F		2.2642							0.9930		0.9900
Perfluoroheptanoic acid	1.5656 1.1961	1.2701 1.0636	1.3663	1.2508	1.2949	LID1F		1.1387							0.9930		0.9900
Perfluorohexanesulfonic acid	1.1053 1.0089	1.0370 0.9666	0.9551	0.9676	1.0336	LID1F		0.9860							0.9990		0.9900
DONA	1.6160 1.3488	1.3873 1.2472	1.4714	1.4018	1.4601	LID1F		1.3090							0.9960		0.9900
6:2 Fluorotelomer sulfonic acid	1.7276 1.6135	1.6006 1.5337	1.7825	1.6137	1.7642	LID1F		1.5880							0.9980		0.9900
Perfluoroheptanesulfonic acid	1.0152 0.8964	0.8660 0.8646	0.8487	0.8449	0.9029	LID1F		0.8768							1.0000		0.9900
Perfluorooctanoic acid	0.9610 0.7108	0.7432 0.6854	0.6736	0.6824	0.7345	LID1F		0.6981							0.9990		0.9900
Perfluorooctanesulfonic acid	1.2449 1.0644	1.0934 1.0228	0.9650	0.9841	0.9906	LID1F		1.0288							0.9990		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorononanoic acid	0.8664 0.8632	0.9145 0.8285	0.8785	0.8188	0.9009	LID1F		0.8465							0.9990		0.9900
9Cl-PF3ONS	2.4470 2.2699	2.2827 2.2448	2.1367	2.1817	2.2572	LID1F		2.2495							1.0000		0.9900
Perfluorononanesulfonic acid	0.6995 0.6591	0.7009 0.6428	0.6819	0.6563	0.6691	LID1F		0.6514							1.0000		0.9900
Perfluorodecanoic acid	0.5861 0.5574	0.5839 0.5535	0.5190	0.5681	0.5867	LID1F		0.5587							1.0000		0.9900
8:2 Fluorotelomer sulfonic acid	1.8646 1.6757	1.6514 1.5120	1.5427	1.7516	1.7115	LID1F		1.5911							0.9970		0.9900
Perfluorooctanesulfonamide	1.0466 1.0098	0.9586 0.9253	1.0024	0.9229	1.0336	LID1F		0.9616							0.9980		0.9900
NMeFOSAA	1.0122 1.0226	0.9525 0.8888	1.0305	1.0055	1.0748	LID1F		0.9535							0.9940		0.9900
Perfluorodecanesulfonic acid	0.5992 0.5095	0.5835 0.5191	0.5180	0.5180	0.5042	LID1F		0.5150							1.0000		0.9900
Perfluoroundecanoic acid	0.6005 0.5240	0.5215 0.4585	0.5741	0.4920	0.5329	LID1F		0.4880							0.9950		0.9900
NEtFOSAA	1.1603 0.9177	0.8977 0.9441	0.9754	0.9723	1.0408	LID1F		0.9492							0.9980		0.9900
11Cl-PF3OUdS	1.8842 1.8393	1.7714 1.7959	1.6464	1.6938	1.7958	LID1F		1.8018							1.0000		0.9900
Perfluorododecanoic acid	0.7466 0.5554	0.5982 0.5400	0.5811	0.5705	0.5645	LID1F		0.5492							0.9990		0.9900
10:2 FTS	1.9781 1.9103	2.0679 1.7724	2.0445	2.0078	1.9085	LID1F		1.8401							0.9980		0.9900
NMeFOSE	0.9082 0.8761	0.8789 0.9636	0.9286	0.8802	0.9842	LID1F		0.9373							0.9980		0.9900
NMeFOSA	0.9339 1.0768	1.0185 1.0475	0.9778	0.9837	1.0664	LID1F		1.0539							1.0000		0.9900
Perfluorododecanesulfonic acid	0.2663 0.2527	0.2610 0.2536	0.2361	0.2428	0.2570	LID1F		0.2531							1.0000		0.9900
NEtFOSE	0.8375 0.7751	0.7792 0.7396	0.7322	0.7041	0.7469	LID1F		0.7488							0.9990		0.9900
Perfluorotridecanoic acid	0.9053 0.7834	0.8165 0.6822	0.7856	0.7636	0.8175	LID1F		0.7306							0.9940		0.9900
NEtFOSA	0.7918 1.0387	1.0161 0.9533	1.0036	0.9936	0.9965	LID1F		0.9840							0.9980		0.9900
Perfluorotetradecanoic acid	1.0586 0.8914	1.0133 0.8565	0.9986	1.0139	0.9759	LID1F		0.8885							0.9970		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorohexadecanoic acid	0.6883 0.5328	0.5889 0.4952	0.5457	0.5251	0.5715	LID1F		0.5164							0.9970		0.9900
Perfluorooctadecanoic acid	0.5186 0.4927	0.4878 0.4709	0.4817	0.4846	0.5194	LID1F		0.4832							0.9990		0.9900
13C4 PFBA	1.1180 1.0818	1.1605 1.0533	1.1496	1.1105	1.0970	Ave		1.1101				3.4		20.0			
13C5 PFPeA	0.9128 0.8720	0.9027 0.8313	0.8989	0.8702	0.8705	Ave		0.8798				3.1		20.0			
13C3 PFBS	0.4469 0.4313	0.4631 0.4275	0.4428	0.4324	0.4232	Ave		0.4382				3.1		20.0			
M2-4:2 FTS	0.0944 0.0973	0.0956 0.0949	0.0949	0.0984	0.0937	Ave		0.0956				1.8		20.0			
13C5 PFHxA	1.4386 1.4162	1.5172 1.3806	1.4431	1.4812	1.4240	Ave		1.4430				3.1		20.0			
13C3 HFPO-DA	0.2784 0.2523	0.2613 0.2903	0.2830	0.3103	0.3053	Ave		0.2830				7.5		20.0			
13C4 PFHpA	1.0365 1.0276	1.1256 1.0300	1.0560	1.0530	1.0755	Ave		1.0578				3.2		20.0			
13C3 PFHxS	0.4525 0.4256	0.4937 0.4135	0.4850	0.4656	0.4533	Ave		0.4556				6.4		20.0			
M2-6:2 FTS	0.0891 0.0702	0.0928 0.0664	0.0788	0.0786	0.0737	Ave		0.0785				12.3		20.0			
13C8 PFOA	1.3802 1.3197	1.4718 1.2327	1.4351	1.3955	1.3766	Ave		1.3731				5.7		20.0			
13C8 PFOS	0.9861 0.9752	1.0422 0.9686	1.0907	0.9969	1.0376	Ave		1.0139				4.4		20.0			
13C9 PFNA	2.1439 2.1234	2.3636 2.0840	2.3091	2.1904	2.1483	Ave		2.1947				4.7		20.0			
13C6 PFDA	1.7215 1.5056	1.7237 1.5282	1.6448	1.5967	1.6846	Ave		1.6293				5.4		20.0			
M2-8:2 FTS	0.1368 0.0944	0.1254 0.1001	0.1066	0.1092	0.1125	Ave		0.1121				13.0		20.0			
13C8 FOSA	1.3231 1.1050	1.2385 1.1655	1.1311	1.1740	1.2143	Ave		1.1931				6.1		20.0			
d3-NMeFOSAA	0.3102 0.2923	0.3187 0.3408	0.2887	0.3098	0.3180	Ave		0.3112				5.6		20.0			
13C7 PFUnA	1.5358 1.3860	1.5616 1.4895	1.4551	1.4894	1.5154	Ave		1.4904				3.9		20.0			
d5-NEtFOSAA	0.2716 0.2333	0.2463 0.2384	0.2286	0.2450	0.2534	Ave		0.2452				5.8		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
13C2-PFDoDA	1.7377 1.7264	1.9360 1.7453	1.7571	1.9271	1.8852	Ave		1.8164				5.2		20.0			
d7-N-MeFOSE-M	0.2508 0.2258	0.2266 0.2363	0.2223	0.2304	0.2341	Ave		0.2323				4.1		20.0			
d3-NMePFOSA	0.1394 0.1102	0.1190 0.1282	0.1146	0.1180	0.1252	Ave		0.1221				8.0		20.0			
d9-N-EtFOSE-M	0.2627 0.2193	0.2344 0.2421	0.2198	0.2328	0.2436	Ave		0.2364				6.4		20.0			
d5-NEtPFOSA	0.1088 0.0928	0.0967 0.1062	0.0958	0.0961	0.1026	Ave		0.0999				6.0		20.0			
13C2 PFTeDA	1.4494 1.3780	1.4423 1.4675	1.3890	1.4314	1.4421	Ave		1.4285				2.3		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-21880/1	20JUL13MCAL-09.d
Level 2	IC 410-21880/2	20JUL13MCAL-10.d
Level 3	IC 410-21880/3	20JUL13MCAL-11.d
Level 4	IC 410-21880/4	20JUL13MCAL-12.d
Level 5	ICISAV 410-21880/5	20JUL13MCAL-13.d
Level 6	IC 410-21880/6	20JUL13MCAL-14.d
Level 7	IC 410-21880/7	20JUL13MCAL-15.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid		LID1F	69431 11997076	159609 21699496	568737	2307540	5893808	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanoic acid		LID1F	60355 10716753	135471 18772184	468526	2068908	5174022	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorobutanesulfonic acid		LID1F	22664 5367662	59971 9692086	217149	933881	2455186	0.177 44.3	0.443 88.5	1.77	7.08	17.7
4:2 Fluorotelomer sulfonic acid		LID1F	7332 1536385	18875 3162711	76188	301882	752317	0.187 46.7	0.467 93.4	1.87	7.47	18.7
Perfluorohexanoic acid		LID1F	58199 11591241	135324 20502706	521855	2167887	5408586	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanesulfonic acid		LID1F	12678 2440032	31992 4857412	108620	472356	1199342	0.188 46.9	0.469 93.8	1.88	7.50	18.8
HFPODA		LID1F	34561 7023501	72311 13093215	287758	1240060	3203287	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoroheptanoic acid		LID1F	73855 13334156	161195 23106466	649206	2591483	6577812	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexanesulfonic acid		LID1F	20760 4248612	52641 7688445	190062	808498	2018139	0.182 45.6	0.456 91.2	1.82	7.30	18.2
DONA		LID1F	72038 14209258	166389 25604154	660667	2744557	7009023	0.189 47.3	0.473 94.5	1.89	7.56	18.9
6:2 Fluorotelomer sulfonic acid		LID1F	6641 1164970	15874 2035851	59880	236702	581944	0.190 47.4	0.474 94.8	1.90	7.58	19.0
Perfluoroheptanesulfonic acid		LID1F	19904 3940256	45889 7178851	176306	736943	1840412	0.190 47.6	0.476 95.2	1.90	7.62	19.0
Perfluorooctanoic acid		LID1F	60367 10176627	123330 17819051	434956	1873655	4775161	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctanesulfonic acid		LID1F	22427 4651450	52878 8174235	186865	799832	2009892	0.185 46.3	0.463 92.6	1.85	7.40	18.5
Perfluorononanoic acid		LID1F	36667 8875235	108379 15392947	389162	1579833	4088902	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
9Cl-PF3ONS		LID1F	44297 9967823	110928 18027720	415755	1781698	4601723	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorononanesulfonic acid		LID1F	13072 2987403	35160 5328626	136968	553252	1408086	0.192 48.0	0.480 96.0	1.92	7.68	19.2
Perfluorodecanoic acid		LID1F	34802 7038801	90209 12428914	306878	1361542	3438285	0.200 50.0	0.500 100	2.00	8.00	20.0
8:2 Fluorotelomer sulfonic acid		LID1F	8430 1271643	17787 2129847	56622	275027	641449	0.192 47.9	0.479 95.8	1.92	7.66	19.2
Perfluorooctanesulfonamide		LID1F	47764 9358734	106402 15845241	407551	1626363	4366515	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSAA		LID1F	10831 2506871	27205 4450282	106948	467568	1188868	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorodecanesulfonic acid		LID1F	11243 2318979	29390 4321524	104478	438481	1065608	0.193 48.2	0.482 96.4	1.93	7.71	19.3
Perfluoroundecanoic acid		LID1F	31810 6091736	72988 10035051	300247	1099950	2809263	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSAA		LID1F	10870 1796027	19813 3307195	80133	357513	917471	0.200 50.0	0.500 100	2.00	8.00	20.0
11Cl-PF3OUdS		LID1F	34109 8076972	86079 14422884	320345	1383286	3661137	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorododecanoic acid		LID1F	44749 8042843	103792 13848305	367022	1650105	3702240	0.200 50.0	0.500 100	2.00	8.00	20.0
10:2 FTS		LID1F	8999 1458729	22412 2512243	75506	317228	719734	0.193 48.2	0.482 96.4	1.93	7.71	19.3
NMeFOSE		LID1F	7857 1659332	17848 3345516	74211	304475	801539	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSA		LID1F	4491 995516	10862 1972954	40284	174195	464354	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorododecanesulfonic acid		LID1F	5018 1154877	13202 2119602	47809	206401	545361	0.194 48.4	0.484 96.8	1.94	7.74	19.4
NEtFOSE		LID1F	7587 1425894	16371 2631088	57856	246035	632999	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotridecanoic acid		LID1F	54259 11344399	141674 17494575	496169	2208799	5361638	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSA		LID1F	2972 808303	8810 1486807	34546	143370	355680	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotetradecanoic acid		LID1F	52917 10302571	130977 18466864	498582	2178289	4896020	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexadecanoic acid		LID1F	34408 6158348	76124 10677212	272466	1128232	2867156	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctadecanoic acid		LID1F	25925 5694959	63052 10154360	240515	1041196	2605568	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	13C3 PFBA	Ave	3172761 2967355	3392193 2711103	3265430	3571913	3370379	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C5 PFPeA	13C3 PFBA	Ave	2590654 2391896	2638706 2139665	2553330	2798856	2674657	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFBS	13C3 PFBA	Ave	1187092 1107237	1267062 1029883	1177328	1301876	1217071	9.36 9.36	9.36 9.36	9.36	9.36	9.36
M2-4:2 FTS	13PF OA	Ave	200563 197174	201303 186893	199374	226154	206649	9.34 9.34	9.34 9.34	9.34	9.34	9.34
13C5 PFHxA	13PF OA	Ave	3273785 3072617	3421335 2911805	3246481	3643084	3362725	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 HFPO-DA	13PF OA	Ave	633422 547355	589131 612248	636627	763240	721090	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C4 PFHpA	13PF OA	Ave	2358626 2229584	2538267 2172379	2375745	2589725	2539922	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFHxS	13PF OA	Ave	974106 873592	1053086 825076	1032100	1083353	1012703	9.46 9.46	9.46 9.46	9.46	9.46	9.46
M2-6:2 FTS	13PF OA	Ave	192607 144708	198775 133021	168324	183740	165283	9.50 9.50	9.50 9.50	9.50	9.50	9.50
13C8 PFOA	13PF OA	Ave	3140803 2863293	3318758 2599837	3228402	3432261	3250829	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C8 PFOS	PFOS	Ave	930927 903269	999590 825974	1000612	1049925	1048412	9.57 9.57	9.57 9.57	9.57	9.57	9.57
13C9 PFNA	PFOS	Ave	2116048 2056283	2370192 1857996	2214810	2411734	2269415	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C6 PFDA	PFDA	Ave	2968733 2525669	3089643 2245347	2956151	2995795	2930285	10.0 10.0	10.0 10.0	10.0	10.0	10.0
M2-8:2 FTS	PFDA	Ave	226054 151775	215416 140862	183511	196268	187389	9.58 9.58	9.58 9.58	9.58	9.58	9.58
13C8 FOSA	PFDA	Ave	2281818 1853618	2219989 1712452	2032844	2202758	2112267	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMeFOSAA	PFDA	Ave	535016 490279	571252 500717	518928	581266	553080	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C7 PFUnA	PFDA	Ave	2648646 2324946	2799073 2188460	2615147	2794411	2635910	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtFOSAA	PFDA	Ave	468432 391407	441433 350292	410778	459613	440737	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2-PFDoDA	PFDA	Ave	2996738 2896111	3470214 2564330	3157905	3615759	3279252	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d7-N-MeFOSE-M	PFDA	Ave	432562 378809	406159 347192	399598	432371	407198	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMePFOSA	PFDA	Ave	240434 184906	213299 188350	205987	221342	217721	10.0 10.0	10.0 10.0	10.0	10.0	10.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
d9-N-EtFOSE-M	PFDA	Ave	452957 367932	420175 355735	395079	436785	423734	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtPFOSA	PFDA	Ave	187664 155641	173408 155963	172104	180374	178466	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2 PFTeDA	PFDA	Ave	2499498 2311591	2585189 2156163	2496449	2685634	2508441	10.0 10.0	10.0 10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD
LID1F = Linear 1/Conc IsoDil FZ

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-21880/1	20JUL13MCAL-09.d
Level 2	IC 410-21880/2	20JUL13MCAL-10.d
Level 3	IC 410-21880/3	20JUL13MCAL-11.d
Level 4	IC 410-21880/4	20JUL13MCAL-12.d
Level 5	ICISAV 410-21880/5	20JUL13MCAL-13.d
Level 6	IC 410-21880/6	20JUL13MCAL-14.d
Level 7	IC 410-21880/7	20JUL13MCAL-15.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanoic acid	34.6 -1.5	15.8	7.2	-0.6	7.6	-0.5	50 30	30	30	30	30	30
Perfluoropentanoic acid	30.0 -2.1	14.6	2.4	3.2	8.0	0.0	50 30	30	30	30	30	30
Perfluorobutanesulfonic acid	0.0 -1.4	-0.8	-3.4	-6.0	5.7	1.6	50 30	30	30	30	30	30
4:2 Fluorotelomer sulfonic acid	9.4 1.2	12.2	14.3	-0.2	8.9	-6.8	50 30	30	30	30	30	30
Perfluorohexanoic acid	21.4 -3.9	8.0	9.7	1.6	9.8	3.0	50 30	30	30	30	30	30
Perfluoropentanesulfonic acid	14.9 1.5	8.7	-0.7	-2.4	6.0	-5.1	50 30	30	30	30	30	30
HFPODA	20.5 -5.5	8.4	-0.2	-10.3	-1.9	13.3	50 30	30	30	30	30	30
Perfluoroheptanoic acid	37.5 -6.6	11.5	20.0	9.9	13.7	5.0	50 30	30	30	30	30	30
Perfluorohexanesulfonic acid	12.1 -2.0	5.2	-3.1	-1.9	4.8	2.3	50 30	30	30	30	30	30
DONA	23.5 -4.7	6.0	12.4	7.1	11.5	3.0	50 30	30	30	30	30	30
6:2 Fluorotelomer sulfonic acid	8.8 -3.4	0.8	12.2	1.6	11.1	1.6	50 30	30	30	30	30	30
Perfluoroheptanesulfonic acid	15.8 -1.4	-1.2	-3.2	-3.6	3.0	2.2	50 30	30	30	30	30	30
Perfluorooctanoic acid	37.7 -1.8	6.5	-3.5	-2.2	5.2	1.8	50 30	30	30	30	30	30
Perfluorooctanesulfonic acid	21.0 -0.6	6.3	-6.2	-4.3	-3.7	3.5	50 30	30	30	30	30	30
Perfluorononanoic acid	2.4 -2.1	8.0	3.8	-3.3	6.4	2.0	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
9Cl-PF3ONS	8.8 -0.2	1.5	-5.0	-3.0	0.3	0.9	50 30	30	30	30	30	30
Perfluorononanesulfonic acid	7.4 -1.3	7.6	4.7	0.7	2.7	1.2	50 30	30	30	30	30	30
Perfluorodecanoic acid	4.9 -0.9	4.5	-7.1	1.7	5.0	-0.2	50 30	30	30	30	30	30
8:2 Fluorotelomer sulfonic acid	17.2 -5.0	3.8	-3.0	10.1	7.6	5.3	50 30	30	30	30	30	30
Perfluorooctanesulfonamide	8.8 -3.8	-0.3	4.2	-4.0	7.5	5.0	50 30	30	30	30	30	30
NMeFOSAA	6.2 -6.8	-0.1	8.1	5.5	12.7	7.3	50 30	30	30	30	30	30
Perfluorodecanesulfonic acid	16.3 0.8	13.3	0.6	0.6	-2.1	-1.1	50 30	30	30	30	30	30
Perfluoroundecanoic acid	23.1 -6.0	6.9	17.6	0.8	9.2	7.4	50 30	30	30	30	30	30
NEtFOSAA	22.2 -0.5	-5.4	2.8	2.4	9.7	-3.3	50 30	30	30	30	30	30
11Cl-PF3OUdS	4.6 -0.3	-1.7	-8.6	-6.0	-0.3	2.1	50 30	30	30	30	30	30
Perfluorododecanoic acid	36.0 -1.7	8.9	5.8	3.9	2.8	1.1	50 30	30	30	30	30	30
10:2 FTS	7.5 -3.7	12.4	11.1	9.1	3.7	3.8	50 30	30	30	30	30	30
NMeFOSE	-3.1 2.8	-6.2	-0.9	-6.1	5.0	-6.5	50 30	30	30	30	30	30
NMeFOSA	-11.4 -0.6	-3.4	-7.2	-6.7	1.2	2.2	50 30	30	30	30	30	30
Perfluorododecanesulfonic acid	5.2 0.2	3.1	-6.7	-4.1	1.6	-0.2	50 30	30	30	30	30	30
NEtFOSE	11.8 -1.2	4.1	-2.2	-6.0	-0.3	3.5	50 30	30	30	30	30	30
Perfluorotridecanoic acid	23.9 -6.6	11.8	7.5	4.5	11.9	7.2	50 30	30	30	30	30	30
NEtFOSA	-19.5 -3.1	3.3	2.0	1.0	1.3	5.6	50 30	30	30	30	30	30
Perfluorotetradecanoic acid	19.1 -3.6	14.0	12.4	14.1	9.8	0.3	50 30	30	30	30	30	30
Perfluorohexadecanoic acid	33.3 -4.1	14.0	5.7	1.7	10.7	3.2	50 30	30	30	30	30	30
Perfluorooctadecanoic acid	7.3 -2.5	1.0	-0.3	0.3	7.5	2.0	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
13C4 PFBA	0.7 -5.1	4.5	3.6	0.0	-1.2	-2.6	30 30	30	30	30	30	30
13C5 PFPeA	3.8 -5.5	2.6	2.2	-1.1	-1.1	-0.9	30 30	30	30	30	30	30
13C3 PFBS	2.0 -2.4	5.7	1.1	-1.3	-3.4	-1.6	30 30	30	30	30	30	30
M2-4:2 FTS	-1.3 -0.7	0.0	-0.7	3.0	-2.0	1.8	30 30	30	30	30	30	30
13C5 PFHxA	-0.3 -4.3	5.1	0.0	2.7	-1.3	-1.9	30 30	30	30	30	30	30
13C3 HFPO-DA	-1.6 2.6	-7.7	0.0	9.7	7.9	-10.8	30 30	30	30	30	30	30
13C4 PFHpA	-2.0 -2.6	6.4	-0.2	-0.5	1.7	-2.8	30 30	30	30	30	30	30
13C3 PFHxS	-0.7 -9.2	8.4	6.4	2.2	-0.5	-6.6	30 30	30	30	30	30	30
M2-6:2 FTS	13.5 -15.4	18.2	0.3	0.2	-6.2	-10.6	30 30	30	30	30	30	30
13C8 PFOA	0.5 -10.2	7.2	4.5	1.6	0.3	-3.9	30 30	30	30	30	30	30
13C8 PFOS	-2.7 -4.5	2.8	7.6	-1.7	2.3	-3.8	30 30	30	30	30	30	30
13C9 PFNA	-2.3 -5.0	7.7	5.2	-0.2	-2.1	-3.2	30 30	30	30	30	30	30
13C6 PFDA	5.7 -6.2	5.8	1.0	-2.0	3.4	-7.6	30 30	30	30	30	30	30
M2-8:2 FTS	22.0 -10.8	11.9	-5.0	-2.6	0.3	-15.8	30 30	30	30	30	30	30
13C8 FOSA	10.9 -2.3	3.8	-5.2	-1.6	1.8	-7.4	30 30	30	30	30	30	30
d3-NMeFOSAA	-0.3 9.5	2.4	-7.2	-0.5	2.2	-6.1	30 30	30	30	30	30	30
13C7 PFUnA	3.1 -0.1	4.8	-2.4	-0.1	1.7	-7.0	30 30	30	30	30	30	30
d5-NEtFOSAA	10.8 -2.8	0.4	-6.8	-0.1	3.3	-4.9	30 30	30	30	30	30	30
13C2-PFDoDA	-4.3 -3.9	6.6	-3.3	6.1	3.8	-5.0	30 30	30	30	30	30	30
d7-N-MeFOSE-M	8.0 1.7	-2.5	-4.3	-0.8	0.8	-2.8	30 30	30	30	30	30	30
d3-NMePFOSA	14.2 5.0	-2.5	-6.1	-3.4	2.5	-9.7	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
d9-N-EtFOSE-M	11.1 2.4	-0.8	-7.0	-1.5	3.1	-7.2	30 30	30	30	30	30	30
d5-NEtPFOSA	9.0 6.3	-3.1	-4.1	-3.7	2.7	-7.1	30 30	30	30	30	30	30
13C2 PFTeDA	1.5 2.7	1.0	-2.8	0.2	1.0	-3.5	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 9225

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/26/2020 12:43 Calibration End Date: 05/26/2020 13:37 Calibration ID: 4400

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-9225/1	20MAY26MCAL-01.d
Level 2	IC 410-9225/2	20MAY26MCAL-02.d
Level 3	IC 410-9225/3	20MAY26MCAL-03.d
Level 4	IC 410-9225/4	20MAY26MCAL-04.d
Level 5	ICISAV 410-9225/5	20MAY26MCAL-05.d
Level 6	IC 410-9225/6	20MAY26MCAL-06.d
Level 7	IC 410-9225/7	20MAY26MCAL-07.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid	1.2178 1.0139	1.0590 0.9889	1.1271	0.9868	1.0657	LID1F		1.0062							0.9990		0.9900
Perfluoropentanoic acid	1.1918 1.0840	1.0532 0.9441	1.1892	1.0205	1.0737	LID1F		1.0038							0.9950		0.9900
Perfluorobutanesulfonic acid	1.0670 0.9753	0.9921 1.0206	1.0603	1.0155	1.0305	LID1F		1.0094							1.0000		0.9900
4:2 Fluorotelomer sulfonic acid	3.1329 2.9742	3.3042 2.9748	3.2468	2.6347	3.1780	LID1F		2.9862							0.9990		0.9900
Perfluorohexanoic acid	0.8972 0.8333	0.8135 0.8485	0.8917	0.8456	0.8807	LID1F		0.8482							1.0000		0.9900
Perfluoropentanesulfonic acid	0.9432 0.9660	0.9392 0.8903	0.9626	0.9929	0.9913	LID1F		0.9279							0.9980		0.9900
HFPODA	1.6412 1.5033	1.6624 1.7213	1.7015	1.5702	1.5483	LID1F		1.6347							0.9960		0.9900
Perfluoroheptanoic acid	1.2967 1.0790	1.1236 1.0537	1.1478	1.1970	1.2200	LID1F		1.0869							0.9970		0.9900
Perfluorohexanesulfonic acid	1.0971 0.9750	0.9820 1.0387	1.0693	0.9793	1.1869	LID1F		1.0351							0.9960		0.9900
DONA	1.9013 1.7252	1.7820 1.7675	1.8200	1.7429	1.9849	LID1F		1.7795							0.9980		0.9900
6:2 Fluorotelomer sulfonic acid	5.9461 5.0096	5.2247 5.0365	5.6943	4.9341	5.3632	LID1F		5.0695							0.9990		0.9900
Perfluoroheptanesulfonic acid	1.0743 1.0047	0.9573 0.9714	1.0429	0.9746	1.1161	LID1F		0.9977							0.9980		0.9900
Perfluorooctanoic acid	1.0300 0.8420	0.9547 0.8464	0.8998	0.8492	0.8827	LID1F		0.8504							1.0000		0.9900
Perfluorooctanesulfonic acid	1.1570 1.0358	0.9494 1.0662	1.1044	1.0447	1.1494	LID1F		1.0662							0.9990		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 9225

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/26/2020 12:43 Calibration End Date: 05/26/2020 13:37 Calibration ID: 4400

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorononanoic acid	0.9420 0.8896	0.8511 0.8562	0.9766	0.9601	1.0024	LID1F		0.8876							0.9970		0.9900
9Cl-PF3ONS	1.9308 1.7428	1.6662 1.8292	1.8742	1.8775	1.9648	LID1F		1.8226							0.9990		0.9900
Perfluorononanesulfonic acid	1.1967 1.1080	1.0918 1.1063	1.2267	1.2296	1.2693	LID1F		1.1317							0.9970		0.9900
Perfluorodecanoic acid	0.8869 0.8187	0.7519 0.7599	0.8912	0.8089	0.8668	LID1F		0.7917							0.9970		0.9900
8:2 Fluorotelomer sulfonic acid	7.7208 7.8047	8.2617 6.5837	7.9796	7.0606	7.4958	LID1F		7.0650							0.9930		0.9900
Perfluorooctanesulfonamide	1.0620 1.0511	1.0871 0.9213	1.0664	0.9098	1.0321	LID1F		0.9712							0.9960		0.9900
NMeFOSAA	0.9669 0.8875	0.9949 0.8915	0.9364	0.9253	1.0000	LID1F		0.9048							0.9980		0.9900
Perfluorodecanesulfonic acid	1.0921 1.0189	0.9296 1.0419	1.0546	1.0326	1.1123	LID1F		1.0428							0.9990		0.9900
Perfluoroundecanoic acid	0.9324 0.7554	0.8202 0.7839	0.8440	0.7782	0.8384	LID1F		0.7827							0.9990		0.9900
NEtFOSAA	1.0586 0.8406	0.9944 0.9406	0.9486	0.8359	1.0225	LID1F		0.9177							0.9960		0.9900
11Cl-PF3OUdS	1.5255 1.4038	1.3675 1.4225	1.5933	1.4429	1.5623	LID1F		1.4355							0.9990		0.9900
Perfluorododecanoic acid	0.9228 0.8724	0.8335 0.8478	0.9684	0.9401	0.9079	LID1F		0.8667							0.9990		0.9900
10:2 FTS	7.2333 8.2747	7.2338 7.7770	8.0665	7.0073	7.9970	LID1F		7.9061							0.9990		0.9900
NMeFOSE	1.1468 1.0340	0.9954 0.9950	1.0591	0.9651	1.0235	LID1F		1.0085							1.0000		0.9900
NMeFOSA	1.1024 0.9666	0.9284 0.9716	1.0295	0.9470	1.0048	LID1F		0.9734							1.0000		0.9900
Perfluorododecanesulfonic acid	0.7817 0.8036	0.7486 0.8040	0.8712	0.8160	0.9057	LID1F		0.8162							0.9980		0.9900
NEtFOSE	1.1595 1.0543	1.1158 1.0379	1.1638	1.0260	1.1312	LID1F		1.0540							0.9990		0.9900
Perfluorotridecanoic acid	0.7398 0.7697	0.7155 +++++	0.7977	0.7686	0.7811	LID1F		0.7727							1.0000		0.9900
NEtFOSA	1.0472 0.9813	1.1065 0.9576	1.0395	0.9490	1.0972	LID1F		0.9806							0.9980		0.9900
Perfluorotetradecanoic acid	1.0678 0.8753	0.9589 0.8878	1.0138	0.9086	0.9205	LID1F		0.8907							0.9990		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 9225

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/26/2020 12:43 Calibration End Date: 05/26/2020 13:37 Calibration ID: 4400

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorohexadecanoic acid	0.5371 0.4290	0.4663 0.4106	0.4758	0.4346	0.4586	LID1F		0.4231							0.9980		0.9900
Perfluorooctadecanoic acid	0.2784 0.2562	0.2426 0.2508	0.2724	0.2513	0.2595	LID1F		0.2535							1.0000		0.9900
13C4 PFBA	1.2141 1.1245	1.2089 1.1271	1.0632	1.1592	1.1288	Ave		1.1466				4.6		20.0			
13C5 PFPeA	1.3182 1.1557	1.3086 1.2139	1.0968	1.1914	1.2004	Ave		1.2122				6.5		20.0			
13C3 PFBS	1.7158 1.4889	1.6588 1.5283	1.4385	1.5253	1.5086	Ave		1.5520				6.3		20.0			
M2-4:2 FTS	0.0626 0.0726	0.0583 0.0704	0.0613	0.0718	0.0660	Ave		0.0661				8.5		20.0			
13C5 PFHxA	0.7559 0.7635	0.7535 0.7613	0.7456	0.7718	0.7685	Ave		0.7600				1.2		20.0			
13C3 HFPO-DA	0.1258 0.1412	0.1180 0.1322	0.1179	0.1229	0.1369	Ave		0.1278				7.2		20.0			
13C3 PFHxS	0.7232 0.7382	0.7226 0.7067	0.6700	0.7172	0.6775	Ave		0.7079				3.6		20.0			
13C4 PFHpA	0.7443 0.7649	0.7376 0.7533	0.7466	0.7141	0.7222	Ave		0.7404				2.4		20.0			
M2-6:2 FTS	0.0385 0.0380	0.0380 0.0340	0.0375	0.0423	0.0390	Ave		0.0382				6.4		20.0			
13C8 PFOA	1.0500 1.0159	1.0442 0.9640	0.9818	0.9826	1.0267	Ave		1.0093				3.3		20.0			
13C8 PFOS	1.1049 1.0839	1.1856 1.0348	1.0303	1.0035	1.0226	Ave		1.0665				6.0		20.0			
13C9 PFNA	1.2977 1.2299	1.3569 1.1765	1.1955	1.1325	1.1727	Ave		1.2231				6.4		20.0			
13C6 PFDA	1.3111 1.1549	1.3061 1.1567	1.1566	1.2115	1.1206	Ave		1.2025				6.4		20.0			
M2-8:2 FTS	0.0302 0.0250	0.0266 0.0243	0.0270	0.0300	0.0257	Ave		0.0270				8.6		20.0			
13C8 FOSA	1.4934 1.4762	1.4244 1.5402	1.4462	1.5491	1.5100	Ave		1.4913				3.1		20.0			
d3-NMeFOSAA	0.2964 0.3349	0.2825 0.3437	0.3205	0.3106	0.3128	Ave		0.3145				6.7		20.0			
13C7 PFUnA	1.4140 1.3742	1.4954 1.2786	1.3903	1.4162	1.3286	Ave		1.3853				5.0		20.0			
d5-NEtFOSAA	0.2471 0.2710	0.2353 0.2491	0.2574	0.2710	0.2355	Ave		0.2524				5.9		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 9225

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/26/2020 12:43 Calibration End Date: 05/26/2020 13:37 Calibration ID: 4400

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
13C2-PFDoDA	1.4667 1.3903	1.4825 1.3640	1.3469	1.3628	1.3584	Ave		1.3959				4.0		20.0			
d7-N-MeFOSE-M	0.2457 0.2683	0.2340 0.2704	0.2476	0.2475	0.2497	Ave		0.2519				5.2		20.0			
d3-NMePFOSA	0.1366 0.1543	0.1310 0.1513	0.1358	0.1372	0.1414	Ave		0.1411				6.1		20.0			
d9-N-EtFOSE-M	0.2399 0.2706	0.2244 0.2528	0.2376	0.2559	0.2401	Ave		0.2459				6.1		20.0			
d5-NEtPFOSA	0.1255 0.1429	0.1183 0.1395	0.1268	0.1352	0.1259	Ave		0.1306				6.8		20.0			
13C2 PFTeDA	0.9889 1.0554	1.0427 1.0534	0.9444	0.9866	1.0132	Ave		1.0121				4.1		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 9225

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/26/2020 12:43 Calibration End Date: 05/26/2020 13:37 Calibration ID: 4400

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-9225/1	20MAY26MCAL-01.d
Level 2	IC 410-9225/2	20MAY26MCAL-02.d
Level 3	IC 410-9225/3	20MAY26MCAL-03.d
Level 4	IC 410-9225/4	20MAY26MCAL-04.d
Level 5	ICISAV 410-9225/5	20MAY26MCAL-05.d
Level 6	IC 410-9225/6	20MAY26MCAL-06.d
Level 7	IC 410-9225/7	20MAY26MCAL-07.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid		LID1F	69042 13069716	160958 23510969	659634	2170850	5704645	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanoic acid		LID1F	73359 14360512	173283 24173027	717981	2307335	6112134	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorobutanesulfonic acid		LID1F	75657 14731686	183112 29119022	742993	2601405	6524669	0.177 44.3	0.443 88.5	1.77	7.08	17.7
4:2 Fluorotelomer sulfonic acid		LID1F	17878 4082645	46510 7408827	193074	656349	1712830	0.187 46.7	0.467 93.4	1.87	7.47	18.7
Perfluorohexanoic acid		LID1F	66182 12883224	158415 24485325	690025	2423033	5920869	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanesulfonic acid		LID1F	70883 15464957	183723 26921289	714966	2695862	6652082	0.188 46.9	0.469 93.8	1.88	7.50	18.8
HFPODA		LID1F	20148 4299542	50706 8621531	208251	716324	1854103	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoroheptanoic acid		LID1F	94181 16712125	214203 30081554	889359	3173568	7708087	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexanesulfonic acid		LID1F	70625 13290734	167259 25372112	678121	2378153	6415072	0.182 45.6	0.456 91.2	1.82	7.30	18.2
DONA		LID1F	130505 25252346	321034 47684166	1332631	4366712	11851005	0.189 47.3	0.473 94.5	1.89	7.56	18.9
6:2 Fluorotelomer sulfonic acid		LID1F	21200 3651155	48607 6156490	210332	734338	1735731	0.190 47.4	0.474 94.8	1.90	7.58	19.0
Perfluoroheptanesulfonic acid		LID1F	72191 14297076	170198 24768984	690372	2470552	6297348	0.190 47.6	0.476 95.2	1.90	7.62	19.0
Perfluorooctanoic acid		LID1F	105551 17320978	257629 30923616	916799	3098068	7927718	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctanesulfonic acid		LID1F	83278 15802616	183368 29332667	769152	2641931	6973452	0.185 46.3	0.463 92.6	1.85	7.40	18.5
Perfluorononanoic acid		LID1F	86043 16638988	203272 28934883	852693	2960794	7535914	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 9225

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/26/2020 12:43 Calibration End Date: 05/26/2020 13:37 Calibration ID: 4400

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
9Cl-PF3ONS		LID1F	139653 26719633	323379 50567540	1311599	4771029	11978663	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorononanesulfonic acid		LID1F	89349 17535071	218732 31569834	886161	3225489	7988517	0.192 48.0	0.480 96.0	1.92	7.68	19.2
Perfluorodecanoic acid		LID1F	98599 16857999	216804 29383383	926442	3130669	7756118	0.200 50.0	0.500 100	2.00	8.00	20.0
8:2 Fluorotelomer sulfonic acid		LID1F	18927 3334868	46454 5119051	185531	648543	1476029	0.192 47.9	0.479 95.8	1.92	7.66	19.2
Perfluorooctanesulfonamide		LID1F	134475 27666825	341830 47437856	1386096	4501969	12444445	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSAA		LID1F	24299 5300016	62038 10243563	269764	917927	2497677	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorodecanesulfonic acid		LID1F	81880 16191219	187024 29857282	765003	2720010	7029329	0.193 48.2	0.482 96.4	1.93	7.71	19.3
Perfluoroundecanoic acid		LID1F	111781 18508674	270776 33508633	1054649	3520287	8894839	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSAA		LID1F	22179 4061764	51660 7833665	219456	723723	1922587	0.200 50.0	0.500 100	2.00	8.00	20.0
11Cl-PF3OUdS		LID1F	110339 21521211	265415 39324221	1114972	3666591	9525243	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorododecanoic acid		LID1F	114757 21625789	272777 38659048	1172264	4092596	9848339	0.200 50.0	0.500 100	2.00	8.00	20.0
10:2 FTS		LID1F	17843 3557842	40929 6084741	188725	647676	1584592	0.193 48.2	0.482 96.4	1.93	7.71	19.3
NMeFOSE		LID1F	23896 4947031	51421 8993933	235663	762835	2040449	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSA		LID1F	12768 2659132	26847 4914230	125625	415183	1134690	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorododecanesulfonic acid		LID1F	58849 12823313	151222 23133938	634563	2158229	5747345	0.194 48.4	0.484 96.8	1.94	7.74	19.4
NEtFOSE		LID1F	23591 5087408	55267 8770533	248535	838679	2168941	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotridecanoic acid		LID1F	92003 19080539	234167 +++++	965650	3345857	8472708	0.200 50.0	0.500 +++++	2.00	8.00	20.0
NEtFOSA		LID1F	11142 2500172	28884 4465809	118488	409859	1103047	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotetradecanoic acid		LID1F	89529 16471224	220725 31264296	860502	2863501	7447312	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexadecanoic acid		LID1F	45036 8072415	107330 14458536	403850	1369536	3710435	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctadecanoic acid		LID1F	23339 4820839	55852 8833091	231193	792146	2099675	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 9225

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/26/2020 12:43 Calibration End Date: 05/26/2020 13:37 Calibration ID: 4400

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	13C3 PFBA	Ave	2834642 2578080	3039783 2377566	2926121	2749748	2676527	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C5 PFPeA	13C3 PFBA	Ave	3077722 2649619	3290549 2560504	3018698	2826148	2846187	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFBS	13C3 PFBA	Ave	3749528 3195072	3904172 3017460	3705768	3386647	3348087	9.36 9.36	9.36 9.36	9.36	9.36	9.36
M2-4:2 FTS	13PF OA	Ave	285324 274533	281518 249051	297329	311393	269482	9.34 9.34	9.34 9.34	9.34	9.34	9.34
13C5 PFHxA	13PF OA	Ave	3688353 3092133	3894659 2885596	3869019	3581972	3361474	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 HFPO-DA	13PF OA	Ave	613835 571996	610016 500876	611946	570243	598737	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFHxS	13PF OA	Ave	3338592 2828024	3533423 2533743	3289051	3148686	2803263	9.46 9.46	9.46 9.46	9.46	9.46	9.46
13C4 PFHpA	13PF OA	Ave	3631683 3097785	3812792 2854917	3874098	3314151	3158961	10.0 10.0	10.0 10.0	10.0	10.0	10.0
M2-6:2 FTS	13PF OA	Ave	178644 146074	186459 122495	185076	186428	162159	9.50 9.50	9.50 9.50	9.50	9.50	9.50
13C8 PFOA	13PF OA	Ave	5123623 4114277	5397332 3653611	5094674	4560351	4490857	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C8 PFOS	PFOS	Ave	3719435 3153581	3992254 2843311	3598752	3266988	3135235	9.57 9.57	9.57 9.57	9.57	9.57	9.57
13C9 PFNA	PFOS	Ave	4566915 3740957	4776928 3379623	4365713	3854643	3758902	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C6 PFDA	PFDA	Ave	5558610 4118366	5766651 3866854	5197717	4837565	4474107	10.0 10.0	10.0 10.0	10.0	10.0	10.0
M2-8:2 FTS	PFDA	Ave	122571 85458	112456 77753	116253	114817	98457	9.58 9.58	9.58 9.58	9.58	9.58	9.58
13C8 FOSA	PFDA	Ave	6331338 5264150	6288764 5148993	6498827	6185333	6028612	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMeFOSAA	PFDA	Ave	1256499 1194416	1247077 1149025	1440388	1240039	1248781	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C7 PFUnA	PFDA	Ave	5994549 4900438	6602561 4274411	6247924	5654879	5304456	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtFOSAA	PFDA	Ave	1047583 966422	1038975 832871	1156790	1082274	940160	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2-PFDoDA	PFDA	Ave	6218206 4957900	6545233 4559744	6052704	5441540	5423544	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d7-N-MeFOSE-M	PFDA	Ave	1041854 956903	1033163 903890	1112566	988072	996803	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMePFOSA	PFDA	Ave	579109 550207	578322 505813	610141	548026	564655	10.0 10.0	10.0 10.0	10.0	10.0	10.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 9225

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/26/2020 12:43 Calibration End Date: 05/26/2020 13:37 Calibration ID: 4400

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
d9-N-EtFOSE-M	PFDA	Ave	1017280 965086	990590 845056	1067736	1021744	958658	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtPFOSA	PFDA	Ave	531975 509566	522095 466368	569924	539841	502647	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2 PFTeDA	PFDA	Ave	4192380 3763696	4603630 3521657	4244121	3939521	4045063	10.0 10.0	10.0 10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD
LID1F = Linear 1/Conc IsoDil FZ

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 9225

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/26/2020 12:43 Calibration End Date: 05/26/2020 13:37 Calibration ID: 4400

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-9225/1	20MAY26MCAL-01.d
Level 2	IC 410-9225/2	20MAY26MCAL-02.d
Level 3	IC 410-9225/3	20MAY26MCAL-03.d
Level 4	IC 410-9225/4	20MAY26MCAL-04.d
Level 5	ICISAV 410-9225/5	20MAY26MCAL-05.d
Level 6	IC 410-9225/6	20MAY26MCAL-06.d
Level 7	IC 410-9225/7	20MAY26MCAL-07.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanoic acid	21.0 -1.7	5.2	12.0	-1.9	5.9	0.8	50 30	30	30	30	30	30
Perfluoropentanoic acid	18.7 -6.0	4.9	18.5	1.7	7.0	8.0	50 30	30	30	30	30	30
Perfluorobutanesulfonic acid	5.7 1.1	-1.7	5.0	0.6	2.1	-3.4	50 30	30	30	30	30	30
4:2 Fluorotelomer sulfonic acid	4.9 -0.4	10.7	8.7	-11.8	6.4	-0.4	50 30	30	30	30	30	30
Perfluorohexanoic acid	5.8 0.0	-4.1	5.1	-0.3	3.8	-1.8	50 30	30	30	30	30	30
Perfluoropentanesulfonic acid	1.6 -4.1	1.2	3.7	7.0	6.8	4.1	50 30	30	30	30	30	30
HFPODA	0.4 5.3	1.7	4.1	-3.9	-5.3	-8.0	50 30	30	30	30	30	30
Perfluoroheptanoic acid	19.3 -3.1	3.4	5.6	10.1	12.2	-0.7	50 30	30	30	30	30	30
Perfluorohexanesulfonic acid	6.0 0.3	-5.1	3.3	-5.4	14.7	-5.8	50 30	30	30	30	30	30
DONA	6.8 -0.7	0.1	2.3	-2.1	11.5	-3.1	50 30	30	30	30	30	30
6:2 Fluorotelomer sulfonic acid	17.3 -0.7	3.1	12.3	-2.7	5.8	-1.2	50 30	30	30	30	30	30
Perfluoroheptanesulfonic acid	7.7 -2.6	-4.0	4.5	-2.3	11.9	0.7	50 30	30	30	30	30	30
Perfluorooctanoic acid	21.1 -0.5	12.3	5.8	-0.1	3.8	-1.0	50 30	30	30	30	30	30
Perfluorooctanesulfonic acid	8.5 0.0	-11.0	3.6	-2.0	7.8	-2.9	50 30	30	30	30	30	30
Perfluorononanoic acid	6.1 -3.5	-4.1	10.0	8.2	12.9	0.2	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 9225

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/26/2020 12:43 Calibration End Date: 05/26/2020 13:37 Calibration ID: 4400

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
9Cl-PF3ONS	5.9 0.4	-8.6	2.8	3.0	7.8	-4.4	50 30	30	30	30	30	30
Perfluorononanesulfonic acid	5.8 -2.2	-3.5	8.4	8.7	12.2	-2.1	50 30	30	30	30	30	30
Perfluorodecanoic acid	12.0 -4.0	-5.0	12.6	2.2	9.5	3.4	50 30	30	30	30	30	30
8:2 Fluorotelomer sulfonic acid	9.3 -6.8	16.9	12.9	-0.1	6.1	10.5	50 30	30	30	30	30	30
Perfluorooctanesulfonamide	9.3 -5.1	11.9	9.8	-6.3	6.3	8.2	50 30	30	30	30	30	30
NMeFOSAA	6.9 -1.5	10.0	3.5	2.3	10.5	-1.9	50 30	30	30	30	30	30
Perfluorodecanesulfonic acid	4.7 -0.1	-10.9	1.1	-1.0	6.7	-2.3	50 30	30	30	30	30	30
Perfluoroundecanoic acid	19.1 0.2	4.8	7.8	-0.6	7.1	-3.5	50 30	30	30	30	30	30
NEtFOSAA	15.4 2.5	8.4	3.4	-8.9	11.4	-8.4	50 30	30	30	30	30	30
11Cl-PF3OUdS	6.3 -0.9	-4.7	11.0	0.5	8.8	-2.2	50 30	30	30	30	30	30
Perfluorododecanoic acid	6.5 -2.2	-3.8	11.7	8.5	4.8	0.7	50 30	30	30	30	30	30
10:2 FTS	-8.5 -1.6	-8.5	2.0	-11.4	1.2	4.7	50 30	30	30	30	30	30
NMeFOSE	13.7 -1.3	-1.3	5.0	-4.3	1.5	2.5	50 30	30	30	30	30	30
NMeFOSA	13.2 -0.2	-4.6	5.8	-2.7	3.2	-0.7	50 30	30	30	30	30	30
Perfluorododecanesulfonic acid	-4.2 -1.5	-8.3	6.7	0.0	11.0	-1.5	50 30	30	30	30	30	30
NEtFOSE	10.0 -1.5	5.9	10.4	-2.6	7.3	0.0	50 30	30	30	30	30	30
Perfluorotridecanoic acid	-4.3 +++++	-7.4	3.2	-0.5	1.1	-0.4	50	30	30	30	30	30
NEtFOSA	6.8 -2.4	12.8	6.0	-3.2	11.9	0.1	50 30	30	30	30	30	30
Perfluorotetradecanoic acid	19.9 -0.3	7.7	13.8	2.0	3.4	-1.7	50 30	30	30	30	30	30
Perfluorohexadecanoic acid	27.0 -3.0	10.2	12.5	2.7	8.4	1.4	50 30	30	30	30	30	30
Perfluorooctadecanoic acid	9.8 -1.1	-4.3	7.4	-0.9	2.4	1.0	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 9225

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/26/2020 12:43 Calibration End Date: 05/26/2020 13:37 Calibration ID: 4400

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
13C4 PFBA	5.9 -1.7	5.4	-7.3	1.1	-1.5	-1.9	30 30	30	30	30	30	30
13C5 PFPeA	8.8 0.1	8.0	-9.5	-1.7	-1.0	-4.7	30 30	30	30	30	30	30
13C3 PFBS	10.6 -1.5	6.9	-7.3	-1.7	-2.8	-4.1	30 30	30	30	30	30	30
M2-4:2 FTS	-5.3 6.4	-11.8	-7.3	8.6	-0.3	9.7	30 30	30	30	30	30	30
13C5 PFHxA	-0.5 0.2	-0.9	-1.9	1.6	1.1	0.5	30 30	30	30	30	30	30
13C3 HFPO-DA	-1.6 3.4	-7.7	-7.8	-3.9	7.1	10.5	30 30	30	30	30	30	30
13C3 PFHxS	2.2 -0.2	2.1	-5.4	1.3	-4.3	4.3	30 30	30	30	30	30	30
13C4 PFHpA	0.5 1.7	-0.4	0.8	-3.6	-2.5	3.3	30 30	30	30	30	30	30
M2-6:2 FTS	0.9 -10.9	-0.6	-1.7	10.7	2.2	-0.6	30 30	30	30	30	30	30
13C8 PFOA	4.0 -4.5	3.5	-2.7	-2.6	1.7	0.7	30 30	30	30	30	30	30
13C8 PFOS	3.6 -3.0	11.2	-3.4	-5.9	-4.1	1.6	30 30	30	30	30	30	30
13C9 PFNA	6.1 -3.8	10.9	-2.3	-7.4	-4.1	0.6	30 30	30	30	30	30	30
13C6 PFDA	9.0 -3.8	8.6	-3.8	0.8	-6.8	-4.0	30 30	30	30	30	30	30
M2-8:2 FTS	11.9 -10.0	-1.4	0.1	11.3	-4.6	-7.3	30 30	30	30	30	30	30
13C8 FOSA	0.1 3.3	-4.5	-3.0	3.9	1.2	-1.0	30 30	30	30	30	30	30
d3-NMeFOSAA	-5.8 9.3	-10.2	1.9	-1.2	-0.5	6.5	30 30	30	30	30	30	30
13C7 PFUnA	2.1 -7.7	7.9	0.4	2.2	-4.1	-0.8	30 30	30	30	30	30	30
d5-NEtFOSAA	-2.1 -1.3	-6.8	2.0	7.4	-6.7	7.4	30 30	30	30	30	30	30
13C2-PFDoDA	5.1 -2.3	6.2	-3.5	-2.4	-2.7	-0.4	30 30	30	30	30	30	30
d7-N-MeFOSE-M	-2.4 7.3	-7.1	-1.7	-1.8	-0.9	6.5	30 30	30	30	30	30	30
d3-NMePFOSA	-3.2 7.2	-7.2	-3.8	-2.7	0.2	9.4	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 9225

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 05/26/2020 12:43 Calibration End Date: 05/26/2020 13:37 Calibration ID: 4400

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
d9-N-EtFOSE-M	-2.4 2.8	-8.8	-3.4	4.1	-2.4	10.1	30 30	30	30	30	30	30
d5-NEtPFOSA	-3.9 6.8	-9.4	-2.9	3.5	-3.6	9.4	30 30	30	30	30	30	30
13C2 PFTeDA	-2.3 4.1	3.0	-6.7	-2.5	0.1	4.3	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 18152

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 06/30/2020 15:33 Calibration End Date: 06/30/2020 16:27 Calibration ID: 6396

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-18152/1	20JUN30MCAL-17.d
Level 2	IC 410-18152/2	20JUN30MCAL-18.d
Level 3	IC 410-18152/3	20JUN30MCAL-19.d
Level 4	IC 410-18152/4	20JUN30MCAL-20.d
Level 5	ICISAV 410-18152/5	20JUN30MCAL-21.d
Level 6	IC 410-18152/6	20JUN30MCAL-22.d
Level 7	IC 410-18152/7	20JUN30MCAL-23.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid	1.0954 0.8351	0.9385 0.8359	0.8721	0.8295	0.8846	LID1F		0.8417				13.4			0.9990		0.9900
Perfluoropentanoic acid	1.2721 0.9736	1.1671 0.9482	1.0283	0.9817	1.0008	LID1F		0.9644				15.9			0.9990		0.9900
Perfluorobutanesulfonic acid	1.1192 0.9266	1.0359 0.9928	0.9628	0.9472	1.0430	LID1F		0.9780				7.4			0.9980		0.9900
4:2 Fluorotelomer sulfonic acid	3.0694 2.8870	3.3044 2.6757	3.0418	2.8235	2.9333	LID1F		2.7754				10.3			0.9980		0.9900
Perfluorohexanoic acid	0.8950 0.7915	0.8325 0.8030	0.7754	0.8009	0.8682	LID1F		0.8068				5.9			0.9990		0.9900
Perfluoropentanesulfonic acid	0.9147 0.7123	0.8853 0.7740	0.7624	0.7557	0.8425	LID1F		0.7640				11.5			0.9970		0.9900
HFPODA	1.9862 1.9649	1.6481 1.9128	2.3108	1.7756	2.2328	LID1F		1.9603				12.0			0.9970		0.9900
Perfluoroheptanoic acid	1.1900 1.1027	1.1695 0.9894	1.1657	1.1103	1.1877	LID1F		1.0507				10.7			0.9950		0.9900
Perfluorohexanesulfonic acid	1.1443 0.9597	1.0142 0.9769	1.0488	0.9627	1.0503	LID1F		0.9807				8.1			0.9990		0.9900
DONA	1.8548 1.7671	1.7112 1.6342	1.9088	1.7999	1.9451	LID1F		1.7162				8.4			0.9960		0.9900
6:2 Fluorotelomer sulfonic acid	5.6537 5.5423	5.9630 5.3649	5.4276	5.4003	5.7729	LID1F		5.4634				4.7			0.9990		0.9900
Perfluoroheptanesulfonic acid	1.0778 0.9050	1.0005 0.8662	0.9721	0.9716	1.0149	LID1F		0.8998				11.7			0.9970		0.9900
Perfluorooctanoic acid	1.0727 0.8243	0.8511 0.8335	0.8734	0.8695	0.8970	LID1F		0.8403				11.9			0.9990		0.9900
Perfluorooctanesulfonic acid	1.2926 1.0497	1.0824 1.0087	1.0122	0.9568	0.9988	LID1F		1.0172				11.7			0.9990		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 18152

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 06/30/2020 15:33 Calibration End Date: 06/30/2020 16:27 Calibration ID: 6396

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorononanoic acid	0.9684 0.8650	0.9461 0.8749	0.9135	0.8605	0.8838	LID1F		0.8732				6.0			1.0000		0.9900
9Cl-PF3ONS	1.7457 1.7392	1.6841 1.6255	1.6821	1.6221	1.7175	LID1F		1.6679				3.3			0.9990		0.9900
Perfluorononanesulfonic acid	1.1179 1.0596	1.0046 0.9904	1.0277	0.9840	0.9968	LID1F		1.0106				5.0			0.9990		0.9900
Perfluorodecanoic acid	0.8582 0.7729	0.8324 0.7821	0.7984	0.7620	0.8597	LID1F		0.7876				6.0			0.9990		0.9900
8:2 Fluorotelomer sulfonic acid	8.0016 7.1499	7.2111 7.2149	6.9318	7.0510	8.1130	LID1F		7.2868				6.6			0.9980		0.9900
Perfluorooctanesulfonamide	1.0382 0.9827	1.0420 0.9230	0.9894	0.9401	0.9914	LID1F		0.9490				6.4			0.9990		0.9900
NMeFOSAA	1.2130 0.9809	1.0722 0.9589	1.0456	0.9958	1.1117	LID1F		0.9851				11.7			0.9980		0.9900
Perfluorodecanesulfonic acid	1.1133 1.0346	0.9990 0.9899	1.0159	0.9677	1.0081	LID1F		1.0038				4.9			1.0000		0.9900
Perfluoroundecanoic acid	0.8099 0.7604	0.7819 0.7296	0.7669	0.7063	0.7496	LID1F		0.7400				5.3			1.0000		0.9900
NEtFOSAA	1.0350 0.9760	1.0291 1.0021	0.9617	0.9489	0.9798	LID1F		0.9897				3.3			1.0000		0.9900
11Cl-PF3OUdS	1.6580 1.4955	1.5879 1.4184	1.4761	1.3818	1.4726	LID1F		1.4455				7.7			0.9990		0.9900
Perfluorododecanoic acid	1.0833 0.9058	0.9509 0.8257	0.9508	0.8530	0.8733	LID1F		0.8563				12.9			0.9980		0.9900
10:2 FTS	9.0517 8.0874	7.5689 8.1702	7.9292	8.0063	8.8417	LID1F		8.2110				6.4			0.9990		0.9900
NMeFOSE	1.0918 1.0312	1.1192 1.0041	1.0451	0.9743	1.0442	LID1F		1.0156				5.7			1.0000		0.9900
NMeFOSA	1.0622 1.0290	1.1610 0.9708	1.0220	0.9638	1.1032	LID1F		1.0025				8.4			0.9980		0.9900
Perfluorododecanesulfonic acid	0.7727 0.7129	0.7000 0.6964	0.6927	0.6630	0.7140	LID1F		0.7015				4.8			1.0000		0.9900
Perfluorotridecanoic acid	0.9279 0.8041	0.9141 0.7634	0.9141	0.8222	0.8298	LID1F		0.7869				12.3			0.9980		0.9900
NEtFOSE	1.1689 1.0768	1.1571 1.0675	1.0849	1.0555	1.1612	LID1F		1.0804				5.5			0.9990		0.9900
NEtFOSA	0.9345 1.0441	1.0428 0.9420	1.0078	0.9688	1.0784	LID1F		0.9876				5.9			0.9970		0.9900
Perfluorotetradecanoic acid	1.1068 0.8889	0.9276 0.8866	0.8875	0.9043	0.9215	LID1F		0.8923				10.1			1.0000		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 18152

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 06/30/2020 15:33 Calibration End Date: 06/30/2020 16:27 Calibration ID: 6396

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorohexadecanoic acid	0.4972 0.3635	0.4136 0.3643	0.3897	0.3714	0.3929	LID1F		0.3681				15.6			0.9990		0.9900
Perfluorooctadecanoic acid	0.2063 0.1910	0.1975 0.1950	0.1933	0.1964	0.1944	LID1F		0.1939				2.9			1.0000		0.9900
13C4 PFBA	1.0778 1.0716	1.1146 1.0546	1.1201	1.0895	1.0792	Ave		1.0868				2.2		20.0			
13C5 PFPeA	1.0543 1.0161	1.0152 0.9565	1.1014	1.0140	1.0354	Ave		1.0276				4.3		20.0			
13C3 PFBS	1.2141 1.2851	1.2225 1.1415	1.3686	1.2485	1.2048	Ave		1.2407				5.8		20.0			
M2-4:2 FTS	0.0604 0.0561	0.0531 0.0648	0.0554	0.0568	0.0576	Ave		0.0577				6.6		20.0			
13C5 PFHxA	0.7226 0.7242	0.7820 0.7547	0.7373	0.7407	0.7484	Ave		0.7443				2.7		20.0			
13C3 HFPO-DA	0.0989 0.0987	0.1105 0.1032	0.0832	0.1076	0.0890	Ave		0.0987				9.9		20.0			
13C4 PFHpA	0.7221 0.6905	0.7223 0.7508	0.6973	0.6776	0.6779	Ave		0.7055				3.9		20.0			
13C3 PFHxS	0.6342 0.6569	0.6615 0.6438	0.6457	0.6401	0.6356	Ave		0.6454				1.6		20.0			
M2-6:2 FTS	0.0341 0.0259	0.0295 0.0254	0.0295	0.0298	0.0284	Ave		0.0289				10.0		20.0			
13C8 PFOA	1.0249 0.9516	1.0674 0.9310	1.0281	0.9560	0.9517	Ave		0.9872				5.3		20.0			
13C8 PFOS	1.0228 0.9826	1.0715 0.9922	1.0571	1.0078	1.0304	Ave		1.0235				3.2		20.0			
13C9 PFNA	1.1941 1.0878	1.1857 1.0659	1.1755	1.0924	1.1379	Ave		1.1342				4.6		20.0			
13C6 PFDA	1.1784 1.0940	1.2209 1.0768	1.2320	1.1955	1.1078	Ave		1.1579				5.5		20.0			
M2-8:2 FTS	0.0231 0.0197	0.0233 0.0188	0.0240	0.0218	0.0206	Ave		0.0216				9.1		20.0			
13C8 FOSA	1.4525 1.3285	1.4581 1.3290	1.4474	1.3975	1.4575	Ave		1.4100				4.2		20.0			
d3-NMeFOSAA	0.2769 0.2896	0.2807 0.2827	0.2747	0.2790	0.2706	Ave		0.2792				2.2		20.0			
13C7 PFUnA	1.4033 1.3144	1.4491 1.2437	1.4433	1.4594	1.4353	Ave		1.3926				5.9		20.0			
d5-NEtFOSAA	0.2281 0.2123	0.2277 0.2031	0.2363	0.2197	0.2337	Ave		0.2230				5.4		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 18152

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 06/30/2020 15:33 Calibration End Date: 06/30/2020 16:27 Calibration ID: 6396

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
13C2-PFDoDA	1.2088 1.1917	1.2981 1.2329	1.2788	1.3012	1.3407	Ave		1.2646				4.3		20.0			
d7-N-MeFOSE-M	0.2415 0.2410	0.2378 0.2540	0.2354	0.2309	0.2455	Ave		0.2409				3.1		20.0			
d3-NMePFOSA	0.1256 0.1320	0.1381 0.1455	0.1307	0.1294	0.1373	Ave		0.1341				5.0		20.0			
d9-N-EtFOSE-M	0.2378 0.2368	0.2423 0.2527	0.2385	0.2320	0.2361	Ave		0.2395				2.8		20.0			
d5-NEtPFOSA	0.1391 0.1338	0.1432 0.1492	0.1387	0.1314	0.1363	Ave		0.1388				4.3		20.0			
13C2 PFTeDA	0.9094 0.9724	1.0292 0.9531	1.0032	0.9758	1.0083	Ave		0.9788				4.1		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 18152

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 06/30/2020 15:33 Calibration End Date: 06/30/2020 16:27 Calibration ID: 6396

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-18152/1	20JUN30MCAL-17.d
Level 2	IC 410-18152/2	20JUN30MCAL-18.d
Level 3	IC 410-18152/3	20JUN30MCAL-19.d
Level 4	IC 410-18152/4	20JUN30MCAL-20.d
Level 5	ICISAV 410-18152/5	20JUN30MCAL-21.d
Level 6	IC 410-18152/6	20JUN30MCAL-22.d
Level 7	IC 410-18152/7	20JUN30MCAL-23.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid		LID1F	55858 9900994	120781 18091905	442221	1730777	4379839	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanoic acid		LID1F	63457 10946234	136803 18614943	512730	1906188	4753974	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorobutanesulfonic acid		LID1F	56899 11659261	129397 20586109	527939	2004164	5101755	0.177 44.3	0.443 88.5	1.77	7.08	17.7
4:2 Fluorotelomer sulfonic acid		LID1F	13727 2690056	31435 5011257	125010	477367	1180155	0.187 46.7	0.467 93.4	1.87	7.47	18.7
Perfluorohexanoic acid		LID1F	51276 10192058	124914 18759049	454087	1891262	4857194	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanesulfonic acid		LID1F	49288 9499634	117205 17009026	443074	1694674	4367605	0.188 46.9	0.469 93.8	1.88	7.50	18.8
HFPODA		LID1F	15574 3446361	34940 6113573	152705	609246	1485163	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoroheptanoic acid		LID1F	68137 13536442	162094 22995080	645699	2398733	6018707	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexanesulfonic acid		LID1F	52476 10222670	117416 17756985	490581	1791655	4551535	0.182 45.6	0.456 91.2	1.82	7.30	18.2
DONA		LID1F	100361 20498748	224130 35893638	999115	3674636	9314836	0.189 47.3	0.473 94.5	1.89	7.56	18.9
6:2 Fluorotelomer sulfonic acid		LID1F	14487 2416343	32032 3998519	120582	485624	1160392	0.190 47.4	0.474 94.8	1.90	7.58	19.0
Perfluoroheptanesulfonic acid		LID1F	51592 10063323	120902 16436306	474648	1887577	4590786	0.190 47.6	0.476 95.2	1.90	7.62	19.0
Perfluorooctanoic acid		LID1F	87163 13944953	174324 24023496	713237	2650235	6381466	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctanesulfonic acid		LID1F	71603 12648319	152240 22637790	565058	2199217	5468230	0.185 46.3	0.463 92.6	1.85	7.40	18.5
Perfluorononanoic acid		LID1F	67673 12467072	159109 22790959	612694	2316638	5773518	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 18152

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 06/30/2020 15:33 Calibration End Date: 06/30/2020 16:27 Calibration ID: 6396

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
9Cl-PF3ONS		LID1F	97172 21057674	238017 36657204	943540	3746755	9448718	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorononanesulfonic acid		LID1F	64234 13243400	146558 23055674	595063	2346053	5660755	0.192 48.0	0.480 96.0	1.92	7.68	19.2
Perfluorodecanoic acid		LID1F	73642 13722415	172273 24701697	689033	2642475	6369322	0.200 50.0	0.500 100	2.00	8.00	20.0
8:2 Fluorotelomer sulfonic acid		LID1F	12919 2188557	27229 3809806	111650	427979	1071058	0.192 47.9	0.479 95.8	1.92	7.66	19.2
Perfluorooctanesulfonamide		LID1F	109812 21185272	257552 35980887	1003201	3810967	9664445	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSAA		LID1F	24454 4609298	51024 7951831	201197	805896	2011953	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorodecanesulfonic acid		LID1F	64236 12984384	146361 23140142	590709	2316870	5748369	0.193 48.2	0.482 96.4	1.93	7.71	19.3
Perfluoroundecanoic acid		LID1F	82755 16219646	192082 26617788	775419	2989827	7195966	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSAA		LID1F	17195 3362689	39729 5968389	159181	604656	1531252	0.200 50.0	0.500 100	2.00	8.00	20.0
11Cl-PF3OUdS		LID1F	92293 18106752	224424 31986754	828017	3191758	8101201	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorododecanoic acid		LID1F	95356 17517559	209241 29858818	851785	3219835	7830991	0.200 50.0	0.500 100	2.00	8.00	20.0
10:2 FTS		LID1F	14706 2491006	28759 4341272	128516	489005	1174571	0.193 48.2	0.482 96.4	1.93	7.71	19.3
NMeFOSE		LID1F	19199 4033408	45107 7482171	172331	652494	1714848	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSA		LID1F	9714 2204661	27187 4143313	93557	361771	1012762	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorododecanesulfonic acid		LID1F	44768 8984621	102971 16347277	404448	1593978	4088414	0.194 48.4	0.484 96.8	1.94	7.74	19.4
Perfluorotridecanoic acid		LID1F	81683 15551712	201151 27606415	818879	3103436	7441163	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSE		LID1F	20241 4137656	47532 7913081	181298	710249	1833960	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSA		LID1F	9464 2266766	25305 4123763	97918	369322	983078	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotetradecanoic acid		LID1F	73293 14027044	161824 24785366	623699	2559917	6214451	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexadecanoic acid		LID1F	32927 5736691	72154 10184560	273875	1051249	2649520	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctadecanoic acid		LID1F	13663 3014676	34461 5449915	135833	556037	1310753	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 18152

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 06/30/2020 15:33 Calibration End Date: 06/30/2020 16:27 Calibration ID: 6396

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	13C3 PFBA	Ave	2549633 2371318	2573823 2164432	2535468	2608024	2475533	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C5 PFPeA	13C3 PFBA	Ave	2494190 2248532	2344334 1963138	2493114	2427240	2375013	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFBS	13C3 PFBA	Ave	2688425 2661720	2642278 2192930	2899623	2797306	2586600	9.36 9.36	9.36 9.36	9.36	9.36	9.36
M2-4:2 FTS	13PF OA	Ave	223609 186356	190263 187288	205489	211335	201166	9.34 9.34	9.34 9.34	9.34	9.34	9.34
13C5 PFHxA	13PF OA	Ave	2864660 2575267	3000900 2336219	2928227	2951746	2797380	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 HFPO-DA	13PF OA	Ave	392058 350787	424003 319618	330422	428912	332576	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C4 PFHpA	13PF OA	Ave	2862855 2455111	2772041 2324195	2769480	2700474	2533813	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFHxS	13PF OA	Ave	2378317 2209839	2401678 1885542	2425941	2413163	2247494	9.46 9.46	9.46 9.46	9.46	9.46	9.46
M2-6:2 FTS	13PF OA	Ave	128390 87380	107663 74688	111316	112644	100715	9.50 9.50	9.50 9.50	9.50	9.50	9.50
13C8 PFOA	13PF OA	Ave	4062960 3383573	4096417 2882146	4083287	3809897	3557219	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C8 PFOS	PFOS	Ave	2862520 2490553	2907219 2319351	2884592	2969532	2829033	9.57 9.57	9.57 9.57	9.57	9.57	9.57
13C9 PFNA	PFOS	Ave	3494105 2882710	3363412 2604868	3353594	3365102	3266202	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C6 PFDA	PFDA	Ave	4290471 3550807	4139252 3158453	4315141	4334769	3704579	10.0 10.0	10.0 10.0	10.0	10.0	10.0
M2-8:2 FTS	PFDA	Ave	80728 61219	75520 52805	80535	75872	66009	9.58 9.58	9.58 9.58	9.58	9.58	9.58
13C8 FOSA	PFDA	Ave	5288366 4311745	4943416 3898178	5069687	5067242	4874068	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMeFOSAA	PFDA	Ave	1008020 939857	951761 829268	962154	1011634	904937	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C7 PFUnA	PFDA	Ave	5109258 4266079	4913065 3648044	5055289	5291679	4799960	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtFOSAA	PFDA	Ave	830677 689102	772077 595604	827621	796547	781410	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2-PFDoDA	PFDA	Ave	4401299 3867927	4400948 3616361	4479232	4718320	4483577	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d7-N-MeFOSE-M	PFDA	Ave	879267 782248	806069 745159	824510	837136	821123	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMePFOSA	PFDA	Ave	457267 428508	468318 426786	457736	469197	459005	10.0 10.0	10.0 10.0	10.0	10.0	10.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 18152

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 06/30/2020 15:33 Calibration End Date: 06/30/2020 16:27 Calibration ID: 6396

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
d9-N-EtFOSE-M	PFDA	Ave	865842 768510	821604 741302	835530	841113	789654	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtPFOSA	PFDA	Ave	506345 434189	485337 437757	485817	476508	455821	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2 PFTeDA	PFDA	Ave	3310951 3156061	3489251 2795507	3513818	3538467	3371886	10.0 10.0	10.0 10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD
LID1F = Linear 1/Conc IsoDil FZ

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 18152

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 06/30/2020 15:33 Calibration End Date: 06/30/2020 16:27 Calibration ID: 6396

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-18152/1	20JUN30MCAL-17.d
Level 2	IC 410-18152/2	20JUN30MCAL-18.d
Level 3	IC 410-18152/3	20JUN30MCAL-19.d
Level 4	IC 410-18152/4	20JUN30MCAL-20.d
Level 5	ICISAV 410-18152/5	20JUN30MCAL-21.d
Level 6	IC 410-18152/6	20JUN30MCAL-22.d
Level 7	IC 410-18152/7	20JUN30MCAL-23.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanoic acid	30.1 -0.7	11.5	3.6	-1.4	5.1	-0.8	50 30	30	30	30	30	30
Perfluoropentanoic acid	31.9 -1.7	21.0	6.6	1.8	3.8	1.0	50 30	30	30	30	30	30
Perfluorobutanesulfonic acid	14.4 1.5	5.9	-1.5	-3.1	6.7	-5.3	50 30	30	30	30	30	30
4:2 Fluorotelomer sulfonic acid	10.6 -3.6	19.1	9.6	1.7	5.7	4.0	50 30	30	30	30	30	30
Perfluorohexanoic acid	10.9 -0.5	3.2	-3.9	-0.7	7.6	-1.9	50 30	30	30	30	30	30
Perfluoropentanesulfonic acid	19.7 1.3	15.9	-0.2	-1.1	10.3	-6.8	50 30	30	30	30	30	30
HFPODA	1.3 -2.4	-15.9	17.9	-9.4	13.9	0.2	50 30	30	30	30	30	30
Perfluoroheptanoic acid	13.3 -5.8	11.3	10.9	5.7	13.0	4.9	50 30	30	30	30	30	30
Perfluorohexanesulfonic acid	16.7 -0.4	3.4	6.9	-1.8	7.1	-2.1	50 30	30	30	30	30	30
DONA	8.1 -4.8	-0.3	11.2	4.9	13.3	3.0	50 30	30	30	30	30	30
6:2 Fluorotelomer sulfonic acid	3.5 -1.8	9.1	-0.7	-1.2	5.7	1.4	50 30	30	30	30	30	30
Perfluoroheptanesulfonic acid	19.8 -3.7	11.2	8.0	8.0	12.8	0.6	50 30	30	30	30	30	30
Perfluorooctanoic acid	27.6 -0.8	1.3	3.9	3.5	6.7	-1.9	50 30	30	30	30	30	30
Perfluorooctanesulfonic acid	27.1 -0.8	6.4	-0.5	-5.9	-1.8	3.2	50 30	30	30	30	30	30
Perfluorononanoic acid	10.9 0.2	8.3	4.6	-1.5	1.2	-0.9	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 18152

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 06/30/2020 15:33 Calibration End Date: 06/30/2020 16:27 Calibration ID: 6396

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
9Cl-PF3ONS	4.7 -2.5	1.0	0.8	-2.7	3.0	4.3	50 30	30	30	30	30	30
Perfluorononanesulfonic acid	10.6 -2.0	-0.6	1.7	-2.6	-1.4	4.9	50 30	30	30	30	30	30
Perfluorodecanoic acid	9.0 -0.7	5.7	1.4	-3.3	9.1	-1.9	50 30	30	30	30	30	30
8:2 Fluorotelomer sulfonic acid	9.8 -1.0	-1.0	-4.9	-3.2	11.3	-1.9	50 30	30	30	30	30	30
Perfluorooctanesulfonamide	9.4 -2.7	9.8	4.3	-0.9	4.5	3.5	50 30	30	30	30	30	30
NMeFOSAA	23.1 -2.7	8.8	6.1	1.1	12.9	-0.4	50 30	30	30	30	30	30
Perfluorodecanesulfonic acid	10.9 -1.4	-0.5	1.2	-3.6	0.4	3.1	50 30	30	30	30	30	30
Perfluoroundecanoic acid	9.4 -1.4	5.7	3.6	-4.6	1.3	2.8	50 30	30	30	30	30	30
NEtFOSAA	4.6 1.3	4.0	-2.8	-4.1	-1.0	-1.4	50 30	30	30	30	30	30
11Cl-PF3OUdS	14.7 -1.9	9.9	2.1	-4.4	1.9	3.5	50 30	30	30	30	30	30
Perfluorododecanoic acid	26.5 -3.6	11.0	11.0	-0.4	2.0	5.8	50 30	30	30	30	30	30
10:2 FTS	10.2 -0.5	-7.8	-3.4	-2.5	7.7	-1.5	50 30	30	30	30	30	30
NMeFOSE	7.5 -1.1	10.2	2.9	-4.1	2.8	1.5	50 30	30	30	30	30	30
NMeFOSA	6.0 -3.2	15.8	1.9	-3.9	10.1	2.6	50 30	30	30	30	30	30
Perfluorododecanesulfonic acid	10.1 -0.7	-0.2	-1.3	-5.5	1.8	1.6	50 30	30	30	30	30	30
Perfluorotridecanoic acid	17.9 -3.0	16.2	16.2	4.5	5.5	2.2	50 30	30	30	30	30	30
NEtFOSE	8.2 -1.2	7.1	0.4	-2.3	7.5	-0.3	50 30	30	30	30	30	30
NEtFOSA	-5.4 -4.6	5.6	2.0	-1.9	9.2	5.7	50 30	30	30	30	30	30
Perfluorotetradecanoic acid	24.0 -0.6	4.0	-0.5	1.4	3.3	-0.4	50 30	30	30	30	30	30
Perfluorohexadecanoic acid	35.1 -1.0	12.3	5.9	0.9	6.7	-1.3	50 30	30	30	30	30	30
Perfluorooctadecanoic acid	6.4 0.6	1.9	-0.3	1.3	0.3	-1.5	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 18152

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 06/30/2020 15:33 Calibration End Date: 06/30/2020 16:27 Calibration ID: 6396

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
13C4 PFBA	-0.8 -3.0	2.6	3.1	0.3	-0.7	-1.4	30 30	30	30	30	30	30
13C5 PFPeA	2.6 -6.9	-1.2	7.2	-1.3	0.8	-1.1	30 30	30	30	30	30	30
13C3 PFBS	-2.1 -8.0	-1.5	10.3	0.6	-2.9	3.6	30 30	30	30	30	30	30
M2-4:2 FTS	4.6 12.2	-8.1	-4.1	-1.7	-0.2	-2.8	30 30	30	30	30	30	30
13C5 PFHxA	-2.9 1.4	5.1	-0.9	-0.5	0.6	-2.7	30 30	30	30	30	30	30
13C3 HFPO-DA	0.2 4.6	11.9	-15.7	9.0	-9.9	-0.1	30 30	30	30	30	30	30
13C4 PFHpA	2.4 6.4	2.4	-1.2	-4.0	-3.9	-2.1	30 30	30	30	30	30	30
13C3 PFHxS	-1.7 -0.2	2.5	0.0	-0.8	-1.5	1.8	30 30	30	30	30	30	30
M2-6:2 FTS	17.8 -12.2	2.1	2.0	2.8	-2.0	-10.6	30 30	30	30	30	30	30
13C8 PFOA	3.8 -5.7	8.1	4.1	-3.2	-3.6	-3.6	30 30	30	30	30	30	30
13C8 PFOS	-0.1 -3.1	4.7	3.3	-1.5	0.7	-4.0	30 30	30	30	30	30	30
13C9 PFNA	5.3 -6.0	4.5	3.6	-3.7	0.3	-4.1	30 30	30	30	30	30	30
13C6 PFDA	1.8 -7.0	5.4	6.4	3.2	-4.3	-5.5	30 30	30	30	30	30	30
M2-8:2 FTS	7.1 -13.1	7.6	11.0	1.0	-4.7	-8.9	30 30	30	30	30	30	30
13C8 FOSA	3.0 -5.7	3.4	2.6	-0.9	3.4	-5.8	30 30	30	30	30	30	30
d3-NMeFOSAA	-0.8 1.3	0.6	-1.6	-0.1	-3.1	3.7	30 30	30	30	30	30	30
13C7 PFUnA	0.8 -10.7	4.1	3.6	4.8	3.1	-5.6	30 30	30	30	30	30	30
d5-NEtFOSAA	2.3 -8.9	2.1	6.0	-1.5	4.8	-4.8	30 30	30	30	30	30	30
13C2-PFDoDA	-4.4 -2.5	2.6	1.1	2.9	6.0	-5.8	30 30	30	30	30	30	30
d7-N-MeFOSE-M	0.3 5.5	-1.3	-2.3	-4.2	1.9	0.1	30 30	30	30	30	30	30
d3-NMePFOSA	-6.3 8.5	3.0	-2.5	-3.5	2.4	-1.5	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1 Analy Batch No.: 18152

SDG No.:

Instrument ID: 30731 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 06/30/2020 15:33 Calibration End Date: 06/30/2020 16:27 Calibration ID: 6396

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
d9-N-EtFOSE-M	-0.7 5.5	1.2	-0.4	-3.1	-1.4	-1.1	30 30	30	30	30	30	30
d5-NEtPFOSA	0.2 7.5	3.1	-0.1	-5.3	-1.8	-3.6	30 30	30	30	30	30	30
13C2 PFTeDA	-7.1 -2.6	5.1	2.5	-0.3	3.0	-0.7	30 30	30	30	30	30	30

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: ICV 410-19789/9 Calibration Date: 07/07/2020 07:22

Instrument ID: 27632 Calib Start Date: 07/07/2020 06:09

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/07/2020 07:04

Lab File ID: 20JUL07MCAL-09.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8850		2.17	2.00	8.6	30.0
Perfluoropentanoic acid	LID1F		0.9493		2.17	2.00	8.5	30.0
Perfluorobutanesulfonic acid	LID1F		0.999		1.79	1.77	0.9	30.0
Perfluorohexanoic acid	LID1F		0.8745		2.29	2.00	14.7	30.0
HFPODA	LID1F		2.450		1.88	2.00	-5.9	30.0
Perfluoroheptanoic acid	LID1F		1.247		2.13	2.00	6.6	30.0
Perfluorohexanesulfonic acid	LID1F		0.9557		1.82	1.89	-3.7	30.0
DONA	LID1F		1.395		1.89	1.88	0.6	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9344		1.97	1.90	3.3	30.0
Perfluorooctanoic acid	LID1F		0.6850		2.00	2.00	0.1	30.0
Perfluorooctanesulfonic acid	LID1F		0.9791		1.80	1.91	-5.7	30.0
Perfluorononanoic acid	LID1F		0.9616		2.24	2.00	12.1	30.0
9Cl-PF3ONS	LID1F		2.352		1.87	1.86	0.4	30.0
Perfluorodecanoic acid	LID1F		0.5752		2.17	2.00	8.7	30.0
NMeFOSAA	LID1F		1.114		2.33	2.00	16.5	30.0
Perfluorodecanesulfonic acid	LID1F		0.5991		2.22	1.93	15.3	30.0
Perfluoroundecanoic acid	LID1F		0.5122		2.06	2.00	3.0	30.0
NEtFOSAA	LID1F		0.9659		1.93	2.00	-3.4	30.0
11Cl-PF3OUdS	LID1F		1.757		1.85	1.88	-1.9	30.0
Perfluorododecanoic acid	LID1F		0.5491		2.01	2.00	0.6	30.0
Perfluorotridecanoic acid	LID1F		0.8483		2.11	2.00	5.3	30.0
Perfluorotetradecanoic acid	LID1F		0.9385		2.07	2.00	3.5	30.0
13C4 PFBA	Ave	1.089	1.004		9.22	10.0	-7.8	30.0
13C5 PFPeA	Ave	0.8337	0.8072		9.68	10.0	-3.2	30.0
13C3 PFBS	Ave	0.4452	0.4012		8.44	9.36	-9.9	30.0
M2-4:2 FTS	Ave	0.1095	0.1037		8.84	9.34	-5.4	30.0
13C5 PFHxA	Ave	1.502	1.437		9.56	10.0	-4.4	30.0
13C3 HFPO-DA	Ave	0.2584	0.2453		9.49	10.0	-5.1	30.0
13C4 PFHpA	Ave	1.061	1.028		9.69	10.0	-3.1	30.0
13C3 PFHxS	Ave	0.4671	0.4583		9.28	9.46	-1.9	30.0
M2-6:2 FTS	Ave	0.0785	0.0817		9.89	9.50	4.1	30.0
13C8 PFOA	Ave	1.400	1.407		10.0	10.0	0.4	30.0
13C8 PFOS	Ave	0.9840	0.8896		8.65	9.57	-9.6	30.0
13C9 PFNA	Ave	2.093	1.860		8.88	10.0	-11.2	30.0
13C6 PFDA	Ave	1.603	1.374		8.57	10.0	-14.3	30.0
M2-8:2 FTS	Ave	0.1100	0.0990		8.63	9.58	-10.0	30.0
13C8 FOSA	Ave	1.220	1.171		9.60	10.0	-4.0	30.0
d3-NMeFOSAA	Ave	0.4287	0.3965		9.25	10.0	-7.5	30.0
13C7 PFUnA	Ave	1.619	1.484		9.17	10.0	-8.3	30.0
d5-NEtFOSAA	Ave	0.3137	0.3335		10.6	10.0	6.3	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: ICV 410-19789/9 Calibration Date: 07/07/2020 07:22

Instrument ID: 27632 Calib Start Date: 07/07/2020 06:09

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/07/2020 07:04

Lab File ID: 20JUL07MCAL-09.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C2-PFDoDA	Ave	1.913	1.767		9.24	10.0	-7.6	30.0
d7-N-MeFOSE-M	Ave	0.2303	0.2122		9.21	10.0	-7.9	30.0
d3-NMePFOSA	Ave	0.1161	0.1093		9.41	10.0	-5.9	30.0
d9-N-EtFOSE-M	Ave	0.2447	0.2373		9.69	10.0	-3.1	30.0
d5-NEtPFOSA	Ave	0.0949	0.0878		9.26	10.0	-7.4	30.0
13C2 PFTeDA	Ave	1.807	1.677		9.28	10.0	-7.2	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: CCV 410-21216/13 Calibration Date: 07/10/2020 12:07

Instrument ID: 27632 Calib Start Date: 07/07/2020 06:09

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/07/2020 07:04

Lab File ID: 20JUL10-21.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8263		8.11	8.00	1.4	30.0
Perfluoropentanoic acid	LID1F		0.9282		8.49	8.00	6.1	30.0
Perfluorobutanesulfonic acid	LID1F		0.9532		6.82	7.08	-3.6	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		1.899		8.41	7.47	12.5	30.0
Perfluorohexanoic acid	LID1F		0.7243		7.60	8.00	-5.0	30.0
Perfluoropentanesulfonic acid	LID1F		0.4609		7.93	7.50	5.7	30.0
HFPODA	LID1F		3.009		9.25	8.00	15.6	30.0
Perfluoroheptanoic acid	LID1F		1.224		8.37	8.00	4.6	30.0
Perfluorohexanesulfonic acid	LID1F		0.9230		6.78	7.30	-7.0	30.0
DONA	LID1F		1.501		8.18	7.56	8.2	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		1.599		7.35	7.58	-3.1	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8273		6.97	7.62	-8.5	30.0
Perfluorooctanoic acid	LID1F		0.7124		8.33	8.00	4.1	30.0
Perfluorooctanesulfonic acid	LID1F		0.9844		7.02	7.40	-5.2	30.0
Perfluorononanoic acid	LID1F		0.8147		7.60	8.00	-5.0	30.0
9Cl-PF3ONS	LID1F		2.171		6.89	7.44	-7.4	30.0
Perfluorononanesulfonic acid	LID1F		0.6894		7.68	7.68	0.0	30.0
Perfluorodecanoic acid	LID1F		0.5279		7.98	8.00	-0.3	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		1.690		8.55	7.66	11.5	30.0
Perfluorooctanesulfonamide	LID1F		0.9879		7.98	8.00	-0.3	30.0
NMeFOSAA	LID1F		0.9703		8.12	8.00	1.5	30.0
Perfluorodecanesulfonic acid	LID1F		0.5077		7.53	7.71	-2.3	30.0
Perfluoroundecanoic acid	LID1F		0.4849		7.80	8.00	-2.5	30.0
NEtFOSAA	LID1F		0.9739		7.80	8.00	-2.6	30.0
11Cl-PF3OUdS	LID1F		1.750		7.27	7.44	-2.3	30.0
Perfluorododecanoic acid	LID1F		0.5525		8.10	8.00	1.2	30.0
10:2 FTS	LID1F		2.392		8.54	7.71	10.7	30.0
NMeFOSE	LID1F		0.8391		7.11	8.00	-11.1	30.0
NMeFOSA	LID1F		0.997		7.94	8.00	-0.8	30.0
Perfluorododecanesulfonic acid	LID1F		0.2579		7.50	7.74	-3.2	30.0
NEtFOSE	LID1F		0.6814		7.17	8.00	-10.3	30.0
Perfluorotridecanoic acid	LID1F		0.7697		7.64	8.00	-4.4	30.0
NEtFOSA	LID1F		0.9791		7.53	8.00	-5.9	30.0
Perfluorotetradecanoic acid	LID1F		0.8628		7.61	8.00	-4.9	30.0
Perfluorohexadecanoic acid	LID1F		0.4523		8.33	8.00	4.2	30.0
Perfluorooctadecanoic acid	LID1F		0.4084		7.70	8.00	-3.8	30.0
13C4 PFBA	Ave	1.089	1.085		9.96	10.0	-0.4	30.0
13C5 PFPeA	Ave	0.8337	0.9008		10.8	10.0	8.0	30.0

FORM VII EPA 537 (Mod)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: CCV 410-21216/13 Calibration Date: 07/10/2020 12:07

Instrument ID: 27632 Calib Start Date: 07/07/2020 06:09

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/07/2020 07:04

Lab File ID: 20JUL10-21.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.4452	0.4007		8.42	9.36	-10.0	30.0
M2-4:2 FTS	Ave	0.1095	0.1013		8.63	9.34	-7.6	30.0
13C5 PFHxA	Ave	1.502	1.536		10.2	10.0	2.2	30.0
13C3 HFPO-DA	Ave	0.2584	0.2014		7.79	10.0	-22.1	30.0
13C3 PFHxS	Ave	0.4671	0.4785		9.69	9.46	2.4	30.0
13C4 PFHpA	Ave	1.061	1.070		10.1	10.0	0.8	30.0
M2-6:2 FTS	Ave	0.0785	0.0790		9.56	9.50	0.6	30.0
13C8 PFOA	Ave	1.400	1.393		9.95	10.0	-0.5	30.0
13C8 PFOS	Ave	0.9840	0.9818		9.54	9.57	-0.2	30.0
13C9 PFNA	Ave	2.093	2.144		10.2	10.0	2.4	30.0
13C6 PFDA	Ave	1.603	1.638		10.2	10.0	2.2	30.0
M2-8:2 FTS	Ave	0.1100	0.1059		9.22	9.58	-3.7	30.0
13C8 FOSA	Ave	1.220	1.332		10.9	10.0	9.2	30.0
d3-NMeFOSAA	Ave	0.4287	0.4879		11.4	10.0	13.8	30.0
13C7 PFUnA	Ave	1.619	1.702		10.5	10.0	5.2	30.0
d5-NEtFOSAA	Ave	0.3137	0.3786		12.1	10.0	20.7	30.0
13C2-PFDoDA	Ave	1.913	2.067		10.8	10.0	8.0	30.0
d7-N-MeFOSE-M	Ave	0.2303	0.2710		11.8	10.0	17.7	30.0
d3-NMePFOSA	Ave	0.1161	0.1244		10.7	10.0	7.1	30.0
d9-N-EtFOSE-M	Ave	0.2447	0.2721		11.1	10.0	11.2	30.0
d5-NEtPFOSA	Ave	0.0949	0.1107		11.7	10.0	16.7	30.0
13C2 PFTeDA	Ave	1.807	1.915		10.6	10.0	6.0	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: ICV 410-21880/9 Calibration Date: 07/13/2020 14:13

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL13MCAL-17.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8892		2.19	2.00	9.4	30.0
Perfluoropentanoic acid	LID1F		0.9489		2.12	2.00	5.9	30.0
Perfluorobutanesulfonic acid	LID1F		0.9843		1.73	1.77	-2.5	30.0
Perfluorohexanoic acid	LID1F		0.7442		2.03	2.00	1.6	30.0
HFPODA	LID1F		1.981		1.75	2.00	-12.5	30.0
Perfluoroheptanoic acid	LID1F		1.196		2.10	2.00	5.1	30.0
Perfluorohexanesulfonic acid	LID1F		0.9822		1.88	1.89	-0.4	30.0
DONA	LID1F		1.349		1.94	1.88	3.0	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8982		1.95	1.90	2.4	30.0
Perfluorooctanoic acid	LID1F		0.6907		1.98	2.00	-1.1	30.0
Perfluorooctanesulfonic acid	LID1F		0.9295		1.73	1.91	-9.7	30.0
Perfluorononanoic acid	LID1F		0.7876		1.86	2.00	-7.0	30.0
9Cl-PF3ONS	LID1F		2.105		1.74	1.86	-6.4	30.0
Perfluorodecanoic acid	LID1F		0.5408		1.94	2.00	-3.2	30.0
NMeFOSAA	LID1F		1.087		2.28	2.00	14.0	30.0
Perfluorodecanesulfonic acid	LID1F		0.5334		1.99	1.93	3.6	30.0
Perfluoroundecanoic acid	LID1F		0.5127		2.10	2.00	5.1	30.0
NEtFOSAA	LID1F		0.9705		2.04	2.00	2.2	30.0
11Cl-PF3OUdS	LID1F		1.579		1.65	1.88	-12.3	30.0
Perfluorododecanoic acid	LID1F		0.6358		2.32	2.00	15.8	30.0
Perfluorotridecanoic acid	LID1F		0.8820		2.41	2.00	20.7	30.0
Perfluorotetradecanoic acid	LID1F		0.9386		2.11	2.00	5.6	30.0
13C4 PFBA	Ave	1.110	1.011		9.10	10.0	-9.0	30.0
13C5 PFPeA	Ave	0.8798	0.8057		9.16	10.0	-8.4	30.0
13C3 PFBS	Ave	0.4382	0.3957		8.45	9.36	-9.7	30.0
M2-4:2 FTS	Ave	0.0956	0.0886		8.65	9.34	-7.3	30.0
13C5 PFHxA	Ave	1.443	1.356		9.40	10.0	-6.0	30.0
13C3 HFPO-DA	Ave	0.2830	0.2916		10.3	10.0	3.1	30.0
13C3 PFHxS	Ave	0.4556	0.4280		8.89	9.46	-6.1	30.0
13C4 PFHpA	Ave	1.058	0.9544		9.02	10.0	-9.8	30.0
M2-6:2 FTS	Ave	0.0785	0.0775		9.38	9.50	-1.3	30.0
13C8 PFOA	Ave	1.373	1.287		9.37	10.0	-6.3	30.0
13C8 PFOS	Ave	1.014	0.9808		9.25	9.57	-3.3	30.0
13C9 PFNA	Ave	2.195	2.189		9.98	10.0	-0.2	30.0
13C6 PFDA	Ave	1.629	1.499		9.20	10.0	-8.0	30.0
M2-8:2 FTS	Ave	0.1121	0.1068		9.13	9.58	-4.7	30.0
13C8 FOSA	Ave	1.193	1.082		9.07	10.0	-9.3	30.0
d3-NMeFOSAA	Ave	0.3112	0.2701		8.68	10.0	-13.2	30.0
13C7 PFUnA	Ave	1.490	1.399		9.39	10.0	-6.1	30.0
d5-NEtFOSAA	Ave	0.2452	0.2427		9.90	10.0	-1.0	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: ICV 410-21880/9 Calibration Date: 07/13/2020 14:13

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL13MCAL-17.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C2-PFDoDA	Ave	1.816	1.514		8.33	10.0	-16.7	30.0
d7-N-MeFOSE-M	Ave	0.2323	0.2172		9.35	10.0	-6.5	30.0
d3-NMePFOSA	Ave	0.1221	0.1059		8.68	10.0	-13.2	30.0
d9-N-EtFOSE-M	Ave	0.2364	0.2077		8.79	10.0	-12.1	30.0
d5-NEtPFOSA	Ave	0.0999	0.0904		9.05	10.0	-9.5	30.0
13C2 PFTeDA	Ave	1.429	1.288		9.02	10.0	-9.8	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: CCV 410-21920/102 Calibration Date: 07/14/2020 05:28

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL13-111.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8187		8.06	8.00	0.7	30.0
Perfluoropentanoic acid	LID1F		0.8351		7.46	8.00	-6.8	30.0
Perfluorobutanesulfonic acid	LID1F		0.9718		6.82	7.08	-3.7	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		1.803		8.06	7.47	7.8	30.0
Perfluorohexanoic acid	LID1F		0.7553		8.25	8.00	3.1	30.0
Perfluoropentanesulfonic acid	LID1F		0.4404		7.13	7.50	-5.0	30.0
HFPODA	LID1F		2.065		7.29	8.00	-8.8	30.0
Perfluoroheptanoic acid	LID1F		1.286		9.04	8.00	13.0	30.0
Perfluorohexanesulfonic acid	LID1F		1.012		7.49	7.30	2.6	30.0
DONA	LID1F		1.441		8.32	7.56	10.1	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		1.601		7.64	7.58	0.8	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8996		7.81	7.62	2.6	30.0
Perfluorooctanoic acid	LID1F		0.6674		7.65	8.00	-4.4	30.0
Perfluorooctanesulfonic acid	LID1F		0.9609		6.92	7.40	-6.6	30.0
Perfluorononanoic acid	LID1F		0.8555		8.09	8.00	1.1	30.0
9Cl-PF3ONS	LID1F		2.121		7.01	7.44	-5.7	30.0
Perfluorononanesulfonic acid	LID1F		0.6447		7.60	7.68	-1.0	30.0
Perfluorodecanoic acid	LID1F		0.5004		7.17	8.00	-10.4	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		1.590		7.66	7.66	-0.0	30.0
Perfluorooctanesulfonamide	LID1F		0.9597		7.98	8.00	-0.2	30.0
NMeFOSAA	LID1F		0.8895		7.46	8.00	-6.7	30.0
Perfluorodecanesulfonic acid	LID1F		0.4706		7.05	7.71	-8.6	30.0
Perfluoroundecanoic acid	LID1F		0.5240		8.59	8.00	7.4	30.0
NEtFOSAA	LID1F		1.008		8.49	8.00	6.2	30.0
11Cl-PF3OUdS	LID1F		1.681		6.94	7.44	-6.7	30.0
Perfluorododecanoic acid	LID1F		0.5388		7.85	8.00	-1.9	30.0
10:2 FTS	LID1F		1.981		8.30	7.71	7.7	30.0
NMeFOSE	LID1F		0.8994		7.68	8.00	-4.0	30.0
NMeFOSA	LID1F		1.012		7.69	8.00	-3.9	30.0
Perfluorododecanesulfonic acid	LID1F		0.2422		7.41	7.74	-4.3	30.0
NEtFOSE	LID1F		0.7507		8.02	8.00	0.3	30.0
Perfluorotridecanoic acid	LID1F		0.7361		8.06	8.00	0.8	30.0
NEtFOSA	LID1F		1.046		8.50	8.00	6.3	30.0
Perfluorotetradecanoic acid	LID1F		0.9137		8.23	8.00	2.8	30.0
Perfluorohexadecanoic acid	LID1F		0.4628		7.17	8.00	-10.4	30.0
Perfluorooctadecanoic acid	LID1F		0.4251		7.04	8.00	-12.0	30.0
13C4 PFBA	Ave	1.110	1.100		9.91	10.0	-0.9	30.0
13C5 PFPeA	Ave	0.8798	0.8940		10.2	10.0	1.6	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: CCV 410-21920/102 Calibration Date: 07/14/2020 05:28

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL13-111.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.4382	0.4305		9.20	9.36	-1.8	30.0
M2-4:2 FTS	Ave	0.0956	0.0937		9.15	9.34	-2.0	30.0
13C5 PFHxA	Ave	1.443	1.473		10.2	10.0	2.1	30.0
13C3 HFPO-DA	Ave	0.2830	0.2970		10.5	10.0	5.0	30.0
13C4 PFHpA	Ave	1.058	1.008		9.53	10.0	-4.7	30.0
13C3 PFHxS	Ave	0.4556	0.4409		9.15	9.46	-3.2	30.0
M2-6:2 FTS	Ave	0.0785	0.0783		9.48	9.50	-0.2	30.0
13C8 PFOA	Ave	1.373	1.397		10.2	10.0	1.7	30.0
13C8 PFOS	Ave	1.014	0.9619		9.07	9.57	-5.1	30.0
13C9 PFNA	Ave	2.195	2.038		9.29	10.0	-7.1	30.0
13C6 PFDA	Ave	1.629	1.565		9.60	10.0	-4.0	30.0
M2-8:2 FTS	Ave	0.1121	0.1002		8.56	9.58	-10.6	30.0
13C8 FOSA	Ave	1.193	1.200		10.1	10.0	0.6	30.0
d3-NMeFOSAA	Ave	0.3112	0.3334		10.7	10.0	7.1	30.0
13C7 PFUnA	Ave	1.490	1.396		9.37	10.0	-6.3	30.0
d5-NEtFOSAA	Ave	0.2452	0.2311		9.42	10.0	-5.8	30.0
13C2-PFDoDA	Ave	1.816	1.792		9.86	10.0	-1.4	30.0
d7-N-MeFOSE-M	Ave	0.2323	0.2167		9.33	10.0	-6.7	30.0
d3-NMePFOSA	Ave	0.1221	0.1108		9.08	10.0	-9.2	30.0
d9-N-EtFOSE-M	Ave	0.2364	0.2260		9.56	10.0	-4.4	30.0
d5-NEtPFOSA	Ave	0.0999	0.0918		9.19	10.0	-8.1	30.0
13C2 PFTeDA	Ave	1.429	1.563		10.9	10.0	9.4	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: CCV 410-21920/113 Calibration Date: 07/14/2020 07:08

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL13-122.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8704		21.4	20.0	7.1	30.0
Perfluoropentanoic acid	LID1F		0.9096		20.3	20.0	1.6	30.0
Perfluorobutanesulfonic acid	LID1F		1.020		17.9	17.7	1.0	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		1.688		18.9	18.7	1.0	30.0
Perfluorohexanoic acid	LID1F		0.8011		21.9	20.0	9.4	30.0
Perfluoropentanesulfonic acid	LID1F		0.4909		19.9	18.8	5.9	30.0
HFPODA	LID1F		2.753		24.3	20.0	21.6	30.0
Perfluoroheptanoic acid	LID1F		1.281		22.5	20.0	12.5	30.0
Perfluorohexanesulfonic acid	LID1F		0.9898		18.3	18.2	0.4	30.0
DONA	LID1F		1.544		22.3	18.9	17.9	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		1.636		19.5	19.0	3.1	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8807		19.1	19.0	0.4	30.0
Perfluorooctanoic acid	LID1F		0.7229		20.7	20.0	3.6	30.0
Perfluorooctanesulfonic acid	LID1F		0.9940		17.9	18.5	-3.4	30.0
Perfluorononanoic acid	LID1F		0.8784		20.8	20.0	3.8	30.0
9Cl-PF3ONS	LID1F		2.265		18.7	18.6	0.7	30.0
Perfluorononanesulfonic acid	LID1F		0.6562		19.3	19.2	0.7	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		1.574		19.0	19.2	-1.1	30.0
Perfluorodecanoic acid	LID1F		0.5689		20.4	20.0	1.8	30.0
Perfluorooctanesulfonamide	LID1F		1.084		22.5	20.0	12.7	30.0
NMeFOSAA	LID1F		0.9570		20.1	20.0	0.4	30.0
Perfluorodecanesulfonic acid	LID1F		0.5055		18.9	19.3	-1.8	30.0
Perfluoroundecanoic acid	LID1F		0.5658		23.2	20.0	16.0	30.0
NEtFOSAA	LID1F		1.012		21.3	20.0	6.6	30.0
11Cl-PF3OUdS	LID1F		1.827		18.9	18.6	1.4	30.0
Perfluorododecanoic acid	LID1F		0.5825		21.2	20.0	6.1	30.0
10:2 FTS	LID1F		1.956		20.5	19.3	6.3	30.0
NMeFOSA	LID1F		1.028		19.5	20.0	-2.5	30.0
NMeFOSE	LID1F		0.9734		20.8	20.0	3.8	30.0
Perfluorododecanesulfonic acid	LID1F		0.2494		19.1	19.4	-1.5	30.0
NEtFOSE	LID1F		0.7647		20.4	20.0	2.1	30.0
Perfluorotridecanoic acid	LID1F		0.8144		22.3	20.0	11.5	30.0
NEtFOSA	LID1F		1.058		21.5	20.0	7.5	30.0
Perfluorotetradecanoic acid	LID1F		0.9552		21.5	20.0	7.5	30.0
Perfluorohexadecanoic acid	LID1F		0.5122		19.8	20.0	-0.8	30.0
Perfluorooctadecanoic acid	LID1F		0.4463		18.5	20.0	-7.6	30.0
13C4 PFBA	Ave	1.110	1.068		9.62	10.0	-3.8	30.0
13C5 PFPeA	Ave	0.8798	0.8648		9.83	10.0	-1.7	30.0

FORM VII EPA 537 (Mod)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: CCV 410-21920/113 Calibration Date: 07/14/2020 07:08

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL13-122.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.4382	0.4182		8.93	9.36	-4.6	30.0
M2-4:2 FTS	Ave	0.0956	0.0978		9.55	9.34	2.3	30.0
13C5 PFHxA	Ave	1.443	1.484		10.3	10.0	2.8	30.0
13C3 HFPO-DA	Ave	0.2830	0.2515		8.89	10.0	-11.1	30.0
13C4 PFHpA	Ave	1.058	1.072		10.1	10.0	1.4	30.0
13C3 PFHxS	Ave	0.4556	0.4687		9.73	9.46	2.9	30.0
M2-6:2 FTS	Ave	0.0785	0.0743		9.00	9.50	-5.3	30.0
13C8 PFOA	Ave	1.373	1.346		9.80	10.0	-2.0	30.0
13C8 PFOS	Ave	1.014	1.040		9.81	9.57	2.6	30.0
13C9 PFNA	Ave	2.195	2.227		10.1	10.0	1.5	30.0
13C6 PFDA	Ave	1.629	1.436		8.81	10.0	-11.9	30.0
M2-8:2 FTS	Ave	0.1121	0.0979		8.36	9.58	-12.7	30.0
13C8 FOSA	Ave	1.193	1.158		9.71	10.0	-2.9	30.0
d3-NMeFOSAA	Ave	0.3112	0.3313		10.6	10.0	6.4	30.0
13C7 PFUnA	Ave	1.490	1.410		9.46	10.0	-5.4	30.0
d5-NEtFOSAA	Ave	0.2452	0.2507		10.2	10.0	2.2	30.0
13C2-PFDoDA	Ave	1.816	1.742		9.59	10.0	-4.1	30.0
d7-N-MeFOSE-M	Ave	0.2323	0.2260		9.73	10.0	-2.7	30.0
d3-NMePFOSA	Ave	0.1221	0.1148		9.40	10.0	-6.0	30.0
d9-N-EtFOSE-M	Ave	0.2364	0.2304		9.74	10.0	-2.6	30.0
d5-NEtPFOSA	Ave	0.0999	0.0960		9.61	10.0	-3.9	30.0
13C2 PFTeDA	Ave	1.429	1.577		11.0	10.0	10.4	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: ICV 410-18152/9 Calibration Date: 06/30/2020 16:45

Instrument ID: 30731 Calib Start Date: 06/30/2020 15:33

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 06/30/2020 16:27

Lab File ID: 20JUN30MCAL-25.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8940		2.12	2.00	6.2	30.0
Perfluoropentanoic acid	LID1F		1.013		2.10	2.00	5.0	30.0
Perfluorobutanesulfonic acid	LID1F		0.9651		1.75	1.77	-1.3	30.0
Perfluorohexanoic acid	LID1F		0.8281		2.05	2.00	2.6	30.0
HFPODA	LID1F		1.867		1.90	2.00	-4.8	30.0
Perfluoroheptanoic acid	LID1F		1.140		2.17	2.00	8.5	30.0
Perfluorohexanesulfonic acid	LID1F		0.9875		1.90	1.89	0.7	30.0
DONA	LID1F		1.645		1.81	1.88	-4.2	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9220		1.95	1.90	2.5	30.0
Perfluorooctanoic acid	LID1F		0.8119		1.93	2.00	-3.4	30.0
Perfluorooctanesulfonic acid	LID1F		0.9250		1.74	1.91	-9.1	30.0
Perfluorononanoic acid	LID1F		0.9244		2.12	2.00	5.9	30.0
9Cl-PF3ONS	LID1F		1.699		1.90	1.86	1.9	30.0
Perfluorodecanoic acid	LID1F		0.8136		2.07	2.00	3.3	30.0
NMeFOSAA	LID1F		1.003		2.04	2.00	1.8	30.0
Perfluorodecanesulfonic acid	LID1F		1.058		2.03	1.93	5.4	30.0
Perfluoroundecanoic acid	LID1F		0.7568		2.05	2.00	2.3	30.0
NEtFOSAA	LID1F		0.9869		1.99	2.00	-0.3	30.0
11Cl-PF3OUdS	LID1F		1.404		1.83	1.88	-2.9	30.0
Perfluorododecanoic acid	LID1F		0.8452		1.97	2.00	-1.3	30.0
Perfluorotridecanoic acid	LID1F		0.8334		2.12	2.00	5.9	30.0
Perfluorotetradecanoic acid	LID1F		0.9233		2.07	2.00	3.5	30.0
13C4 PFBA	Ave	1.087	1.001		9.21	10.0	-7.9	30.0
13C5 PFPeA	Ave	1.028	0.9540		9.28	10.0	-7.2	30.0
13C3 PFBS	Ave	1.241	1.130		8.52	9.36	-8.9	30.0
M2-4:2 FTS	Ave	0.0577	0.0526		8.51	9.34	-8.9	30.0
13C5 PFHxA	Ave	0.7443	0.6777		9.11	10.0	-8.9	30.0
13C3 HFPO-DA	Ave	0.0987	0.0884		8.95	10.0	-10.5	30.0
13C3 PFHxS	Ave	0.6454	0.5998		8.79	9.46	-7.1	30.0
13C4 PFHpA	Ave	0.7055	0.6297		8.93	10.0	-10.7	30.0
M2-6:2 FTS	Ave	0.0289	0.0272		8.94	9.50	-5.9	30.0
13C8 PFOA	Ave	0.9872	0.9049		9.17	10.0	-8.3	30.0
13C8 PFOS	Ave	1.023	0.8999		8.41	9.57	-12.1	30.0
13C9 PFNA	Ave	1.134	1.027		9.06	10.0	-9.4	30.0
13C6 PFDA	Ave	1.158	1.089		9.41	10.0	-5.9	30.0
M2-8:2 FTS	Ave	0.0216	0.0206		9.14	9.58	-4.6	30.0
13C8 FOSA	Ave	1.410	1.327		9.41	10.0	-5.9	30.0
d3-NMeFOSAA	Ave	0.2792	0.2587		9.27	10.0	-7.3	30.0
13C7 PFUnA	Ave	1.393	1.290		9.26	10.0	-7.4	30.0
d5-NEtFOSAA	Ave	0.2230	0.2128		9.54	10.0	-4.6	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: ICV 410-18152/9 Calibration Date: 06/30/2020 16:45

Instrument ID: 30731 Calib Start Date: 06/30/2020 15:33

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 06/30/2020 16:27

Lab File ID: 20JUN30MCAL-25.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C2-PFDoDA	Ave	1.265	1.217		9.62	10.0	-3.8	30.0
d7-N-MeFOSE-M	Ave	0.2409	0.2124		8.82	10.0	-11.8	30.0
d3-NMePFOSA	Ave	0.1341	0.1249		9.32	10.0	-6.8	30.0
d9-N-EtFOSE-M	Ave	0.2395	0.2187		9.13	10.0	-8.7	30.0
d5-NEtPFOSA	Ave	0.1388	0.1300		9.37	10.0	-6.3	30.0
13C2 PFTeDA	Ave	0.9788	0.8720		8.91	10.0	-10.9	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: CCV 410-19162/14 Calibration Date: 07/04/2020 11:15

Instrument ID: 30731 Calib Start Date: 06/30/2020 15:33

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 06/30/2020 16:27

Lab File ID: 20JUL04-18.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8888		2.11	2.00	5.6	30.0
Perfluoropentanoic acid	LID1F		0.9662		2.00	2.00	0.2	30.0
Perfluorobutanesulfonic acid	LID1F		0.9592		1.74	1.77	-1.9	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.157		2.12	1.87	13.7	30.0
Perfluorohexanoic acid	LID1F		0.7916		1.96	2.00	-1.9	30.0
Perfluoropentanesulfonic acid	LID1F		0.8448		2.07	1.88	10.6	30.0
HFPODA	LID1F		2.105		2.15	2.00	7.4	30.0
Perfluoroheptanoic acid	LID1F		1.216		2.31	2.00	15.7	30.0
Perfluorohexanesulfonic acid	LID1F		0.9541		1.77	1.82	-2.7	30.0
DONA	LID1F		1.856		2.04	1.89	8.1	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.423		1.88	1.90	-0.7	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9105		1.93	1.90	1.2	30.0
Perfluorooctanoic acid	LID1F		0.8736		2.08	2.00	4.0	30.0
Perfluorooctanesulfonic acid	LID1F		1.024		1.86	1.85	0.7	30.0
Perfluorononanoic acid	LID1F		0.8665		1.98	2.00	-0.8	30.0
9Cl-PF3ONS	LID1F		1.777		1.98	1.86	6.5	30.0
Perfluorononanesulfonic acid	LID1F		0.9931		1.89	1.92	-1.7	30.0
Perfluorodecanoic acid	LID1F		0.7837		1.99	2.00	-0.5	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		7.881		2.07	1.92	8.2	30.0
Perfluorooctanesulfonamide	LID1F		0.9918		2.09	2.00	4.5	30.0
NMeFOSAA	LID1F		1.054		2.14	2.00	7.0	30.0
Perfluorodecanesulfonic acid	LID1F		0.9097		1.75	1.93	-9.4	30.0
Perfluoroundecanoic acid	LID1F		0.8029		2.17	2.00	8.5	30.0
NEtFOSAA	LID1F		0.9681		1.96	2.00	-2.2	30.0
11Cl-PF3OUdS	LID1F		1.267		1.63	1.86	-12.3	30.0
Perfluorododecanoic acid	LID1F		0.8497		1.98	2.00	-0.8	30.0
10:2 FTS	LID1F		8.552		2.01	1.93	4.1	30.0
NMeFOSE	LID1F		0.998		1.97	2.00	-1.7	30.0
NMeFOSA	LID1F		1.046		2.09	2.00	4.3	30.0
Perfluorododecanesulfonic acid	LID1F		0.6083		1.68	1.94	-13.3	30.0
Perfluorotridecanoic acid	LID1F		0.7523		1.91	2.00	-4.4	30.0
NEtFOSE	LID1F		1.108		2.05	2.00	2.6	30.0
NEtFOSA	LID1F		1.007		2.04	2.00	1.9	30.0
Perfluorotetradecanoic acid	LID1F		0.9382		2.10	2.00	5.1	30.0
Perfluorohexadecanoic acid	LID1F		0.3312		1.80	2.00	-10.0	30.0
Perfluorooctadecanoic acid	LID1F		0.1560		1.61	2.00	-19.5	30.0
13C4 PFBA	Ave	1.087	1.121		10.3	10.0	3.1	30.0
13C5 PFPeA	Ave	1.028	1.014		9.87	10.0	-1.3	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: CCV 410-19162/14 Calibration Date: 07/04/2020 11:15

Instrument ID: 30731 Calib Start Date: 06/30/2020 15:33

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 06/30/2020 16:27

Lab File ID: 20JUL04-18.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	1.241	1.258		9.49	9.36	1.4	30.0
M2-4:2 FTS	Ave	0.0577	0.0519		8.39	9.34	-10.1	30.0
13C5 PFHxA	Ave	0.7443	0.7301		9.81	10.0	-1.9	30.0
13C3 HFPO-DA	Ave	0.0987	0.0856		8.67	10.0	-13.3	30.0
13C3 PFHxS	Ave	0.6454	0.7077		10.4	9.46	9.7	30.0
13C4 PFHpA	Ave	0.7055	0.7133		10.1	10.0	1.1	30.0
M2-6:2 FTS	Ave	0.0289	0.0313		10.3	9.50	8.2	30.0
13C8 PFOA	Ave	0.9872	1.030		10.4	10.0	4.3	30.0
13C8 PFOS	Ave	1.023	1.036		9.68	9.57	1.3	30.0
13C9 PFNA	Ave	1.134	1.183		10.4	10.0	4.3	30.0
13C6 PFDA	Ave	1.158	1.272		11.0	10.0	9.8	30.0
M2-8:2 FTS	Ave	0.0216	0.0226		10.0	9.58	4.4	30.0
13C8 FOSA	Ave	1.410	1.383		9.81	10.0	-1.9	30.0
d3-NMeFOSAA	Ave	0.2792	0.3064		11.0	10.0	9.8	30.0
13C7 PFUnA	Ave	1.393	1.410		10.1	10.0	1.2	30.0
d5-NEtFOSAA	Ave	0.2230	0.2492		11.2	10.0	11.8	30.0
13C2-PFDoDA	Ave	1.265	1.365		10.8	10.0	7.9	30.0
d7-N-MeFOSE-M	Ave	0.2409	0.2243		9.31	10.0	-6.9	30.0
d3-NMePFOSA	Ave	0.1341	0.1195		8.91	10.0	-10.9	30.0
d9-N-EtFOSE-M	Ave	0.2395	0.2127		8.88	10.0	-11.2	30.0
d5-NEtPFOSA	Ave	0.1388	0.1191		8.58	10.0	-14.2	30.0
13C2 PFTeDA	Ave	0.9788	1.070		10.9	10.0	9.3	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: CCV 410-19162/28 Calibration Date: 07/04/2020 13:22

Instrument ID: 30731 Calib Start Date: 06/30/2020 15:33

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 06/30/2020 16:27

Lab File ID: 20JUL04-32.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8241		7.83	8.00	-2.1	30.0
Perfluoropentanoic acid	LID1F		0.8892		7.38	8.00	-7.8	30.0
Perfluorobutanesulfonic acid	LID1F		0.9369		6.78	7.08	-4.2	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		2.921		7.86	7.47	5.2	30.0
Perfluorohexanoic acid	LID1F		0.7841		7.77	8.00	-2.8	30.0
Perfluoropentanesulfonic acid	LID1F		0.7969		7.83	7.50	4.3	30.0
HFPODA	LID1F		2.418		9.87	8.00	23.4	30.0
Perfluoroheptanoic acid	LID1F		1.143		8.70	8.00	8.8	30.0
Perfluorohexanesulfonic acid	LID1F		1.008		7.50	7.30	2.8	30.0
DONA	LID1F		1.835		8.08	7.56	6.9	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.401		7.50	7.58	-1.1	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9523		8.06	7.62	5.8	30.0
Perfluorooctanoic acid	LID1F		0.8081		7.69	8.00	-3.8	30.0
Perfluorooctanesulfonic acid	LID1F		0.9883		7.19	7.40	-2.8	30.0
Perfluorononanoic acid	LID1F		0.9176		8.41	8.00	5.1	30.0
9Cl-PF3ONS	LID1F		1.745		7.78	7.44	4.6	30.0
Perfluorononanesulfonic acid	LID1F		1.027		7.80	7.68	1.6	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		7.358		7.74	7.66	1.0	30.0
Perfluorodecanoic acid	LID1F		0.7695		7.82	8.00	-2.3	30.0
Perfluorooctanesulfonamide	LID1F		0.9560		8.06	8.00	0.7	30.0
NMeFOSAA	LID1F		0.9937		8.07	8.00	0.9	30.0
Perfluorodecanesulfonic acid	LID1F		0.9322		7.16	7.71	-7.1	30.0
Perfluoroundecanoic acid	LID1F		0.7330		7.92	8.00	-0.9	30.0
NEtFOSAA	LID1F		0.8303		6.71	8.00	-16.1	30.0
11Cl-PF3OUdS	LID1F		1.276		6.57	7.44	-11.7	30.0
Perfluorododecanoic acid	LID1F		0.8734		8.16	8.00	2.0	30.0
10:2 FTS	LID1F		8.134		7.64	7.71	-0.9	30.0
NMeFOSE	LID1F		1.027		8.09	8.00	1.1	30.0
NMeFOSA	LID1F		0.9949		7.94	8.00	-0.8	30.0
Perfluorododecanesulfonic acid	LID1F		0.6581		7.27	7.74	-6.2	30.0
Perfluorotridecanoic acid	LID1F		0.7685		7.81	8.00	-2.3	30.0
NEtFOSE	LID1F		1.115		8.26	8.00	3.2	30.0
NEtFOSA	LID1F		1.024		8.29	8.00	3.7	30.0
Perfluorotetradecanoic acid	LID1F		0.8759		7.85	8.00	-1.8	30.0
Perfluorohexadecanoic acid	LID1F		0.3362		7.30	8.00	-8.7	30.0
Perfluorooctadecanoic acid	LID1F		0.1510		6.23	8.00	-22.1	30.0
13C4 PFBA	Ave	1.087	1.087		10.0	10.0	0.0	30.0
13C5 PFPeA	Ave	1.028	1.019		9.91	10.0	-0.9	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: CCV 410-19162/28 Calibration Date: 07/04/2020 13:22

Instrument ID: 30731 Calib Start Date: 06/30/2020 15:33

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 06/30/2020 16:27

Lab File ID: 20JUL04-32.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	1.241	1.247		9.41	9.36	0.5	30.0
M2-4:2 FTS	Ave	0.0577	0.0565		9.13	9.34	-2.2	30.0
13C5 PFHxA	Ave	0.7443	0.6938		9.32	10.0	-6.8	30.0
13C3 HFPO-DA	Ave	0.0987	0.0695		7.04	10.0	-29.6	30.0
13C3 PFHxS	Ave	0.6454	0.6354		9.31	9.46	-1.6	30.0
13C4 PFHpA	Ave	0.7055	0.6664		9.45	10.0	-5.5	30.0
M2-6:2 FTS	Ave	0.0289	0.0285		9.36	9.50	-1.5	30.0
13C8 PFOA	Ave	0.9872	0.9818		9.94	10.0	-0.6	30.0
13C8 PFOS	Ave	1.023	1.055		9.86	9.57	3.1	30.0
13C9 PFNA	Ave	1.134	1.186		10.5	10.0	4.6	30.0
13C6 PFDA	Ave	1.158	1.149		9.93	10.0	-0.7	30.0
M2-8:2 FTS	Ave	0.0216	0.0217		9.62	9.58	0.5	30.0
13C8 FOSA	Ave	1.410	1.322		9.38	10.0	-6.2	30.0
d3-NMeFOSAA	Ave	0.2792	0.3098		11.1	10.0	11.0	30.0
13C7 PFUnA	Ave	1.393	1.349		9.68	10.0	-3.2	30.0
d5-NEtFOSAA	Ave	0.2230	0.2653		11.9	10.0	19.0	30.0
13C2-PFDoDA	Ave	1.265	1.247		9.86	10.0	-1.4	30.0
d7-N-MeFOSE-M	Ave	0.2409	0.1996		8.29	10.0	-17.1	30.0
d3-NMePFOSA	Ave	0.1341	0.1173		8.75	10.0	-12.5	30.0
d9-N-EtFOSE-M	Ave	0.2395	0.1919		8.01	10.0	-19.9	30.0
d5-NEtPFOSA	Ave	0.1388	0.1101		7.93	10.0	-20.7	30.0
13C2 PFTeDA	Ave	0.9788	1.004		10.3	10.0	2.6	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: CCV 410-19162/35 Calibration Date: 07/04/2020 14:26

Instrument ID: 30731 Calib Start Date: 06/30/2020 15:33

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 06/30/2020 16:27

Lab File ID: 20JUL04-39.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8969		21.3	20.0	6.6	30.0
Perfluoropentanoic acid	LID1F		0.9178		19.0	20.0	-4.8	30.0
Perfluorobutanesulfonic acid	LID1F		0.9831		17.8	17.7	0.5	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.029		20.4	18.7	9.1	30.0
Perfluorohexanoic acid	LID1F		0.9168		22.7	20.0	13.6	30.0
Perfluoropentanesulfonic acid	LID1F		0.8208		20.2	18.8	7.4	30.0
HFPODA	LID1F		2.415		24.6	20.0	23.2	30.0
Perfluoroheptanoic acid	LID1F		1.150		21.9	20.0	9.4	30.0
Perfluorohexanesulfonic acid	LID1F		0.999		18.6	18.2	1.8	30.0
DONA	LID1F		1.884		20.7	18.9	9.8	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.590		19.4	19.0	2.3	30.0
Perfluoroheptanesulfonic acid	LID1F		1.010		21.4	19.0	12.2	30.0
Perfluorooctanoic acid	LID1F		0.9144		21.8	20.0	8.8	30.0
Perfluorooctanesulfonic acid	LID1F		1.049		19.1	18.5	3.1	30.0
Perfluorononanoic acid	LID1F		0.8868		20.3	20.0	1.6	30.0
9Cl-PF3ONS	LID1F		1.838		20.5	18.6	10.2	30.0
Perfluorononanesulfonic acid	LID1F		1.050		19.9	19.2	3.9	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		7.115		18.7	19.2	-2.4	30.0
Perfluorodecanoic acid	LID1F		0.8306		21.1	20.0	5.5	30.0
Perfluorooctanesulfonamide	LID1F		1.014		21.4	20.0	6.8	30.0
NMeFOSAA	LID1F		0.9929		20.2	20.0	0.8	30.0
Perfluorodecanesulfonic acid	LID1F		0.9523		18.3	19.3	-5.1	30.0
Perfluoroundecanoic acid	LID1F		0.7906		21.4	20.0	6.8	30.0
NEtFOSAA	LID1F		0.9488		19.2	20.0	-4.1	30.0
11Cl-PF3OUdS	LID1F		1.320		17.0	18.6	-8.7	30.0
Perfluorododecanoic acid	LID1F		0.9434		22.0	20.0	10.2	30.0
10:2 FTS	LID1F		9.506		22.3	19.3	15.8	30.0
NMeFOSE	LID1F		1.073		21.1	20.0	5.7	30.0
NMeFOSA	LID1F		1.068		21.3	20.0	6.5	30.0
Perfluorododecanesulfonic acid	LID1F		0.6663		18.4	19.4	-5.0	30.0
Perfluorotridecanoic acid	LID1F		0.8295		21.1	20.0	5.4	30.0
NEtFOSE	LID1F		1.150		21.3	20.0	6.4	30.0
NEtFOSA	LID1F		1.071		21.7	20.0	8.5	30.0
Perfluorotetradecanoic acid	LID1F		0.9584		21.5	20.0	7.4	30.0
Perfluorohexadecanoic acid	LID1F		0.3475		18.9	20.0	-5.6	30.0
Perfluorooctadecanoic acid	LID1F		0.1657		17.1	20.0	-14.5	30.0
13C4 PFBA	Ave	1.087	1.072		9.87	10.0	-1.3	30.0
13C5 PFPeA	Ave	1.028	1.074		10.5	10.0	4.5	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Lab Sample ID: CCV 410-19162/35 Calibration Date: 07/04/2020 14:26

Instrument ID: 30731 Calib Start Date: 06/30/2020 15:33

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 06/30/2020 16:27

Lab File ID: 20JUL04-39.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	1.241	1.212		9.14	9.36	-2.4	30.0
M2-4:2 FTS	Ave	0.0577	0.0476		7.71	9.34	-17.5	30.0
13C5 PFHxA	Ave	0.7443	0.6516		8.76	10.0	-12.4	30.0
13C3 HFPO-DA	Ave	0.0987	0.0674		6.83	10.0	-31.7*	30.0
13C3 PFHxS	Ave	0.6454	0.5957		8.73	9.46	-7.7	30.0
13C4 PFHpA	Ave	0.7055	0.6470		9.17	10.0	-8.3	30.0
M2-6:2 FTS	Ave	0.0289	0.0270		8.87	9.50	-6.6	30.0
13C8 PFOA	Ave	0.9872	0.8902		9.02	10.0	-9.8	30.0
13C8 PFOS	Ave	1.023	1.016		9.49	9.57	-0.8	30.0
13C9 PFNA	Ave	1.134	1.179		10.4	10.0	4.0	30.0
13C6 PFDA	Ave	1.158	1.126		9.73	10.0	-2.7	30.0
M2-8:2 FTS	Ave	0.0216	0.0219		9.72	9.58	1.4	30.0
13C8 FOSA	Ave	1.410	1.394		9.89	10.0	-1.1	30.0
d3-NMeFOSAA	Ave	0.2792	0.3331		11.9	10.0	19.3	30.0
13C7 PFUnA	Ave	1.393	1.366		9.81	10.0	-1.9	30.0
d5-NEtFOSAA	Ave	0.2230	0.2588		11.6	10.0	16.1	30.0
13C2-PFDoDA	Ave	1.265	1.320		10.4	10.0	4.4	30.0
d7-N-MeFOSE-M	Ave	0.2409	0.2244		9.32	10.0	-6.8	30.0
d3-NMePFOSA	Ave	0.1341	0.1221		9.11	10.0	-8.9	30.0
d9-N-EtFOSE-M	Ave	0.2395	0.2097		8.75	10.0	-12.5	30.0
d5-NEtPFOSA	Ave	0.1388	0.1248		8.99	10.0	-10.1	30.0
13C2 PFTeDA	Ave	0.9788	1.047		10.7	10.0	7.0	30.0

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Instrument ID: 30731 Start Date: 05/26/2020 12:43

Analysis Batch Number: 9225 End Date: 05/26/2020 14:05

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 410-9225/1		05/26/2020 12:43	1	20MAY26MCAL-01.d	Gemini C18 50mm 3(mm)
IC 410-9225/2		05/26/2020 12:52	1	20MAY26MCAL-02.d	Gemini C18 50mm 3(mm)
IC 410-9225/3		05/26/2020 13:01	1	20MAY26MCAL-03.d	Gemini C18 50mm 3(mm)
IC 410-9225/4		05/26/2020 13:10	1	20MAY26MCAL-04.d	Gemini C18 50mm 3(mm)
ICISAV 410-9225/5		05/26/2020 13:19	1	20MAY26MCAL-05.d	Gemini C18 50mm 3(mm)
IC 410-9225/6		05/26/2020 13:28	1	20MAY26MCAL-06.d	Gemini C18 50mm 3(mm)
IC 410-9225/7		05/26/2020 13:37	1	20MAY26MCAL-07.d	Gemini C18 50mm 3(mm)
ICB 410-9225/8		05/26/2020 13:47	1	20MAY26MCAL-08.d	Gemini C18 50mm 3(mm)
ICV 410-9225/9		05/26/2020 13:56	1		Gemini C18 50mm 3(mm)
WDM 410-9225/10		05/26/2020 14:05	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Instrument ID: 30731 Start Date: 06/30/2020 15:33

Analysis Batch Number: 18152 End Date: 06/30/2020 16:55

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 410-18152/1		06/30/2020 15:33	1	20JUN30MCAL-17.d	Gemini C18 50mm 3(mm)
IC 410-18152/2		06/30/2020 15:42	1	20JUN30MCAL-18.d	Gemini C18 50mm 3(mm)
IC 410-18152/3		06/30/2020 15:51	1	20JUN30MCAL-19.d	Gemini C18 50mm 3(mm)
IC 410-18152/4		06/30/2020 16:00	1	20JUN30MCAL-20.d	Gemini C18 50mm 3(mm)
ICISAV 410-18152/5		06/30/2020 16:09	1	20JUN30MCAL-21.d	Gemini C18 50mm 3(mm)
IC 410-18152/6		06/30/2020 16:18	1	20JUN30MCAL-22.d	Gemini C18 50mm 3(mm)
IC 410-18152/7		06/30/2020 16:27	1	20JUN30MCAL-23.d	Gemini C18 50mm 3(mm)
CCB 410-18152/8		06/30/2020 16:36	1	20JUN30MCAL-24.d	Gemini C18 50mm 3(mm)
ICV 410-18152/9		06/30/2020 16:45	1	20JUN30MCAL-25.d	Gemini C18 50mm 3(mm)
WDM 410-18152/10		06/30/2020 16:55	1	20JUN30MCAL-26.d	Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Instrument ID: 30731 Start Date: 07/04/2020 11:15

Analysis Batch Number: 19162 End Date: 07/04/2020 20:01

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 410-19162/14		07/04/2020 11:15	1	20JUL04-18.d	Gemini C18 50mm 3(mm)
MB 410-18452/1-A		07/04/2020 11:24	1	20JUL04-19.d	Gemini C18 50mm 3(mm)
LCS 410-18452/2-A		07/04/2020 11:34	1	20JUL04-20.d	Gemini C18 50mm 3(mm)
LCSD 410-18452/3-A		07/04/2020 11:43	1	20JUL04-21.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 11:52	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 12:01	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 12:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 12:19	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 12:28	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 12:37	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 12:46	1		Gemini C18 50mm 3(mm)
410-6246-1		07/04/2020 12:55	1	20JUL04-29.d	Gemini C18 50mm 3(mm)
410-6246-2		07/04/2020 13:04	1	20JUL04-30.d	Gemini C18 50mm 3(mm)
410-6246-3		07/04/2020 13:13	1	20JUL04-31.d	Gemini C18 50mm 3(mm)
CCV 410-19162/28		07/04/2020 13:22	1	20JUL04-32.d	Gemini C18 50mm 3(mm)
410-6246-4		07/04/2020 13:31	1	20JUL04-33.d	Gemini C18 50mm 3(mm)
410-6246-5		07/04/2020 13:40	1	20JUL04-34.d	Gemini C18 50mm 3(mm)
410-6246-6		07/04/2020 13:49	1	20JUL04-35.d	Gemini C18 50mm 3(mm)
410-6246-8		07/04/2020 13:58	1	20JUL04-36.d	Gemini C18 50mm 3(mm)
410-6246-9		07/04/2020 14:07	1	20JUL04-37.d	Gemini C18 50mm 3(mm)
410-6246-10		07/04/2020 14:16	1	20JUL04-38.d	Gemini C18 50mm 3(mm)
CCV 410-19162/35		07/04/2020 14:26	1	20JUL04-39.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 14:35	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 14:44	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 14:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 15:02	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 15:11	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 15:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 15:29	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 15:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 15:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 15:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 16:05	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 16:14	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 16:23	1		Gemini C18 50mm 3(mm)
CCV 410-19162/60		07/04/2020 16:32	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 16:41	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 16:50	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 17:00	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 17:09	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 17:18	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 17:27	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 17:36	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 17:45	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 17:54	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Instrument ID: 30731 Start Date: 07/04/2020 11:15

Analysis Batch Number: 19162 End Date: 07/04/2020 20:01

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/04/2020 18:03	1		Gemini C18 50mm 3(mm)
CCV 410-19162/59		07/04/2020 18:12	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 18:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 19:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 19:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 19:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 19:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 19:43	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/04/2020 19:52	1		Gemini C18 50mm 3(mm)
CCV 410-19162/68		07/04/2020 20:01	1		Gemini C18 50mm 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Instrument ID: 27632 Start Date: 07/07/2020 06:09

Analysis Batch Number: 19789 End Date: 07/07/2020 07:31

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 410-19789/1		07/07/2020 06:09	1	20JUL07MCAL-01.d	Gemini C18 50mm 3(mm)
IC 410-19789/2		07/07/2020 06:18	1	20JUL07MCAL-02.d	Gemini C18 50mm 3(mm)
IC 410-19789/3		07/07/2020 06:28	1	20JUL07MCAL-03.d	Gemini C18 50mm 3(mm)
IC 410-19789/4		07/07/2020 06:37	1	20JUL07MCAL-04.d	Gemini C18 50mm 3(mm)
ICISAV 410-19789/5		07/07/2020 06:46	1	20JUL07MCAL-05.d	Gemini C18 50mm 3(mm)
IC 410-19789/6		07/07/2020 06:55	1	20JUL07MCAL-06.d	Gemini C18 50mm 3(mm)
IC 410-19789/7		07/07/2020 07:04	1	20JUL07MCAL-07.d	Gemini C18 50mm 3(mm)
CCB 410-19789/8		07/07/2020 07:13	1	20JUL07MCAL-08.d	Gemini C18 50mm 3(mm)
ICV 410-19789/9		07/07/2020 07:22	1	20JUL07MCAL-09.d	Gemini C18 50mm 3(mm)
WDM 410-19789/10		07/07/2020 07:31	1	20JUL07MCAL-10.d	Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Instrument ID: 27632 Start Date: 07/10/2020 10:18

Analysis Batch Number: 21216 End Date: 07/10/2020 18:37

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 410-21216/1		07/10/2020 10:18	1	20JUL10-09.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 10:27	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 10:36	10		Gemini C18 50mm 3(mm)
410-6246-9 RA		07/10/2020 10:45	1	20JUL10-12.d	Gemini C18 50mm 3(mm)
410-6246-10 RA		07/10/2020 10:54	1	20JUL10-13.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:12	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:21	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:30	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:39	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:49	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:58	10		Gemini C18 50mm 3(mm)
CCV 410-21216/13		07/10/2020 12:07	1	20JUL10-21.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 12:16	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 12:25	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 12:34	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 12:43	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 12:52	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 13:01	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 13:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 13:19	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 13:28	100		Gemini C18 50mm 3(mm)
CCV 410-21216/23		07/10/2020 13:37	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 13:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 13:56	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 14:05	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 14:14	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 14:23	1		Gemini C18 50mm 3(mm)
CCV 410-21216/29		07/10/2020 14:32	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 14:41	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 14:50	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 14:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 15:08	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 15:17	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 15:26	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 15:35	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 15:44	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 15:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 16:03	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 16:12	1		Gemini C18 50mm 3(mm)
CCV 410-21216/41		07/10/2020 16:21	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 16:30	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 16:39	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 16:48	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 16:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 17:06	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Instrument ID: 27632 Start Date: 07/10/2020 10:18

Analysis Batch Number: 21216 End Date: 07/10/2020 18:37

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/10/2020 17:15	1		Gemini C18 50mm 3(mm)
CCV 410-21216/48		07/10/2020 17:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 17:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 17:42	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 17:51	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 18:00	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 18:09	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 18:19	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 18:28	1		Gemini C18 50mm 3(mm)
CCV 410-21216/56		07/10/2020 18:37	1		Gemini C18 50mm 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Instrument ID: 27632 Start Date: 07/13/2020 13:01

Analysis Batch Number: 21880 End Date: 07/13/2020 14:22

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 410-21880/1		07/13/2020 13:01	1	20JUL13MCAL-09.d	Gemini C18 50mm 3(mm)
IC 410-21880/2		07/13/2020 13:10	1	20JUL13MCAL-10.d	Gemini C18 50mm 3(mm)
IC 410-21880/3		07/13/2020 13:19	1	20JUL13MCAL-11.d	Gemini C18 50mm 3(mm)
IC 410-21880/4		07/13/2020 13:28	1	20JUL13MCAL-12.d	Gemini C18 50mm 3(mm)
ICISAV 410-21880/5		07/13/2020 13:37	1	20JUL13MCAL-13.d	Gemini C18 50mm 3(mm)
IC 410-21880/6		07/13/2020 13:46	1	20JUL13MCAL-14.d	Gemini C18 50mm 3(mm)
IC 410-21880/7		07/13/2020 13:55	1	20JUL13MCAL-15.d	Gemini C18 50mm 3(mm)
ICB 410-21880/8		07/13/2020 14:04	1	20JUL13MCAL-16.d	Gemini C18 50mm 3(mm)
ICV 410-21880/9		07/13/2020 14:13	1	20JUL13MCAL-17.d	Gemini C18 50mm 3(mm)
WDM 410-21880/10		07/13/2020 14:22	1	20JUL13MCAL-18.d	Gemini C18 50mm 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Instrument ID: 27632 Start Date: 07/13/2020 15:17

Analysis Batch Number: 21920 End Date: 07/14/2020 08:11

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 410-21920/11		07/13/2020 15:17	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 15:26	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 15:35	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 15:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 16:11	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 16:20	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 16:30	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 16:39	10		Gemini C18 50mm 3(mm)
CCV 410-21920/16		07/13/2020 16:48	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 16:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 17:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 17:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 17:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 17:42	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 17:51	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 18:00	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 18:09	1		Gemini C18 50mm 3(mm)
CCV 410-21920/34		07/13/2020 19:48	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:33	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:42	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:51	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 21:00	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 21:09	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 21:18	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 21:27	1		Gemini C18 50mm 3(mm)
CCV 410-21920/53		07/13/2020 21:54	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 22:04	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 22:13	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 22:22	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 22:31	100		Gemini C18 50mm 3(mm)
CCV 410-21920/54		07/13/2020 22:40	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 22:49	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 22:58	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 23:07	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 23:16	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 23:25	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 23:34	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 23:43	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 23:52	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 00:01	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 00:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 00:19	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6246-1

SDG No.:

Instrument ID: 27632 Start Date: 07/13/2020 15:17

Analysis Batch Number: 21920 End Date: 07/14/2020 08:11

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/14/2020 00:28	1		Gemini C18 50mm 3(mm)
CCV 410-21920/67		07/14/2020 00:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 01:41	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 01:50	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 01:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 02:08	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 02:17	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 02:35	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 02:44	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 03:03	1		Gemini C18 50mm 3(mm)
CCV 410-21920/87		07/14/2020 03:12	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 03:21	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 03:39	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 03:48	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 03:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 04:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 04:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 04:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 04:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 04:42	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 04:51	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 05:00	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 05:10	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 05:19	10		Gemini C18 50mm 3(mm)
CCV 410-21920/102		07/14/2020 05:28	1	20JUL13-111.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 05:37	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 05:46	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 05:55	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 06:04	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 06:13	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 06:22	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 06:31	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 06:41	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 06:50	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 06:59	10		Gemini C18 50mm 3(mm)
CCV 410-21920/113		07/14/2020 07:08	1	20JUL13-122.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 07:17	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 07:26	10		Gemini C18 50mm 3(mm)
410-6246-5 DL		07/14/2020 07:35	10	20JUL13-125.d	Gemini C18 50mm 3(mm)
410-6246-8 DL		07/14/2020 07:44	10	20JUL13-126.d	Gemini C18 50mm 3(mm)
410-6246-9 DL		07/14/2020 07:53	100	20JUL13-127.d	Gemini C18 50mm 3(mm)
410-6246-10 DL		07/14/2020 08:02	10	20JUL13-128.d	Gemini C18 50mm 3(mm)
CCV 410-21920/120		07/14/2020 08:11	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-6246-1

SDG No.:

Batch Number: 18452 Batch Start Date: 07/01/20 08:22 Batch Analyst: Barnhart, Toby B

Batch Method: EPA 537 (mod) Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	PFC_MS_MODWX 00015	PFC_SS_MODX 00019
MB 410-18452/1		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL		25 uL
LCS 410-18452/2		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL	40 uL	25 uL
LCSD 410-18452/3		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL	40 uL	25 uL
410-6246-A-1	EQB-WL-062920	EPA 537 (mod), EPA 537 (Mod)	T	299.68 g	27.51 g	272.2 mL	1 mL		25 uL
410-6246-A-2	MSA-MW-48I-062920	EPA 537 (mod), EPA 537 (Mod)	T	294.67 g	27.34 g	267.3 mL	1 mL		25 uL
410-6246-A-3	MSA-MW-49S-062920	EPA 537 (mod), EPA 537 (Mod)	T	287.26 g	27.23 g	260 mL	1 mL		25 uL
410-6246-A-4	MSA-FB-062920	EPA 537 (mod), EPA 537 (Mod)	T	291.36 g	27.54 g	263.8 mL	1 mL		25 uL
410-6246-A-5	MSA-MW-34S-062920	EPA 537 (mod), EPA 537 (Mod)	T	290.56 g	27.37 g	263.2 mL	1 mL		25 uL
410-6246-A-6	MSA-MW-34I-062920	EPA 537 (mod), EPA 537 (Mod)	T	294.23 g	27.24 g	267 mL	1 mL		25 uL
410-6246-A-8	MSA-MW-40S-062920	EPA 537 (mod), EPA 537 (Mod)	T	313.83 g	27.26 g	286.6 mL	1 mL		25 uL
410-6246-A-9	MSA-MW-40I-062920	EPA 537 (mod), EPA 537 (Mod)	T	320.15 g	27.28 g	292.9 mL	1 mL		25 uL
410-6246-A-10	MSA-DMW-7S-062920	EPA 537 (mod), EPA 537 (Mod)	T	315.71 g	27.25 g	288.5 mL	1 mL		25 uL

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-6246-1

SDG No.:

Batch Number: 18452 Batch Start Date: 07/01/20 08:22 Batch Analyst: Barnhart, Toby B

Batch Method: EPA 537 (mod) Batch End Date:

Batch Notes	
Balance ID	B629764122
Collection Tube Witness	NF 33365
H2O ID	House A372
Manifold ID	21, 22
Methanol ID	DX907-IN
Analyst ID - IS Reagent Drop Witness	NF 33365
Solvent Lot #	3336507012033A; 3090606292033A
Solvent Name	1:1 ACN:MeOH; 0.3% NH4OH in MeOH
SPE Cartridge Lot ID	6505521-07

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TETRA TECH **INTERNAL CORRESPONDENCE**

TO: **S. BRENNER** **DATE:** **OCTOBER 14, 2020**

FROM: **GLORIA SCHIFINO** **COPIES:** **DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS)**
MARTIN STATE AIRPORT
SAMPLE DELIVERY GROUP (SDG) 410-6410-1

SAMPLES: 7/Aqueous

MSA-DMW-4S-063020	MSA-DMW-5I-063020
MSA-DMW-5S-063020	MSA-DUP-1-063020
MSA-MW-35S-063020	MSA-MW-44S-063020
MSA-MW-46S-063020	

1/Field Blank (FB)
MSA-FB-063020

1/Equipment Blank/PFAS
EQB-WL-063020

Overview

The sample set for Martin State Airport, SDG 410-6410-1, consisted of seven (7) aqueous samples, one (1) field blank sample and one (1) equipment blank. All samples were analyzed for perfluorinated alkyl acids. One (1) field duplicate pairs (MSA-DUP-1-063020/ MSA-MW-44S-063020) were included in this SDG.

The samples were collected by Tetra Tech on June 30, 2020 and analyzed by Eurofins Lancaster Laboratories. PFAS groundwater analyses were conducted in accordance with EPA method 537 modified analytical and reporting protocols.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, mass calibration, mass spectral acquisition rate, instrument sensitivity check, peak asymmetry factor, initial/continuing calibrations, ion transitions, laboratory method results, extracted internal standard recoveries, laboratory control sample results, chromatographic resolution, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

Major

No major issues were identified.

Minor

The following compound was detected in the equipment blank at a concentration below the reporting limit.

Compound	Concentration	Action Level RL > or <
6:2 FTS	8.00 ng/L	< 5x RL

The detected result for sample MSA-DMW-5I-063020 was raised to the RL and was qualified as nondetected (U).

Detected results reported below the limit of quantitation (LOQ) but above the detection lmit (DRL) were qualified as estimated (J).

The following internal standard percent recovery was above quality control limits for the following sample:

Sample	Labeled Standard	Compounds Affected	Data Qualification
MSA-MW-35S-063020	13C3-PFBS	PFOS	J

The detected results reported below the LOQ were qualified as estimated (J).

Notes

The following extracted internal standard recoveries for 6:2 FTS and/or 8:2 FTS were above quality control limits for the following sample MSA-DMW-5S-063020, MSA-DUP-1-063020 and MSA-MW-44S-063020. No validation actions were required because to the affected sample results were nondetected.

The matrix spike percent recoveries for PFHxS and PFOS in sample MSA-DMW-4S-063020 were above the quality control limits. No validation was required because the sample concentration was more than 4x the concentration of the spike added in the matrix spike. The MSD recovery of 6:2 FTS was also above the upper quality control limit. No action was required because the analyte was not detected in the aforementioned smaple.

Samples MSA-DMW-4S-063020, MSA-DMW-5S-063020 and MSA-MW-35S-063020 was diluted and analyzed at 10x dilution for compounds PFHxS and/or PFOS.

Non-detected results were reported to the RL.

Executive Summary

Laboratory Performance: One analyte was present in the equipment blank.

Other Factors Affecting Data Quality: Results below the RL were estimated.

The data for these analyses were reviewed with reference to the Environmental Protection Agency document EPA 910-R-18-001 “Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537”, (November 2018). The text of this report has been formulated to address only those areas affecting data quality.

Tetra Tech, Inc.
for Gloria Schifino
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

Data Qualifier Definitions

The following definitions provide brief explanations of the validation qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted detection limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value is the estimated concentration in the sample.
R	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
UR	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

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: 09023	NSAMPLE	EQB-WL-063020			MSA-DMW-4S-063020			MSA-DMW-4S-063020DL			MSA-DMW-5I-063020		
SDG: 410-6410-1	LAB_ID	410-6410-1			410-6410-9			410-6410-9			410-6410-8		
FRACTION: PFAS	SAMP_DATE	6/30/2020			6/30/2020			6/30/2020			6/30/2020		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/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
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		8			4.3	U					4	U	B
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		2.8	U		2.6	U					2.5	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)		1.9	U		46						43		
PERFLUOROBUTANESULFONIC ACID (PFBS)		1.9	U		11						8.8		
PERFLUOROHEPTANOIC ACID (PFHPA)		1.9	U		12						7.4		
PERFLUOROHEXANESULFONIC ACID (PFHXS)		1.9	U		300						210		
PERFLUORONONANOIC ACID (PFNA)		1.9	U		4.9						0.56	J	P
PERFLUOROOCTANESULFONIC ACID (PFOS)		1.9	U					300			27		

PROJ_NO: 09023	NSAMPLE	MSA-DMW-5S-063020			MSA-DMW-5S-063020DL			MSA-DUP-1-063020			MSA-FB-063020		
SDG: 410-6410-1	LAB_ID	410-6410-7			410-6410-7			410-6410-6			410-6410-2		
FRACTION: PFAS	SAMP_DATE	6/30/2020			6/30/2020			6/30/2020			6/30/2020		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF							MSA-MW-44S-063020					
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		4.4	U					4.7	U		4.5	U	
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		2.6	U					2.8	U		2.7	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)		95						14			1.8	U	
PERFLUOROBUTANESULFONIC ACID (PFBS)		17						1.6	J	P	1.8	U	
PERFLUOROHEPTANOIC ACID (PFHPA)		15						4.2			1.8	U	
PERFLUOROHEXANESULFONIC ACID (PFHXS)					560			4.3			1.8	U	
PERFLUORONONANOIC ACID (PFNA)		3.4						2.5			1.8	U	
PERFLUOROOCTANESULFONIC ACID (PFOS)		250						25			1.8	U	

PROJ_NO: 09023	NSAMPLE	MSA-MW-35S-063020			MSA-MW-35S-063020DL			MSA-MW-44S-063020			MSA-MW-46S-063020		
SDG: 410-6410-1	LAB_ID	410-6410-5			410-6410-5			410-6410-3			410-6410-4		
FRACTION: PFAS	SAMP_DATE	6/30/2020			6/30/2020			6/30/2020			6/30/2020		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/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
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		180						4.7	U		4.7	U	
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		26						2.8	U		2.8	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)					680			15			74		
PERFLUOROBUTANESULFONIC ACID (PFBS)		57	J	N				1.6	J	P	2.6		
PERFLUOROHEPTANOIC ACID (PFHPA)		99						4.5			8.5		
PERFLUOROHEXANESULFONIC ACID (PFHXS)					1200			4.2			6.5		
PERFLUORONONANOIC ACID (PFNA)		24						2.7			3.3		
PERFLUOROOCTANESULFONIC ACID (PFOS)					3000			28			27		

Appendix B

Results as Reported by the Laboratory

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: EQB-WL-063020 Lab Sample ID: 410-6410-1

Matrix: Water Lab File ID: 20JUL09-140.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/30/2020 00:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 263.8(mL) Date Analyzed: 07/10/2020 10:21

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	ND		1.9	0.47
335-67-1	Perfluorooctanoic acid	ND		1.9	0.47
375-95-1	Perfluorononanoic acid	ND		1.9	0.47
27619-97-2	6:2 Fluorotelomer sulfonic acid	8.0		4.7	1.9
375-73-5	Perfluorobutanesulfonic acid	ND		1.9	0.47
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.95
355-46-4	Perfluorohexanesulfonic acid	ND		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	ND		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	91		33-140
STL01052	13C8 PFOA	92		52-124
STL02578	13C9 PFNA	93		48-130
STL02337	13C3 PFBS	91		23-175
STL02581	13C3 PFHxS	92		35-143
STL01054	13C8 PFOS	91		52-121
STL02279	M2-6:2 FTS	105		29-182
STL02280	M2-8:2 FTS	118		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: MSA-FB-063020 Lab Sample ID: 410-6410-2

Matrix: Water Lab File ID: 20JUL09-142.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/30/2020 09:45

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 276.1(mL) Date Analyzed: 07/10/2020 10:40

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	ND		1.8	0.45
335-67-1	Perfluorooctanoic acid	ND		1.8	0.45
375-95-1	Perfluorononanoic acid	ND		1.8	0.45
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.5	1.8
375-73-5	Perfluorobutanesulfonic acid	ND		1.8	0.45
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.7	0.91
355-46-4	Perfluorohexanesulfonic acid	ND		1.8	0.45
1763-23-1	Perfluorooctanesulfonic acid	ND		1.8	0.45

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	91		33-140
STL01052	13C8 PFOA	91		52-124
STL02578	13C9 PFNA	96		48-130
STL02337	13C3 PFBS	95		23-175
STL02581	13C3 PFHxS	94		35-143
STL01054	13C8 PFOS	93		52-121
STL02279	M2-6:2 FTS	99		29-182
STL02280	M2-8:2 FTS	110		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: MSA-MW-44S-063020 Lab Sample ID: 410-6410-3

Matrix: Water Lab File ID: 20JUL09-143.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/30/2020 10:05

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 267(mL) Date Analyzed: 07/10/2020 10:51

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	4.5		1.9	0.47
335-67-1	Perfluorooctanoic acid	15		1.9	0.47
375-95-1	Perfluorononanoic acid	2.7		1.9	0.47
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.7	1.9
375-73-5	Perfluorobutanesulfonic acid	1.6	J	1.9	0.47
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.94
355-46-4	Perfluorohexanesulfonic acid	4.2		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	28		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	94		33-140
STL01052	13C8 PFOA	102		52-124
STL02578	13C9 PFNA	119		48-130
STL02337	13C3 PFBS	138		23-175
STL02581	13C3 PFHxS	93		35-143
STL01054	13C8 PFOS	102		52-121
STL02279	M2-6:2 FTS	226	*5	29-182
STL02280	M2-8:2 FTS	184	*5	37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: MSA-MW-46S-063020 Lab Sample ID: 410-6410-4

Matrix: Water Lab File ID: 20JUL09-144.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/30/2020 11:05

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 267.2(mL) Date Analyzed: 07/10/2020 11:00

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	8.5		1.9	0.47
335-67-1	Perfluorooctanoic acid	74		1.9	0.47
375-95-1	Perfluorononanoic acid	3.3		1.9	0.47
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.7	1.9
375-73-5	Perfluorobutanesulfonic acid	2.6		1.9	0.47
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.94
355-46-4	Perfluorohexanesulfonic acid	6.5		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	27		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	78		33-140
STL01052	13C8 PFOA	87		52-124
STL02578	13C9 PFNA	98		48-130
STL02337	13C3 PFBS	150		23-175
STL02581	13C3 PFHxS	82		35-143
STL01054	13C8 PFOS	87		52-121
STL02279	M2-6:2 FTS	164		29-182
STL02280	M2-8:2 FTS	133		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: MSA-MW-35S-063020 RA Lab Sample ID: 410-6410-5 RA

Matrix: Water Lab File ID: 20JUL09-145.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/30/2020 13:15

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 260.9(mL) Date Analyzed: 07/10/2020 11:09

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	*Perfluoroheptanoic acid*	*91*		*1.9*	*0.48*
335-67-1	*Perfluorooctanoic acid*	*650*	*E*	*1.9*	*0.48*
375-95-1	*Perfluorononanoic acid*	*23*		*1.9*	*0.48*
27619-97-2	*6:2 Fluorotelomer sulfonic acid*	*180*		*4.8*	*1.9*
375-73-5	*Perfluorobutanesulfonic acid*	*50*		*1.9*	*0.48*
39108-34-4	*8:2 Fluorotelomer sulfonic acid*	*24*		*2.9*	*0.96*
355-46-4	*Perfluorohexanesulfonic acid*	*1200*	*E*	*1.9*	*0.48*
1763-23-1	*Perfluorooctanesulfonic acid*	*3600*	*E*	*1.9*	*0.48*

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	87		33-140
STL01052	13C8 PFOA	98		52-124
STL02578	13C9 PFNA	104		48-130
STL02337	13C3 PFBS	209	*5	23-175
STL02581	13C3 PFHxS	91		35-143
STL01054	13C8 PFOS	99		52-121
STL02279	M2-6:2 FTS	174		29-182
STL02280	M2-8:2 FTS	200	*5	37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: MSA-MW-35S-063020 Lab Sample ID: 410-6410-5

Matrix: Water Lab File ID: 20JUL15-91.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/30/2020 13:15

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 260.9(mL) Date Analyzed: 07/16/2020 01:50

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22831 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	99		1.9	0.48
375-95-1	Perfluorononanoic acid	24		1.9	0.48
27619-97-2	6:2 Fluorotelomer sulfonic acid	180		4.8	1.9
375-73-5	Perfluorobutanesulfonic acid	57		1.9	0.48
39108-34-4	8:2 Fluorotelomer sulfonic acid	26		2.9	0.96

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	80		33-140
STL01052	13C8 PFOA	87		52-124
STL02578	13C9 PFNA	117		48-130
STL02337	13C3 PFBS	297	*5	23-175
STL02581	13C3 PFHxS	79		35-143
STL01054	13C8 PFOS	105		52-121
STL02279	M2-6:2 FTS	133		29-182
STL02280	M2-8:2 FTS	133		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: MSA-MW-35S-063020 DL Lab Sample ID: 410-6410-5 DL

Matrix: Water Lab File ID: 20JUL15-92.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/30/2020 13:15

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 260.9(mL) Date Analyzed: 07/16/2020 01:59

Con. Extract Vol.: 1(mL) Dilution Factor: 10

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22831 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
335-67-1	Perfluorooctanoic acid	680		19	4.8
355-46-4	Perfluorohexanesulfonic acid	1200		19	4.8
1763-23-1	Perfluorooctanesulfonic acid	3000		19	4.8

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01052	13C8 PFOA	94		52-124
STL02581	13C3 PFHxS	103		35-143
STL01054	13C8 PFOS	105		52-121

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: MSA-DUP-1-063020 Lab Sample ID: 410-6410-6

Matrix: Water Lab File ID: 20JUL09-146.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/30/2020 00:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 267.2(mL) Date Analyzed: 07/10/2020 11:18

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	4.2		1.9	0.47
335-67-1	Perfluorooctanoic acid	14		1.9	0.47
375-95-1	Perfluorononanoic acid	2.5		1.9	0.47
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.7	1.9
375-73-5	Perfluorobutanesulfonic acid	1.6	J	1.9	0.47
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.94
355-46-4	Perfluorohexanesulfonic acid	4.3		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	25		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	81		33-140
STL01052	13C8 PFOA	87		52-124
STL02578	13C9 PFNA	101		48-130
STL02337	13C3 PFBS	115		23-175
STL02581	13C3 PFHxS	80		35-143
STL01054	13C8 PFOS	88		52-121
STL02279	M2-6:2 FTS	190	*5	29-182
STL02280	M2-8:2 FTS	158		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: MSA-DMW-5S-063020 Lab Sample ID: 410-6410-7

Matrix: Water Lab File ID: 20JUL09-147.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/30/2020 12:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 283.2(mL) Date Analyzed: 07/10/2020 11:27

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	15		1.8	0.44
335-67-1	Perfluorooctanoic acid	95		1.8	0.44
375-95-1	Perfluorononanoic acid	3.4		1.8	0.44
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.4	1.8
375-73-5	Perfluorobutanesulfonic acid	17		1.8	0.44
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.6	0.88
1763-23-1	Perfluorooctanesulfonic acid	250		1.8	0.44

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	80		33-140
STL01052	13C8 PFOA	94		52-124
STL02578	13C9 PFNA	110		48-130
STL02337	13C3 PFBS	134		23-175
STL02581	13C3 PFHxS	81		35-143
STL01054	13C8 PFOS	95		52-121
STL02279	M2-6:2 FTS	199	*5	29-182
STL02280	M2-8:2 FTS	170	*5	37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: MSA-DMW-5S-063020 DL Lab Sample ID: 410-6410-7 DL

Matrix: Water Lab File ID: 20JUL15-94.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/30/2020 12:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 283.2(mL) Date Analyzed: 07/16/2020 02:17

Con. Extract Vol.: 1(mL) Dilution Factor: 10

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22831 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
355-46-4	Perfluorohexanesulfonic acid	560		18	4.4

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02581	13C3 PFHxS	101		35-143

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: MSA-DMW-5I-063020 Lab Sample ID: 410-6410-8

Matrix: Water Lab File ID: 20JUL09-148.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/30/2020 12:57

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 298.8(mL) Date Analyzed: 07/10/2020 11:36

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	7.4		1.7	0.42
335-67-1	Perfluorooctanoic acid	43		1.7	0.42
375-95-1	Perfluorononanoic acid	0.56	J	1.7	0.42
27619-97-2	6:2 Fluorotelomer sulfonic acid	4.0	J	4.2	1.7
375-73-5	Perfluorobutanesulfonic acid	8.8		1.7	0.42
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.5	0.84
355-46-4	Perfluorohexanesulfonic acid	210		1.7	0.42
1763-23-1	Perfluorooctanesulfonic acid	27		1.7	0.42

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	75		33-140
STL01052	13C8 PFOA	78		52-124
STL02578	13C9 PFNA	84		48-130
STL02337	13C3 PFBS	111		23-175
STL02581	13C3 PFHxS	76		35-143
STL01054	13C8 PFOS	78		52-121
STL02279	M2-6:2 FTS	106		29-182
STL02280	M2-8:2 FTS	101		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: MSA-DMW-4S-063020 Lab Sample ID: 410-6410-9

Matrix: Water Lab File ID: 20JUL09-149.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/30/2020 14:25

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 289.2(mL) Date Analyzed: 07/10/2020 11:45

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	12		1.7	0.43
335-67-1	Perfluorooctanoic acid	46		1.7	0.43
375-95-1	Perfluorononanoic acid	4.9		1.7	0.43
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.3	1.7
375-73-5	Perfluorobutanesulfonic acid	11		1.7	0.43
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.6	0.86
355-46-4	Perfluorohexanesulfonic acid	300		1.7	0.43

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	83		33-140
STL01052	13C8 PFOA	91		52-124
STL02578	13C9 PFNA	102		48-130
STL02337	13C3 PFBS	131		23-175
STL02581	13C3 PFHxS	84		35-143
STL01054	13C8 PFOS	89		52-121
STL02279	M2-6:2 FTS	174		29-182
STL02280	M2-8:2 FTS	164		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: MSA-DMW-4S-063020 DL Lab Sample ID: 410-6410-9 DL

Matrix: Water Lab File ID: 20JUL15-95.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/30/2020 14:25

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 289.2(mL) Date Analyzed: 07/16/2020 02:26

Con. Extract Vol.: 1(mL) Dilution Factor: 10

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22831 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
1763-23-1	Perfluorooctanesulfonic acid	300		17	4.3

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01054	13C8 PFOS	99		52-121

Appendix C

Support Documentation

410-6410 Chain of Custody

Chain of Custody Record 321393

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Samantha Brenner	Site Contact: Patrick O'Brien	Date: 6/30/20	COC No:
Company Name: Tetra Tech	Tel/Fax: 301-528-3556	Lab Contact: Stephen Gordon	Carrier: Fedex	1 of 1 COCs
Address: 10251 Century Blvd. Suite 400	Analysis Turnaround Time			Sampler:
City/State/Zip: Germantown, MD 20874	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 301-528-5552	TAT if different from Below			Walk-in Client:
Fax: 301-528-5080	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day — Standard			Lab Sampling:
Project Name: MSA PFAS GW Round 2				Job / SDG No.:
Site: MSA				
PO # 117FD09023				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFAS (Method 537)	Sample Specific Notes:
EQB-WL-063020	6/30/20		G	GW	2	N	N	X	
MSA-FB-063020	6/30/20	0945	G	GW	2			X	Trizma preserved FB
MSA-MW-44S-063020	6/30/20	1005	G	GW	2			X	
MSA-MW-46S-063020	6/30/20	1105	G	GW	2			X	
MSA-MW-35S-063020	6/30/20	1315	G	GW	2			X	
MSA-DUP-1-063020	6/30/20	0000	G	GW	2			X	
MSA-DMW-5S-063020		1200	G	GW	2			X	
MSA-DMW-5I-063020		1257	G	GW	2			X	
MSA-DMW-4S-063020		1425	G	GW	6			X	MS/MSD

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: 2.8 Corr'd: 2.8	Therm ID No.: 01-42-04
Relinquished by:	Company: Tetra Tech	Date/Time: 6/30/20	Received by:	Company: FEDEX	Date/Time: 6/30/20 1545
Relinquished by:	Company: EFA	Date/Time: 7/1/20 1340	Received by:	Company: ELE	Date/Time: 7/1/20 10:40
Relinquished by:	Company: ELE	Date/Time: 7/1/20 1800	Received in Laboratory by:	Company: ELE	Date/Time: 7-1-20 1834

CT

Qualifiers

LCMS

Qualifier	Qualifier Description
*5	Isotope dilution analyte is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
E	Result exceeded calibration range.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job Narrative
410-6410-1

Comments
No additional comments.

Receipt
The samples were received on 7/1/2020 6:39 PM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.8º C.

Receipt Exceptions

The Field Sampler was not listed on the Chain of Custody.

Received sample EQB-WL-063020 labeled with date and time of 6/30/20, 0800.

LCMS
Method 3535: Isotope Dilution Analyte (IDA) recovery is above QC acceptance criteria as noted on the QC summary for the following samples: MSA-MW-44S-063020 (410-6410-3), MSA-DUP-1-063020 (410-6410-6) and MSA-DMW-5S-063020 (410-6410-7). The native analytes were not detected and the data is reported.

Method 537 (modified): Internal standard response for 13C3-PFBA for the following sample was outside acceptance criteria: MSA-MW-35S-063020 (410-6410-5). The sample was reinjected and internal standard response for 13C3-PFBA was again outside acceptance criteria.

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

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

Method Summary

Client: Tetra Tech, Inc. Job ID: 410-6410-1
Project/Site: MSA PFAS GW Round 2

Method	Method Description	Protocol	Laboratory
EPA 537 (Mod)	EPA 537 Isotope Dilution	EPA	ELLE
EPA 537 (mod)	EPA 537 Isotope Dilution	EPA	ELLE

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: Tetra Tech, Inc.
Job ID: 410-6410-1
Project/Site: MSA PFAS GW Round 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
410-6410-1	EQB-WL-063020	Water	06/30/20 00:00	07/01/20 18:39	
410-6410-2	MSA-FB-063020	Water	06/30/20 09:45	07/01/20 18:39	
410-6410-3	MSA-MW-44S-063020	Water	06/30/20 10:05	07/01/20 18:39	
410-6410-4	MSA-MW-46S-063020	Water	06/30/20 11:05	07/01/20 18:39	
410-6410-5	MSA-MW-35S-063020	Water	06/30/20 13:15	07/01/20 18:39	
410-6410-6	MSA-DUP-1-063020	Water	06/30/20 00:00	07/01/20 18:39	
410-6410-7	MSA-DMW-5S-063020	Water	06/30/20 12:00	07/01/20 18:39	
410-6410-8	MSA-DMW-5I-063020	Water	06/30/20 12:57	07/01/20 18:39	
410-6410-9	MSA-DMW-4S-063020	Water	06/30/20 14:25	07/01/20 18:39	

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6410-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C3PFBS #	C4PFHA #	C3PFHS #	M262FTS #	C8PFOA #	C8PFOS #	C9PFNA #	M282FTS #
EQB-WL-063020	410-6410-1	91	91	92	105	92	91	93	118
MSA-FB-063020	410-6410-2	95	91	94	99	91	93	96	110
MSA-MW-44S-063020	410-6410-3	138	94	93	226 *5	102	102	119	184 *5
MSA-MW-46S-063020	410-6410-4	150	78	82	164	87	87	98	133
MSA-MW-35S-063020	410-6410-5	297 *5	80	79	133	87	105	117	133
MSA-MW-35S-063020 RA	410-6410-5 RA	209 *5	87	91	174	98	99	104	200 *5
MSA-DUP-1-063020	410-6410-6	115	81	80	190 *5	87	88	101	158
MSA-DMW-5S-063020	410-6410-7	134	80	81	199 *5	94	95	110	170 *5
MSA-DMW-5I-063020	410-6410-8	111	75	76	106	78	78	84	101
MSA-DMW-4S-063020	410-6410-9	131	83	84	174	91	89	102	164
	MB 410-19257/1-A	84	86	84	95	86	86	94	88
	LCS 410-19257/2-A	102	97	95	109	96	101	102	111
MSA-DMW-4S-063020 MS	410-6410-9 MS	133	82	83	175	93	91	107	154
MSA-DMW-4S-063020 MSD	410-6410-9 MSD	138	82	84	184 *5	96	93	103	166

	QC LIMITS
C3PFBS = 13C3 PFBS	23-175
C4PFHA = 13C4 PFHpA	33-140
C3PFHS = 13C3 PFHxS	35-143
M262FTS = M2-6:2 FTS	29-182
C8PFOA = 13C8 PFOA	52-124
C8PFOS = 13C8 PFOS	52-121
C9PFNA = 13C9 PFNA	48-130
M282FTS = M2-8:2 FTS	37-169

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6410-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C3PFHS #
MSA-DMW-5S-063020 DL	410-6410-7 DL	101

	QC LIMITS
C3PFHS = 13C3 PFHxS	35-143

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6410-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C3PFHS #	C8PFOA #	C8PFOS #
MSA-MW-35S-063020 DL	410-6410-5 DL	103	94	105

	QC LIMITS
C3PFHS = 13C3 PFHxS	35-143
C8PFOA = 13C8 PFOA	52-124
C8PFOS = 13C8 PFOS	52-121

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6410-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C8PFOS #
MSA-DMW-4S-063020 DL	410-6410-9 DL	99

	QC LIMITS
C8PFOS = 13C8 PFOS	52-121

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6410-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL09-139.d

Lab ID: LCS 410-19257/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluoroheptanoic acid	25.6	25.7	100	69-144	
Perfluorooctanoic acid	25.6	26.4	103	67-139	
Perfluorononanoic acid	25.6	25.4	99	66-144	
6:2 Fluorotelomer sulfonic acid	24.3	25.5	105	56-140	
Perfluorobutanesulfonic acid	22.6	21.2	94	67-135	
8:2 Fluorotelomer sulfonic acid	24.5	23.4	95	58-143	
Perfluorohexanesulfonic acid	24.2	22.4	93	63-132	
Perfluorooctanesulfonic acid	24.5	21.2	87	53-129	
13C4 PFHpA	40.0	38.8	97	33-140	
13C8 PFOA	40.0	38.2	96	52-124	
13C9 PFNA	40.0	40.9	102	48-130	
13C3 PFBS	37.4	38.4	102	23-175	
13C3 PFHxS	37.8	35.9	95	35-143	
13C8 PFOS	38.3	38.5	101	52-121	
M2-6:2 FTS	38.0	41.4	109	29-182	
M2-8:2 FTS	38.3	42.5	111	37-169	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: Lab Sample ID: LCS 410-19257/2-A

Matrix: Water Lab File ID: 20JUL09-139.d

Analysis Method: EPA 537 (Mod) Date Collected:

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 250(mL) Date Analyzed: 07/10/2020 10:12

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	25.7		2.0	0.50
335-67-1	Perfluorooctanoic acid	26.4		2.0	0.50
375-95-1	Perfluorononanoic acid	25.4		2.0	0.50
27619-97-2	6:2 Fluorotelomer sulfonic acid	25.5		5.0	2.0
375-73-5	Perfluorobutanesulfonic acid	21.2		2.0	0.50
39108-34-4	8:2 Fluorotelomer sulfonic acid	23.4		3.0	1.0
355-46-4	Perfluorohexanesulfonic acid	22.4		2.0	0.50
1763-23-1	Perfluorooctanesulfonic acid	21.2		2.0	0.50

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	97		33-140
STL01052	13C8 PFOA	96		52-124
STL02578	13C9 PFNA	102		48-130
STL02337	13C3 PFBS	102		23-175
STL02581	13C3 PFHxS	95		35-143
STL01054	13C8 PFOS	101		52-121
STL02279	M2-6:2 FTS	109		29-182
STL02280	M2-8:2 FTS	111		37-169

FORM III
LCMS MATRIX SPIKE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6410-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL09-150.d

Lab ID: 410-6410-9 MS Client ID: MSA-DMW-4S-063020 MS

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC	QC LIMITS REC	#
Perfluoroheptanoic acid	22.1	12	34.6	100	69-144	
Perfluorooctanoic acid	22.1	46	72.1	116	67-139	
Perfluorononanoic acid	22.1	4.9	26.9	99	66-144	
6:2 Fluorotelomer sulfonic acid	21.0	ND	24.1	115	56-140	
Perfluorobutanesulfonic acid	19.5	11	30.9	103	67-135	
8:2 Fluorotelomer sulfonic acid	21.2	ND	23.4	110	58-143	
Perfluorohexanesulfonic acid	20.9	300	313	85	63-132	4
Perfluorooctanesulfonic acid	21.1	360	363	-0.02	53-129	E 4
13C4 PFHpA	34.5	29	28.3	82	33-140	
13C8 PFOA	34.5	31	31.9	93	52-124	
13C9 PFNA	34.5	35	36.8	107	48-130	
13C3 PFBS	32.3	42	42.8	133	23-175	
13C3 PFHxS	32.7	27	27.0	83	35-143	
13C8 PFOS	33.0	29	30.2	91	52-121	
M2-6:2 FTS	32.8	57	57.5	175	29-182	
M2-8:2 FTS	33.1	54	51.0	154	37-169	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: MSA-DMW-4S-063020 MS Lab Sample ID: 410-6410-9 MS

Matrix: Water Lab File ID: 20JUL09-150.d

Analysis Method: EPA 537 (Mod) Date Collected: 06/30/2020 14:25

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 289.6(mL) Date Analyzed: 07/10/2020 11:54

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	34.6		1.7	0.43
335-67-1	Perfluorooctanoic acid	72.1		1.7	0.43
375-95-1	Perfluorononanoic acid	26.9		1.7	0.43
27619-97-2	6:2 Fluorotelomer sulfonic acid	24.1		4.3	1.7
375-73-5	Perfluorobutanesulfonic acid	30.9		1.7	0.43
39108-34-4	8:2 Fluorotelomer sulfonic acid	23.4		2.6	0.86
355-46-4	Perfluorohexanesulfonic acid	313		1.7	0.43
1763-23-1	Perfluorooctanesulfonic acid	363		1.7	0.43

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	82		33-140
STL01052	13C8 PFOA	93		52-124
STL02578	13C9 PFNA	107		48-130
STL02337	13C3 PFBS	133		23-175
STL02581	13C3 PFHxS	83		35-143
STL01054	13C8 PFOS	91		52-121
STL02279	M2-6:2 FTS	175		29-182
STL02280	M2-8:2 FTS	154		37-169

FORM III
LCMS MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6410-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL09-151.d

Lab ID: 410-6410-9 MSD Client ID: MSA-DMW-4S-063020 MSD

COMPOUND	SPIKE ADDED (ng/L)	MSD CONCENTRATION (ng/L)	MSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
Perfluoroheptanoic acid	22.3	35.5	104	3	30	69-144	
Perfluorooctanoic acid	22.3	68.7	100	5	30	67-139	
Perfluorononanoic acid	22.3	30.1	113	11	30	66-144	
6:2 Fluorotelomer sulfonic acid	21.1	23.7	112	2	30	56-140	
Perfluorobutanesulfonic acid	19.7	30.2	98	2	30	67-135	
8:2 Fluorotelomer sulfonic acid	21.3	22.8	107	2	30	58-143	
Perfluorohexanesulfonic acid	21.1	323	131	3	30	63-132	E 4
Perfluorooctanesulfonic acid	21.3	361	-10	1	30	53-129	E 4
13C4 PFHpA	34.8	28.6	82			33-140	
13C8 PFOA	34.8	33.5	96			52-124	
13C9 PFNA	34.8	35.7	103			48-130	
13C3 PFBS	32.6	45.1	138			23-175	
13C3 PFHxS	32.9	27.6	84			35-143	
13C8 PFOS	33.3	30.8	93			52-121	
M2-6:2 FTS	33.1	60.8	184			29-182	*5
M2-8:2 FTS	33.3	55.5	166			37-169	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6410-1

SDG No.:

Lab File ID: 20JUL09-138.d Lab Sample ID: MB 410-19257/1-A

Matrix: Water Date Extracted: 07/03/2020 08:37

Instrument ID: 30733 Date Analyzed: 07/10/2020 10:01

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 410-19257/2-A	20JUL09-139.d	07/10/2020 10:12
EQB-WL-063020	410-6410-1	20JUL09-140.d	07/10/2020 10:21
MSA-FB-063020	410-6410-2	20JUL09-142.d	07/10/2020 10:40
MSA-MW-44S-063020	410-6410-3	20JUL09-143.d	07/10/2020 10:51
MSA-MW-46S-063020	410-6410-4	20JUL09-144.d	07/10/2020 11:00
MSA-MW-35S-063020 RA	410-6410-5 RA	20JUL09-145.d	07/10/2020 11:09
MSA-DUP-1-063020	410-6410-6	20JUL09-146.d	07/10/2020 11:18
MSA-DMW-5S-063020	410-6410-7	20JUL09-147.d	07/10/2020 11:27
MSA-DMW-5I-063020	410-6410-8	20JUL09-148.d	07/10/2020 11:36
MSA-DMW-4S-063020	410-6410-9	20JUL09-149.d	07/10/2020 11:45
MSA-DMW-4S-063020 MS	410-6410-9 MS	20JUL09-150.d	07/10/2020 11:54
MSA-DMW-4S-063020 MSD	410-6410-9 MSD	20JUL09-151.d	07/10/2020 12:03
MSA-MW-35S-063020	410-6410-5	20JUL15-91.d	07/16/2020 01:50
MSA-MW-35S-063020 DL	410-6410-5 DL	20JUL15-92.d	07/16/2020 01:59
MSA-DMW-5S-063020 DL	410-6410-7 DL	20JUL15-94.d	07/16/2020 02:17
MSA-DMW-4S-063020 DL	410-6410-9 DL	20JUL15-95.d	07/16/2020 02:26

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Client Sample ID: Lab Sample ID: MB 410-19257/1-A

Matrix: Water Lab File ID: 20JUL09-138.d

Analysis Method: EPA 537 (Mod) Date Collected:

Extraction Method: EPA 537 (mod) Date Extracted: 07/03/2020 08:37

Sample wt/vol: 250(mL) Date Analyzed: 07/10/2020 10:01

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	ND		2.0	0.50
335-67-1	Perfluorooctanoic acid	ND		2.0	0.50
375-95-1	Perfluorononanoic acid	ND		2.0	0.50
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		5.0	2.0
375-73-5	Perfluorobutanesulfonic acid	ND		2.0	0.50
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		3.0	1.0
355-46-4	Perfluorohexanesulfonic acid	ND		2.0	0.50
1763-23-1	Perfluorooctanesulfonic acid	ND		2.0	0.50

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	86		33-140
STL01052	13C8 PFOA	86		52-124
STL02578	13C9 PFNA	94		48-130
STL02337	13C3 PFBS	84		23-175
STL02581	13C3 PFHxS	84		35-143
STL01054	13C8 PFOS	86		52-121
STL02279	M2-6:2 FTS	95		29-182
STL02280	M2-8:2 FTS	88		37-169

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Instrument ID: 27632 Calibration Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/13/2020 13:55

Calibration ID: 6740

		13C3PFBA		13PFOA		PFOS	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1443380	3.35	1134281	5.05	475947	5.38
UPPER LIMIT		2165070	3.55	1701422	5.25	713921	5.58
LOWER LIMIT		721690	3.15	567141	4.85	237974	5.18
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-21880/8		1259622	3.35	1019246	5.05	427114	5.37
ICV 410-21880/9		1729800	3.34	1337683	5.04	557572	5.37
CCV 410-22831/70		1543171	3.33	1017274	5.01	463134	5.35
410-6410-5	MSA-MW-35S-063020	311583*3	3.32	1122791	5.02	330802	5.34
410-6410-5 DL	MSA-MW-35S-063020 DL	1334148	3.32	1339684	5.01	537956	5.35
410-6410-7 DL	MSA-DMW-5S-063020 DL	1623959	3.32	1395323	5.00	590979	5.34
410-6410-9 DL	MSA-DMW-4S-063020 DL	1614461	3.33	1279546	5.01	535184	5.34
CCV 410-22831/79		1812039	3.32	1219648	5.01	569050	5.34

13C3PFBA = 13C3-PFBA
13PFOA = 13C2 PFOA
PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Instrument ID: 27632 Calibration Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/13/2020 13:55

Calibration ID: 6740

		PFDA					
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		862620	5.71				
UPPER LIMIT		1293930	5.91				
LOWER LIMIT		431310	5.51				
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-21880/8		734089	5.71				
ICV 410-21880/9		1045892	5.71				
CCV 410-22831/70		792994	5.68				
410-6410-5	MSA-MW-35S-063020	1003632	5.67				
410-6410-5 DL	MSA-MW-35S-063020 DL	1031281	5.67				
410-6410-7 DL	MSA-DMW-5S-063020 DL	1074134	5.66				
410-6410-9 DL	MSA-DMW-4S-063020 DL	1020493	5.67				
CCV 410-22831/79		977785	5.67				

PFDA = 13C2 PFDA

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Instrument ID: 30733 Calibration Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/09/2020 11:08

Calibration ID: 6664

		13C3PFBA		13PFOA		PFOS	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1810897	3.54	2342094	5.26	1136098	5.58
UPPER LIMIT		2716346	3.74	3513141	5.46	1704147	5.78
LOWER LIMIT		905449	3.34	1171047	5.06	568049	5.38
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-20482/8		1707938	3.53	2312321	5.26	1072027	5.58
ICV 410-20482/9		1899600	3.53	2526066	5.25	1207497	5.58
CCV 410-20936/125		2052647	3.57	2585770	5.24	1177086	5.56
MB 410-19257/1-A		2024142	3.57	2573253	5.25	1148637	5.57
LCS 410-19257/2-A		1859339	3.51	2521246	5.25	1150214	5.57
410-6410-1	EQB-WL-063020	2025931	3.56	2678246	5.29	1296091	5.60
CCV 410-20936/139		1948925	3.57	2441883	5.24	1127555	5.56
410-6410-2	MSA-FB-063020	1893247	3.57	2447322	5.24	1134840	5.56
410-6410-3	MSA-MW-44S-063020	1201291	3.53	2455795	5.24	1064474	5.57
410-6410-4	MSA-MW-46S-063020	992337	3.54	2586477	5.25	1199767	5.56
410-6410-5 RA	MSA-MW-35S-063020 RA	742679*3	3.52	2064645	5.24	815605	5.56
410-6410-6	MSA-DUP-1-063020	1560189	3.52	2970630	5.24	1280146	5.56
410-6410-7	MSA-DMW-5S-063020	1315799	3.53	2766896	5.24	1214231	5.56
410-6410-8	MSA-DMW-5I-063020	1502028	3.53	2917109	5.24	1312861	5.56
410-6410-9	MSA-DMW-4S-063020	1192847	3.53	2476534	5.24	1090222	5.56
410-6410-9 MS	MSA-DMW-4S-063020 MS	1176448	3.55	2546041	5.25	1171057	5.57
410-6410-9 MSD	MSA-DMW-4S-063020 MSD	1157341	3.51	2429564	5.24	1133874	5.56
CCV 410-20936/150		1910079	3.57	2402958	5.25	1118317	5.57

13C3PFBA = 13C3-PFBA
13PFOA = 13C2 PFOA
PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6410-1

SDG No.:

Instrument ID: 30733 Calibration Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/09/2020 11:08

Calibration ID: 6664

		PFDA					
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		2137017	5.91				
UPPER LIMIT		3205526	6.11				
LOWER LIMIT		1068509	5.71				
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-20482/8		2052405	5.91				
ICV 410-20482/9		2272200	5.91				
CCV 410-20936/125		2207971	5.89				
MB 410-19257/1-A		2239836	5.89				
LCS 410-19257/2-A		2204204	5.89				
410-6410-1	EQB-WL-063020	2447379	5.92				
CCV 410-20936/139		2195770	5.89				
410-6410-2	MSA-FB-063020	2053572	5.89				
410-6410-3	MSA-MW-44S-063020	2297310	5.89				
410-6410-4	MSA-MW-46S-063020	2289301	5.89				
410-6410-5 RA	MSA-MW-35S-063020 RA	1048122*3	5.89				
410-6410-6	MSA-DUP-1-063020	2538290	5.88				
410-6410-7	MSA-DMW-5S-063020	2513986	5.89				
410-6410-8	MSA-DMW-5I-063020	2532222	5.89				
410-6410-9	MSA-DMW-4S-063020	1876878	5.89				
410-6410-9 MS	MSA-DMW-4S-063020 MS	2447933	5.89				
410-6410-9 MSD	MSA-DMW-4S-063020 MSD	2121642	5.89				
CCV 410-20936/150		2049873	5.90				

PFDA = 13C2 PFDA

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-21880/1	20JUL13MCAL-09.d
Level 2	IC 410-21880/2	20JUL13MCAL-10.d
Level 3	IC 410-21880/3	20JUL13MCAL-11.d
Level 4	IC 410-21880/4	20JUL13MCAL-12.d
Level 5	ICISAV 410-21880/5	20JUL13MCAL-13.d
Level 6	IC 410-21880/6	20JUL13MCAL-14.d
Level 7	IC 410-21880/7	20JUL13MCAL-15.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid	1.0942 0.8086	0.9410 0.8004	0.8708	0.8075	0.8744	LID1F		0.8127							0.9990		0.9900
Perfluoropentanoic acid	1.1649 0.8961	1.0268 0.8773	0.9175	0.9240	0.9672	LID1F		0.8957							0.9990		0.9900
Perfluorobutanesulfonic acid	1.0096 1.0254	1.0012 0.9953	0.9754	0.9483	1.0668	LID1F		1.0093							0.9990		0.9900
4:2 Fluorotelomer sulfonic acid	1.8279 1.5584	1.8753 1.6923	1.9107	1.6686	1.8203	LID1F		1.6714							0.9970		0.9900
Perfluorohexanoic acid	0.8889 0.7545	0.7911 0.7041	0.8037	0.7438	0.8042	LID1F		0.7324							0.9980		0.9900
Perfluoropentanesulfonic acid	0.5329 0.4398	0.5039 0.4706	0.4603	0.4526	0.4917	LID1F		0.4637							0.9990		0.9900
HFPODA	2.7281 2.5663	2.4548 2.1385	2.2600	2.0309	2.2211	LID1F		2.2642							0.9930		0.9900
Perfluoroheptanoic acid	1.5656 1.1961	1.2701 1.0636	1.3663	1.2508	1.2949	LID1F		1.1387							0.9930		0.9900
Perfluorohexanesulfonic acid	1.1053 1.0089	1.0370 0.9666	0.9551	0.9676	1.0336	LID1F		0.9860							0.9990		0.9900
DONA	1.6160 1.3488	1.3873 1.2472	1.4714	1.4018	1.4601	LID1F		1.3090							0.9960		0.9900
6:2 Fluorotelomer sulfonic acid	1.7276 1.6135	1.6006 1.5337	1.7825	1.6137	1.7642	LID1F		1.5880							0.9980		0.9900
Perfluoroheptanesulfonic acid	1.0152 0.8964	0.8660 0.8646	0.8487	0.8449	0.9029	LID1F		0.8768							1.0000		0.9900
Perfluorooctanoic acid	0.9610 0.7108	0.7432 0.6854	0.6736	0.6824	0.7345	LID1F		0.6981							0.9990		0.9900
Perfluorooctanesulfonic acid	1.2449 1.0644	1.0934 1.0228	0.9650	0.9841	0.9906	LID1F		1.0288							0.9990		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorononanoic acid	0.8664 0.8632	0.9145 0.8285	0.8785	0.8188	0.9009	LID1F		0.8465							0.9990		0.9900
9Cl-PF3ONS	2.4470 2.2699	2.2827 2.2448	2.1367	2.1817	2.2572	LID1F		2.2495							1.0000		0.9900
Perfluorononanesulfonic acid	0.6995 0.6591	0.7009 0.6428	0.6819	0.6563	0.6691	LID1F		0.6514							1.0000		0.9900
Perfluorodecanoic acid	0.5861 0.5574	0.5839 0.5535	0.5190	0.5681	0.5867	LID1F		0.5587							1.0000		0.9900
8:2 Fluorotelomer sulfonic acid	1.8646 1.6757	1.6514 1.5120	1.5427	1.7516	1.7115	LID1F		1.5911							0.9970		0.9900
Perfluorooctanesulfonamide	1.0466 1.0098	0.9586 0.9253	1.0024	0.9229	1.0336	LID1F		0.9616							0.9980		0.9900
NMeFOSAA	1.0122 1.0226	0.9525 0.8888	1.0305	1.0055	1.0748	LID1F		0.9535							0.9940		0.9900
Perfluorodecanesulfonic acid	0.5992 0.5095	0.5835 0.5191	0.5180	0.5180	0.5042	LID1F		0.5150							1.0000		0.9900
Perfluoroundecanoic acid	0.6005 0.5240	0.5215 0.4585	0.5741	0.4920	0.5329	LID1F		0.4880							0.9950		0.9900
NEtFOSAA	1.1603 0.9177	0.8977 0.9441	0.9754	0.9723	1.0408	LID1F		0.9492							0.9980		0.9900
11Cl-PF3OUdS	1.8842 1.8393	1.7714 1.7959	1.6464	1.6938	1.7958	LID1F		1.8018							1.0000		0.9900
Perfluorododecanoic acid	0.7466 0.5554	0.5982 0.5400	0.5811	0.5705	0.5645	LID1F		0.5492							0.9990		0.9900
10:2 FTS	1.9781 1.9103	2.0679 1.7724	2.0445	2.0078	1.9085	LID1F		1.8401							0.9980		0.9900
NMeFOSE	0.9082 0.8761	0.8789 0.9636	0.9286	0.8802	0.9842	LID1F		0.9373							0.9980		0.9900
NMeFOSA	0.9339 1.0768	1.0185 1.0475	0.9778	0.9837	1.0664	LID1F		1.0539							1.0000		0.9900
Perfluorododecanesulfonic acid	0.2663 0.2527	0.2610 0.2536	0.2361	0.2428	0.2570	LID1F		0.2531							1.0000		0.9900
NEtFOSE	0.8375 0.7751	0.7792 0.7396	0.7322	0.7041	0.7469	LID1F		0.7488							0.9990		0.9900
Perfluorotridecanoic acid	0.9053 0.7834	0.8165 0.6822	0.7856	0.7636	0.8175	LID1F		0.7306							0.9940		0.9900
NEtFOSA	0.7918 1.0387	1.0161 0.9533	1.0036	0.9936	0.9965	LID1F		0.9840							0.9980		0.9900
Perfluorotetradecanoic acid	1.0586 0.8914	1.0133 0.8565	0.9986	1.0139	0.9759	LID1F		0.8885							0.9970		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorohexadecanoic acid	0.6883 0.5328	0.5889 0.4952	0.5457	0.5251	0.5715	LID1F		0.5164							0.9970		0.9900
Perfluorooctadecanoic acid	0.5186 0.4927	0.4878 0.4709	0.4817	0.4846	0.5194	LID1F		0.4832							0.9990		0.9900
13C4 PFBA	1.1180 1.0818	1.1605 1.0533	1.1496	1.1105	1.0970	Ave		1.1101				3.4		20.0			
13C5 PFPeA	0.9128 0.8720	0.9027 0.8313	0.8989	0.8702	0.8705	Ave		0.8798				3.1		20.0			
13C3 PFBS	0.4469 0.4313	0.4631 0.4275	0.4428	0.4324	0.4232	Ave		0.4382				3.1		20.0			
M2-4:2 FTS	0.0944 0.0973	0.0956 0.0949	0.0949	0.0984	0.0937	Ave		0.0956				1.8		20.0			
13C5 PFHxA	1.4386 1.4162	1.5172 1.3806	1.4431	1.4812	1.4240	Ave		1.4430				3.1		20.0			
13C3 HFPO-DA	0.2784 0.2523	0.2613 0.2903	0.2830	0.3103	0.3053	Ave		0.2830				7.5		20.0			
13C4 PFHpA	1.0365 1.0276	1.1256 1.0300	1.0560	1.0530	1.0755	Ave		1.0578				3.2		20.0			
13C3 PFHxS	0.4525 0.4256	0.4937 0.4135	0.4850	0.4656	0.4533	Ave		0.4556				6.4		20.0			
M2-6:2 FTS	0.0891 0.0702	0.0928 0.0664	0.0788	0.0786	0.0737	Ave		0.0785				12.3		20.0			
13C8 PFOA	1.3802 1.3197	1.4718 1.2327	1.4351	1.3955	1.3766	Ave		1.3731				5.7		20.0			
13C8 PFOS	0.9861 0.9752	1.0422 0.9686	1.0907	0.9969	1.0376	Ave		1.0139				4.4		20.0			
13C9 PFNA	2.1439 2.1234	2.3636 2.0840	2.3091	2.1904	2.1483	Ave		2.1947				4.7		20.0			
13C6 PFDA	1.7215 1.5056	1.7237 1.5282	1.6448	1.5967	1.6846	Ave		1.6293				5.4		20.0			
M2-8:2 FTS	0.1368 0.0944	0.1254 0.1001	0.1066	0.1092	0.1125	Ave		0.1121				13.0		20.0			
13C8 FOSA	1.3231 1.1050	1.2385 1.1655	1.1311	1.1740	1.2143	Ave		1.1931				6.1		20.0			
d3-NMeFOSAA	0.3102 0.2923	0.3187 0.3408	0.2887	0.3098	0.3180	Ave		0.3112				5.6		20.0			
13C7 PFUnA	1.5358 1.3860	1.5616 1.4895	1.4551	1.4894	1.5154	Ave		1.4904				3.9		20.0			
d5-NEtFOSAA	0.2716 0.2333	0.2463 0.2384	0.2286	0.2450	0.2534	Ave		0.2452				5.8		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
13C2-PFDoDA	1.7377 1.7264	1.9360 1.7453	1.7571	1.9271	1.8852	Ave		1.8164				5.2		20.0			
d7-N-MeFOSE-M	0.2508 0.2258	0.2266 0.2363	0.2223	0.2304	0.2341	Ave		0.2323				4.1		20.0			
d3-NMePFOSA	0.1394 0.1102	0.1190 0.1282	0.1146	0.1180	0.1252	Ave		0.1221				8.0		20.0			
d9-N-EtFOSE-M	0.2627 0.2193	0.2344 0.2421	0.2198	0.2328	0.2436	Ave		0.2364				6.4		20.0			
d5-NEtPFOSA	0.1088 0.0928	0.0967 0.1062	0.0958	0.0961	0.1026	Ave		0.0999				6.0		20.0			
13C2 PFTeDA	1.4494 1.3780	1.4423 1.4675	1.3890	1.4314	1.4421	Ave		1.4285				2.3		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-21880/1	20JUL13MCAL-09.d
Level 2	IC 410-21880/2	20JUL13MCAL-10.d
Level 3	IC 410-21880/3	20JUL13MCAL-11.d
Level 4	IC 410-21880/4	20JUL13MCAL-12.d
Level 5	ICISAV 410-21880/5	20JUL13MCAL-13.d
Level 6	IC 410-21880/6	20JUL13MCAL-14.d
Level 7	IC 410-21880/7	20JUL13MCAL-15.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid		LID1F	69431 11997076	159609 21699496	568737	2307540	5893808	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanoic acid		LID1F	60355 10716753	135471 18772184	468526	2068908	5174022	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorobutanesulfonic acid		LID1F	22664 5367662	59971 9692086	217149	933881	2455186	0.177 44.3	0.443 88.5	1.77	7.08	17.7
4:2 Fluorotelomer sulfonic acid		LID1F	7332 1536385	18875 3162711	76188	301882	752317	0.187 46.7	0.467 93.4	1.87	7.47	18.7
Perfluorohexanoic acid		LID1F	58199 11591241	135324 20502706	521855	2167887	5408586	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanesulfonic acid		LID1F	12678 2440032	31992 4857412	108620	472356	1199342	0.188 46.9	0.469 93.8	1.88	7.50	18.8
HFPODA		LID1F	34561 7023501	72311 13093215	287758	1240060	3203287	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoroheptanoic acid		LID1F	73855 13334156	161195 23106466	649206	2591483	6577812	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexanesulfonic acid		LID1F	20760 4248612	52641 7688445	190062	808498	2018139	0.182 45.6	0.456 91.2	1.82	7.30	18.2
DONA		LID1F	72038 14209258	166389 25604154	660667	2744557	7009023	0.189 47.3	0.473 94.5	1.89	7.56	18.9
6:2 Fluorotelomer sulfonic acid		LID1F	6641 1164970	15874 2035851	59880	236702	581944	0.190 47.4	0.474 94.8	1.90	7.58	19.0
Perfluoroheptanesulfonic acid		LID1F	19904 3940256	45889 7178851	176306	736943	1840412	0.190 47.6	0.476 95.2	1.90	7.62	19.0
Perfluorooctanoic acid		LID1F	60367 10176627	123330 17819051	434956	1873655	4775161	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctanesulfonic acid		LID1F	22427 4651450	52878 8174235	186865	799832	2009892	0.185 46.3	0.463 92.6	1.85	7.40	18.5
Perfluorononanoic acid		LID1F	36667 8875235	108379 15392947	389162	1579833	4088902	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
9Cl-PF3ONS		LID1F	44297 9967823	110928 18027720	415755	1781698	4601723	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorononanesulfonic acid		LID1F	13072 2987403	35160 5328626	136968	553252	1408086	0.192 48.0	0.480 96.0	1.92	7.68	19.2
Perfluorodecanoic acid		LID1F	34802 7038801	90209 12428914	306878	1361542	3438285	0.200 50.0	0.500 100	2.00	8.00	20.0
8:2 Fluorotelomer sulfonic acid		LID1F	8430 1271643	17787 2129847	56622	275027	641449	0.192 47.9	0.479 95.8	1.92	7.66	19.2
Perfluorooctanesulfonamide		LID1F	47764 9358734	106402 15845241	407551	1626363	4366515	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSAA		LID1F	10831 2506871	27205 4450282	106948	467568	1188868	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorodecanesulfonic acid		LID1F	11243 2318979	29390 4321524	104478	438481	1065608	0.193 48.2	0.482 96.4	1.93	7.71	19.3
Perfluoroundecanoic acid		LID1F	31810 6091736	72988 10035051	300247	1099950	2809263	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSAA		LID1F	10870 1796027	19813 3307195	80133	357513	917471	0.200 50.0	0.500 100	2.00	8.00	20.0
11Cl-PF3OUdS		LID1F	34109 8076972	86079 14422884	320345	1383286	3661137	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorododecanoic acid		LID1F	44749 8042843	103792 13848305	367022	1650105	3702240	0.200 50.0	0.500 100	2.00	8.00	20.0
10:2 FTS		LID1F	8999 1458729	22412 2512243	75506	317228	719734	0.193 48.2	0.482 96.4	1.93	7.71	19.3
NMeFOSE		LID1F	7857 1659332	17848 3345516	74211	304475	801539	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSA		LID1F	4491 995516	10862 1972954	40284	174195	464354	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorododecanesulfonic acid		LID1F	5018 1154877	13202 2119602	47809	206401	545361	0.194 48.4	0.484 96.8	1.94	7.74	19.4
NEtFOSE		LID1F	7587 1425894	16371 2631088	57856	246035	632999	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotridecanoic acid		LID1F	54259 11344399	141674 17494575	496169	2208799	5361638	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSA		LID1F	2972 808303	8810 1486807	34546	143370	355680	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotetradecanoic acid		LID1F	52917 10302571	130977 18466864	498582	2178289	4896020	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexadecanoic acid		LID1F	34408 6158348	76124 10677212	272466	1128232	2867156	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctadecanoic acid		LID1F	25925 5694959	63052 10154360	240515	1041196	2605568	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	13C3 PFBA	Ave	3172761 2967355	3392193 2711103	3265430	3571913	3370379	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C5 PFPeA	13C3 PFBA	Ave	2590654 2391896	2638706 2139665	2553330	2798856	2674657	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFBS	13C3 PFBA	Ave	1187092 1107237	1267062 1029883	1177328	1301876	1217071	9.36 9.36	9.36 9.36	9.36	9.36	9.36
M2-4:2 FTS	13PF OA	Ave	200563 197174	201303 186893	199374	226154	206649	9.34 9.34	9.34 9.34	9.34	9.34	9.34
13C5 PFHxA	13PF OA	Ave	3273785 3072617	3421335 2911805	3246481	3643084	3362725	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 HFPO-DA	13PF OA	Ave	633422 547355	589131 612248	636627	763240	721090	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C4 PFHpA	13PF OA	Ave	2358626 2229584	2538267 2172379	2375745	2589725	2539922	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFHxS	13PF OA	Ave	974106 873592	1053086 825076	1032100	1083353	1012703	9.46 9.46	9.46 9.46	9.46	9.46	9.46
M2-6:2 FTS	13PF OA	Ave	192607 144708	198775 133021	168324	183740	165283	9.50 9.50	9.50 9.50	9.50	9.50	9.50
13C8 PFOA	13PF OA	Ave	3140803 2863293	3318758 2599837	3228402	3432261	3250829	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C8 PFOS	PFOS	Ave	930927 903269	999590 825974	1000612	1049925	1048412	9.57 9.57	9.57 9.57	9.57	9.57	9.57
13C9 PFNA	PFOS	Ave	2116048 2056283	2370192 1857996	2214810	2411734	2269415	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C6 PFDA	PFDA	Ave	2968733 2525669	3089643 2245347	2956151	2995795	2930285	10.0 10.0	10.0 10.0	10.0	10.0	10.0
M2-8:2 FTS	PFDA	Ave	226054 151775	215416 140862	183511	196268	187389	9.58 9.58	9.58 9.58	9.58	9.58	9.58
13C8 FOSA	PFDA	Ave	2281818 1853618	2219989 1712452	2032844	2202758	2112267	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMeFOSAA	PFDA	Ave	535016 490279	571252 500717	518928	581266	553080	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C7 PFUnA	PFDA	Ave	2648646 2324946	2799073 2188460	2615147	2794411	2635910	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtFOSAA	PFDA	Ave	468432 391407	441433 350292	410778	459613	440737	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2-PFDoDA	PFDA	Ave	2996738 2896111	3470214 2564330	3157905	3615759	3279252	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d7-N-MeFOSE-M	PFDA	Ave	432562 378809	406159 347192	399598	432371	407198	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMePFOSA	PFDA	Ave	240434 184906	213299 188350	205987	221342	217721	10.0 10.0	10.0 10.0	10.0	10.0	10.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
d9-N-EtFOSE-M	PFDA	Ave	452957 367932	420175 355735	395079	436785	423734	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtPFOSA	PFDA	Ave	187664 155641	173408 155963	172104	180374	178466	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2 PFTeDA	PFDA	Ave	2499498 2311591	2585189 2156163	2496449	2685634	2508441	10.0 10.0	10.0 10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD
LID1F = Linear 1/Conc IsoDil FZ

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-21880/1	20JUL13MCAL-09.d
Level 2	IC 410-21880/2	20JUL13MCAL-10.d
Level 3	IC 410-21880/3	20JUL13MCAL-11.d
Level 4	IC 410-21880/4	20JUL13MCAL-12.d
Level 5	ICISAV 410-21880/5	20JUL13MCAL-13.d
Level 6	IC 410-21880/6	20JUL13MCAL-14.d
Level 7	IC 410-21880/7	20JUL13MCAL-15.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanoic acid	34.6 -1.5	15.8	7.2	-0.6	7.6	-0.5	50 30	30	30	30	30	30
Perfluoropentanoic acid	30.0 -2.1	14.6	2.4	3.2	8.0	0.0	50 30	30	30	30	30	30
Perfluorobutanesulfonic acid	0.0 -1.4	-0.8	-3.4	-6.0	5.7	1.6	50 30	30	30	30	30	30
4:2 Fluorotelomer sulfonic acid	9.4 1.2	12.2	14.3	-0.2	8.9	-6.8	50 30	30	30	30	30	30
Perfluorohexanoic acid	21.4 -3.9	8.0	9.7	1.6	9.8	3.0	50 30	30	30	30	30	30
Perfluoropentanesulfonic acid	14.9 1.5	8.7	-0.7	-2.4	6.0	-5.1	50 30	30	30	30	30	30
HFPODA	20.5 -5.5	8.4	-0.2	-10.3	-1.9	13.3	50 30	30	30	30	30	30
Perfluoroheptanoic acid	37.5 -6.6	11.5	20.0	9.9	13.7	5.0	50 30	30	30	30	30	30
Perfluorohexanesulfonic acid	12.1 -2.0	5.2	-3.1	-1.9	4.8	2.3	50 30	30	30	30	30	30
DONA	23.5 -4.7	6.0	12.4	7.1	11.5	3.0	50 30	30	30	30	30	30
6:2 Fluorotelomer sulfonic acid	8.8 -3.4	0.8	12.2	1.6	11.1	1.6	50 30	30	30	30	30	30
Perfluoroheptanesulfonic acid	15.8 -1.4	-1.2	-3.2	-3.6	3.0	2.2	50 30	30	30	30	30	30
Perfluorooctanoic acid	37.7 -1.8	6.5	-3.5	-2.2	5.2	1.8	50 30	30	30	30	30	30
Perfluorooctanesulfonic acid	21.0 -0.6	6.3	-6.2	-4.3	-3.7	3.5	50 30	30	30	30	30	30
Perfluorononanoic acid	2.4 -2.1	8.0	3.8	-3.3	6.4	2.0	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
9Cl-PF3ONS	8.8 -0.2	1.5	-5.0	-3.0	0.3	0.9	50 30	30	30	30	30	30
Perfluorononanesulfonic acid	7.4 -1.3	7.6	4.7	0.7	2.7	1.2	50 30	30	30	30	30	30
Perfluorodecanoic acid	4.9 -0.9	4.5	-7.1	1.7	5.0	-0.2	50 30	30	30	30	30	30
8:2 Fluorotelomer sulfonic acid	17.2 -5.0	3.8	-3.0	10.1	7.6	5.3	50 30	30	30	30	30	30
Perfluorooctanesulfonamide	8.8 -3.8	-0.3	4.2	-4.0	7.5	5.0	50 30	30	30	30	30	30
NMeFOSAA	6.2 -6.8	-0.1	8.1	5.5	12.7	7.3	50 30	30	30	30	30	30
Perfluorodecanesulfonic acid	16.3 0.8	13.3	0.6	0.6	-2.1	-1.1	50 30	30	30	30	30	30
Perfluoroundecanoic acid	23.1 -6.0	6.9	17.6	0.8	9.2	7.4	50 30	30	30	30	30	30
NEtFOSAA	22.2 -0.5	-5.4	2.8	2.4	9.7	-3.3	50 30	30	30	30	30	30
11Cl-PF3OUdS	4.6 -0.3	-1.7	-8.6	-6.0	-0.3	2.1	50 30	30	30	30	30	30
Perfluorododecanoic acid	36.0 -1.7	8.9	5.8	3.9	2.8	1.1	50 30	30	30	30	30	30
10:2 FTS	7.5 -3.7	12.4	11.1	9.1	3.7	3.8	50 30	30	30	30	30	30
NMeFOSE	-3.1 2.8	-6.2	-0.9	-6.1	5.0	-6.5	50 30	30	30	30	30	30
NMeFOSA	-11.4 -0.6	-3.4	-7.2	-6.7	1.2	2.2	50 30	30	30	30	30	30
Perfluorododecanesulfonic acid	5.2 0.2	3.1	-6.7	-4.1	1.6	-0.2	50 30	30	30	30	30	30
NEtFOSE	11.8 -1.2	4.1	-2.2	-6.0	-0.3	3.5	50 30	30	30	30	30	30
Perfluorotridecanoic acid	23.9 -6.6	11.8	7.5	4.5	11.9	7.2	50 30	30	30	30	30	30
NEtFOSA	-19.5 -3.1	3.3	2.0	1.0	1.3	5.6	50 30	30	30	30	30	30
Perfluorotetradecanoic acid	19.1 -3.6	14.0	12.4	14.1	9.8	0.3	50 30	30	30	30	30	30
Perfluorohexadecanoic acid	33.3 -4.1	14.0	5.7	1.7	10.7	3.2	50 30	30	30	30	30	30
Perfluorooctadecanoic acid	7.3 -2.5	1.0	-0.3	0.3	7.5	2.0	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
13C4 PFBA	0.7 -5.1	4.5	3.6	0.0	-1.2	-2.6	30 30	30	30	30	30	30
13C5 PFPeA	3.8 -5.5	2.6	2.2	-1.1	-1.1	-0.9	30 30	30	30	30	30	30
13C3 PFBS	2.0 -2.4	5.7	1.1	-1.3	-3.4	-1.6	30 30	30	30	30	30	30
M2-4:2 FTS	-1.3 -0.7	0.0	-0.7	3.0	-2.0	1.8	30 30	30	30	30	30	30
13C5 PFHxA	-0.3 -4.3	5.1	0.0	2.7	-1.3	-1.9	30 30	30	30	30	30	30
13C3 HFPO-DA	-1.6 2.6	-7.7	0.0	9.7	7.9	-10.8	30 30	30	30	30	30	30
13C4 PFHpA	-2.0 -2.6	6.4	-0.2	-0.5	1.7	-2.8	30 30	30	30	30	30	30
13C3 PFHxS	-0.7 -9.2	8.4	6.4	2.2	-0.5	-6.6	30 30	30	30	30	30	30
M2-6:2 FTS	13.5 -15.4	18.2	0.3	0.2	-6.2	-10.6	30 30	30	30	30	30	30
13C8 PFOA	0.5 -10.2	7.2	4.5	1.6	0.3	-3.9	30 30	30	30	30	30	30
13C8 PFOS	-2.7 -4.5	2.8	7.6	-1.7	2.3	-3.8	30 30	30	30	30	30	30
13C9 PFNA	-2.3 -5.0	7.7	5.2	-0.2	-2.1	-3.2	30 30	30	30	30	30	30
13C6 PFDA	5.7 -6.2	5.8	1.0	-2.0	3.4	-7.6	30 30	30	30	30	30	30
M2-8:2 FTS	22.0 -10.8	11.9	-5.0	-2.6	0.3	-15.8	30 30	30	30	30	30	30
13C8 FOSA	10.9 -2.3	3.8	-5.2	-1.6	1.8	-7.4	30 30	30	30	30	30	30
d3-NMeFOSAA	-0.3 9.5	2.4	-7.2	-0.5	2.2	-6.1	30 30	30	30	30	30	30
13C7 PFUnA	3.1 -0.1	4.8	-2.4	-0.1	1.7	-7.0	30 30	30	30	30	30	30
d5-NEtFOSAA	10.8 -2.8	0.4	-6.8	-0.1	3.3	-4.9	30 30	30	30	30	30	30
13C2-PFDoDA	-4.3 -3.9	6.6	-3.3	6.1	3.8	-5.0	30 30	30	30	30	30	30
d7-N-MeFOSE-M	8.0 1.7	-2.5	-4.3	-0.8	0.8	-2.8	30 30	30	30	30	30	30
d3-NMePFOSA	14.2 5.0	-2.5	-6.1	-3.4	2.5	-9.7	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
d9-N-EtFOSE-M	11.1 2.4	-0.8	-7.0	-1.5	3.1	-7.2	30 30	30	30	30	30	30
d5-NEtPFOSA	9.0 6.3	-3.1	-4.1	-3.7	2.7	-7.1	30 30	30	30	30	30	30
13C2 PFTeDA	1.5 2.7	1.0	-2.8	0.2	1.0	-3.5	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-20482/1	20JUL09MCAL-09.d
Level 2	IC 410-20482/2	20JUL09MCAL-10.d
Level 3	IC 410-20482/3	20JUL09MCAL-11.d
Level 4	IC 410-20482/4	20JUL09MCAL-12.d
Level 5	ICISAV 410-20482/5	20JUL09MCAL-13.d
Level 6	IC 410-20482/6	20JUL09MCAL-14.d
Level 7	IC 410-20482/7	20JUL09MCAL-15.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid	1.0890 0.8294	0.9278 0.8123	0.8716	0.8058	0.8797	LID1F		0.8255							0.9990		0.9900
Perfluoropentanoic acid	1.1959 0.9345	1.0423 0.9300	0.9542	0.9440	0.9903	LID1F		0.9394							0.9990		0.9900
Perfluorobutanesulfonic acid	1.1226 1.0425	0.9850 0.9825	0.9751	1.0081	1.0459	LID1F		1.0073							0.9990		0.9900
4:2 Fluorotelomer sulfonic acid	3.7276 3.4136	3.2886 3.2415	3.3442	3.4207	3.5995	LID1F		3.3385							0.9990		0.9900
Perfluorohexanoic acid	0.9232 0.7654	0.8307 0.7770	0.7862	0.7397	0.8497	LID1F		0.7806							0.9990		0.9900
Perfluoropentanesulfonic acid	0.9939 0.8649	0.9072 0.8561	0.8603	0.8733	0.9588	LID1F		0.8710							0.9990		0.9900
HFPODA	2.7792 2.6693	2.5333 2.4352	2.5096	2.6150	2.7574	LID1F		2.5451							0.9970		0.9900
Perfluoroheptanoic acid	1.2338 1.0373	1.1258 1.0078	1.1633	1.0382	1.1389	LID1F		1.0341							0.9980		0.9900
Perfluorohexanesulfonic acid	1.2074 0.9900	1.0188 1.0082	1.0049	0.9531	1.0523	LID1F		1.0058							1.0000		0.9900
DONA	1.6466 1.4508	1.4906 1.4500	1.5494	1.4280	1.5257	LID1F		1.4591							1.0000		0.9900
6:2 Fluorotelomer sulfonic acid	6.6855 4.7443	5.0388 4.6222	5.3100	5.2617	5.4551	LID1F		4.7876							0.9960		0.9900
Perfluoroheptanesulfonic acid	0.9369 0.8837	0.9256 0.8958	0.8852	0.8568	0.9197	LID1F		0.8934							1.0000		0.9900
Perfluorooctanoic acid	1.0536 0.8648	0.9729 0.8270	0.8712	0.8417	0.8715	LID1F		0.8442							0.9990		0.9900
Perfluorooctanesulfonic acid	1.2793 1.0102	1.0320 1.0300	1.0444	0.9782	1.0393	LID1F		1.0237							1.0000		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorononanoic acid	0.8892 0.8705	0.8792 0.8092	0.8496	0.8289	0.9025	LID1F		0.8381							0.9980		0.9900
9Cl-PF3ONS	1.9975 1.6248	1.6236 1.6782	1.6437	1.5864	1.6558	LID1F		1.6567							1.0000		0.9900
Perfluorononanesulfonic acid	0.9061 0.8475	0.8255 0.8840	0.8706	0.8706	0.8680	LID1F		0.8713							1.0000		0.9900
Perfluorodecanoic acid	0.9730 0.8401	0.8751 0.8137	0.8279	0.8215	0.8781	LID1F		0.8290							0.9990		0.9900
8:2 Fluorotelomer sulfonic acid	8.4365 8.1833	7.6991 7.7374	8.0675	8.0594	8.2689	LID1F		7.9382							0.9990		0.9900
Perfluorooctanesulfonamide	1.0133 1.0062	1.0267 0.9954	1.0257	0.9757	1.0764	LID1F		1.0069							0.9990		0.9900
NMeFOSAA	1.1160 0.9816	1.0285 0.9696	0.9970	1.0124	1.0465	LID1F		0.9840							0.9990		0.9900
Perfluorodecanesulfonic acid	1.0169 0.8959	0.8885 0.9018	0.9220	0.8571	0.9100	LID1F		0.8994							1.0000		0.9900
Perfluoroundecanoic acid	0.9336 0.7955	0.7989 0.7829	0.8411	0.8026	0.8265	LID1F		0.7929							1.0000		0.9900
NEtFOSAA	0.9487 0.9265	0.9265 0.9159	0.9056	0.8886	0.9749	LID1F		0.9241							1.0000		0.9900
11Cl-PF3OUdS	1.4400 1.2952	1.3561 1.3252	1.3478	1.2951	1.3308	LID1F		1.3166							1.0000		0.9900
Perfluorododecanoic acid	1.0989 0.8587	0.9721 0.8549	0.8907	0.8585	0.9056	LID1F		0.8627							1.0000		0.9900
10:2 FTS	6.6081 6.8134	7.1166 6.4153	6.5108	6.0548	6.7148	LID1F		6.5459							0.9990		0.9900
NMeFOSE	0.9983 1.0135	1.0390 1.0073	1.0342	0.9732	1.0501	LID1F		1.0126							1.0000		0.9900
NMeFOSA	1.0087 1.0530	1.1376 1.0104	1.0987	1.0519	1.1307	LID1F		1.0386							0.9990		0.9900
Perfluorododecanesulfonic acid	0.9702 0.8659	0.8927 0.8523	0.8827	0.8573	0.8939	LID1F		0.8615							1.0000		0.9900
NEtFOSE	1.0741 1.0454	1.1116 0.9948	0.9835	0.9619	1.0466	LID1F		1.0134							0.9990		0.9900
NEtFOSA	1.0565 1.0611	1.0398 1.0164	1.0076	0.9928	1.0478	LID1F		1.0312							1.0000		0.9900
Perfluorotridecanoic acid	0.8905 0.7921	0.8047 0.7507	0.8246	0.8028	0.8534	LID1F		0.7769							0.9980		0.9900
Perfluorotetradecanoic acid	1.0151 0.8539	0.9078 0.8232	0.8826	0.8502	0.9175	LID1F		0.8444							0.9990		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorohexadecanoic acid	0.8846 0.7030	0.7442 0.6624	0.7088	0.6724	0.7243	LID1F		0.6819							0.9990		0.9900
Perfluorooctadecanoic acid	0.3700 0.3475	0.3305 0.3375	0.3448	0.3291	0.3616	LID1F		0.3426							0.9990		0.9900
13C4 PFBA	1.0838 1.0573	1.1326 1.0490	1.1365	1.1133	1.0721	Ave		1.0921				3.3		20.0			
13C5 PFPeA	0.8519 0.9122	0.9249 0.8679	0.9688	0.8844	0.9014	Ave		0.9016				4.3		20.0			
13C3 PFBS	0.6512 0.6943	0.7328 0.6574	0.7709	0.6935	0.7006	Ave		0.7001				5.9		20.0			
M2-4:2 FTS	0.0512 0.0484	0.0502 0.0479	0.0515	0.0482	0.0494	Ave		0.0495				3.0		20.0			
13C5 PFHxA	0.8696 0.8434	0.8811 0.8160	0.8945	0.8932	0.8264	Ave		0.8606				3.7		20.0			
13C3 HFPO-DA	0.1064 0.0997	0.1098 0.1111	0.1106	0.1035	0.1025	Ave		0.1062				4.2		20.0			
13C4 PFHpA	0.9128 0.8972	0.9173 0.8713	0.8915	0.9212	0.9218	Ave		0.9047				2.1		20.0			
13C3 PFHxS	0.5276 0.5374	0.5345 0.5148	0.5502	0.5472	0.5575	Ave		0.5384				2.7		20.0			
M2-6:2 FTS	0.0266 0.0252	0.0267 0.0251	0.0264	0.0243	0.0250	Ave		0.0256				3.7		20.0			
13C8 PFOA	0.9728 0.9500	0.9948 0.9550	1.0104	0.9796	1.0065	Ave		0.9813				2.4		20.0			
13C8 PFOS	1.0208 0.9615	1.0760 0.9884	1.0187	0.9738	1.0186	Ave		1.0083				3.8		20.0			
13C9 PFNA	1.8149 1.6068	1.7685 1.7331	1.7871	1.6658	1.6826	Ave		1.7227				4.3		20.0			
13C6 PFDA	1.1256 1.0371	1.1473 1.0091	1.1970	1.1095	1.1075	Ave		1.1047				5.8		20.0			
M2-8:2 FTS	0.0182 0.0152	0.0168 0.0152	0.0179	0.0173	0.0170	Ave		0.0168				7.1		20.0			
13C8 FOSA	0.9899 0.9024	0.9365 0.8775	0.9614	0.9142	0.8575	Ave		0.9199				5.0		20.0			
d3-NMeFOSAA	0.3204 0.2988	0.3108 0.3028	0.3256	0.2988	0.3115	Ave		0.3098				3.4		20.0			
13C7 PFUnA	1.1054 1.0601	1.1781 1.0311	1.1776	1.1152	1.1201	Ave		1.1125				4.9		20.0			
d5-NEtFOSAA	0.2832 0.2631	0.2784 0.2543	0.2929	0.2718	0.2721	Ave		0.2737				4.7		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
13C2-PFDoDA	0.7960 0.7443	0.8014 0.7189	0.8307	0.7800	0.7754	Ave		0.7781				4.8		20.0			
d7-N-MeFOSE-M	0.1921 0.1709	0.1853 0.1717	0.1862	0.1760	0.1764	Ave		0.1798				4.5		20.0			
d3-NMePFOSA	0.1130 0.1117	0.1105 0.1140	0.1138	0.1065	0.1130	Ave		0.1118				2.4		20.0			
d9-N-EtFOSE-M	0.2127 0.1829	0.2022 0.1879	0.2130	0.1956	0.1970	Ave		0.1988				5.8		20.0			
d5-NEtPFOSA	0.1148 0.1076	0.1109 0.1069	0.1143	0.1106	0.1144	Ave		0.1114				3.0		20.0			
13C2 PFTeDA	0.8390 0.7812	0.8556 0.7735	0.8767	0.8235	0.8092	Ave		0.8227				4.6		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-20482/1	20JUL09MCAL-09.d
Level 2	IC 410-20482/2	20JUL09MCAL-10.d
Level 3	IC 410-20482/3	20JUL09MCAL-11.d
Level 4	IC 410-20482/4	20JUL09MCAL-12.d
Level 5	ICISAV 410-20482/5	20JUL09MCAL-13.d
Level 6	IC 410-20482/6	20JUL09MCAL-14.d
Level 7	IC 410-20482/7	20JUL09MCAL-15.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid		LID1F	90614 15730977	196749 27951206	712820	2757743	6526588	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanoic acid		LID1F	78218 15291062	180504 26475485	665228	2566672	6176945	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorobutanesulfonic acid		LID1F	49673 11490838	119608 18749041	478729	1902023	4487633	0.177 44.3	0.443 88.5	1.77	7.08	17.7
4:2 Fluorotelomer sulfonic acid		LID1F	17281 3570405	37963 6005121	155104	613985	1476659	0.187 46.7	0.467 93.4	1.87	7.47	18.7
Perfluorohexanoic acid		LID1F	77809 14942611	180338 26256458	677810	2632620	6241335	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanesulfonic acid		LID1F	46608 10104783	116759 17315237	447676	1746288	4360151	0.188 46.9	0.469 93.8	1.88	7.50	18.8
HFPODA		LID1F	28653 6157950	68551 11205561	267509	1078290	2511222	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoroheptanoic acid		LID1F	109163 21541677	254446 36368070	999494	3810831	9331814	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexanesulfonic acid		LID1F	56312 11230755	122371 19602934	485962	1895300	4755958	0.182 45.6	0.456 91.2	1.82	7.30	18.2
DONA		LID1F	137669 28473434	318376 49446111	1258079	4953378	11813831	0.189 47.3	0.473 94.5	1.89	7.56	18.9
6:2 Fluorotelomer sulfonic acid		LID1F	16355 2623593	31433 4556693	128060	483413	1149355	0.190 47.4	0.474 94.8	1.90	7.58	19.0
Perfluoroheptanesulfonic acid		LID1F	45611 10464384	116050 18180600	446864	1778432	4338819	0.190 47.6	0.476 95.2	1.90	7.62	19.0
Perfluorooctanoic acid		LID1F	99347 19016036	238492 32709736	848362	3285562	7796789	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctanesulfonic acid		LID1F	57092 11237400	122775 19488259	472304	1831270	4534473	0.185 46.3	0.463 92.6	1.85	7.40	18.5
Perfluorononanoic acid		LID1F	76232 17483033	185776 29010123	728319	2868006	7028466	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
9Cl-PF3ONS		LID1F	89579 18162063	194102 31906884	746933	2984298	7259798	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorononanesulfonic acid		LID1F	41945 9778593	101876 17350348	408382	1690524	3928596	0.192 48.0	0.480 96.0	1.92	7.68	19.2
Perfluorodecanoic acid		LID1F	96046 18899028	222417 31879893	837193	3336496	7941129	0.200 50.0	0.500 100	2.00	8.00	20.0
8:2 Fluorotelomer sulfonic acid		LID1F	12884 2584938	27394 4377434	116975	488851	1098277	0.192 47.9	0.479 95.8	1.92	7.66	19.2
Perfluorooctanesulfonamide		LID1F	87962 19695932	213031 33910671	833035	3265307	7536775	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSAA		LID1F	31354 6361362	70819 11398044	274216	1107301	2661837	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorodecanesulfonic acid		LID1F	47273 10380814	110100 17772495	434278	1671325	4135580	0.193 48.2	0.482 96.4	1.93	7.71	19.3
Perfluoroundecanoic acid		LID1F	90498 18292442	208504 31338825	836690	3276522	7559477	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSAA		LID1F	23556 5287767	57137 9042508	224105	884113	2166217	0.200 50.0	0.500 100	2.00	8.00	20.0
11Cl-PF3OUdS		LID1F	64579 14477274	162122 25195705	612448	2436300	5834663	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorododecanoic acid		LID1F	76704 13863063	172599 23860168	625079	2451131	5733685	0.200 50.0	0.500 100	2.00	8.00	20.0
10:2 FTS		LID1F	10155 2165689	25480 3652198	94995	369562	897440	0.193 48.2	0.482 96.4	1.93	7.71	19.3
NMeFOSE		LID1F	16813 3756025	42641 6713175	162676	626844	1512612	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSA		LID1F	9999 2550852	27846 4472132	105627	410112	1043123	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorododecanesulfonic acid		LID1F	45288 10074704	111090 16865765	417514	1678700	4079512	0.194 48.4	0.484 96.8	1.94	7.74	19.4
NEtFOSE		LID1F	20029 4146300	49786 7259050	176957	688846	1683820	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSA		LID1F	10639 2477214	25539 4217410	97311	401948	978518	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotridecanoic acid		LID1F	62159 12787733	142880 20951910	578709	2292122	5403351	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotetradecanoic acid		LID1F	74679 14470603	172080 24720248	653676	2562864	6062433	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexadecanoic acid		LID1F	65077 11914180	141067 19890203	524932	2026992	4786054	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctadecanoic acid		LID1F	27218 5888746	62653 10133619	255342	992059	2389330	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	13C3 PFBA	Ave	4160579 3793132	4241357 3440808	4089344	4277831	3709387	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C5 PFPeA	13C3 PFBA	Ave	3270257 3272629	3463597 2846744	3485903	3398573	3118854	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFBS	13C3 PFBA	Ave	2339821 2331560	2568583 2018290	2596256	2494248	2268884	9.36 9.36	9.36 9.36	9.36	9.36	9.36
M2-4:2 FTS	13PF OA	Ave	231800 209187	230879 185256	231902	224367	205119	9.34 9.34	9.34 9.34	9.34	9.34	9.34
13C5 PFHxA	13PF OA	Ave	4214274 3904452	4342041 3379223	4310882	4448911	3672670	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 HFPO-DA	13PF OA	Ave	515494 461389	541191 460155	532963	515431	455357	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C4 PFHpA	13PF OA	Ave	4423816 4153603	4520440 3608543	4296078	4588346	4096948	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFHxS	13PF OA	Ave	2418900 2353400	2491756 2016798	2508098	2578239	2343987	9.46 9.46	9.46 9.46	9.46	9.46	9.46
M2-6:2 FTS	13PF OA	Ave	122575 110832	125026 98790	120838	115085	105570	9.50 9.50	9.50 9.50	9.50	9.50	9.50
13C8 PFOA	13PF OA	Ave	4714453 4397937	4902463 3955143	4869145	4879082	4473376	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C8 PFOS	PFOS	Ave	2306178 2299309	2459176 1955458	2336848	2418465	2254651	9.57 9.57	9.57 9.57	9.57	9.57	9.57
13C9 PFNA	PFOS	Ave	4286616 4016990	4225794 3584850	4286015	4325071	3893842	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C6 PFDA	PFDA	Ave	4935317 4499278	5083314 3917859	5055876	5076598	4521756	10.0 10.0	10.0 10.0	10.0	10.0	10.0
M2-8:2 FTS	PFDA	Ave	76359 63176	71162 56575	72498	75820	66410	9.58 9.58	9.58 9.58	9.58	9.58	9.58
13C8 FOSA	PFDA	Ave	4340219 3914998	4149677 3406761	4060834	4183147	3500970	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMeFOSAA	PFDA	Ave	1404734 1296077	1377123 1175505	1375194	1367129	1271828	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C7 PFUnA	PFDA	Ave	4846551 4599035	5219785 4003017	4973959	5102953	4572928	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtFOSAA	PFDA	Ave	1241531 1141425	1233338 987290	1237390	1243642	1111014	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2-PFDoDA	PFDA	Ave	3490074 3228861	3551079 2791101	3508926	3569072	3165619	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d7-N-MeFOSE-M	PFDA	Ave	842120 741220	820818 666425	786455	805119	720218	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMePFOSA	PFDA	Ave	495639 484508	489570 442631	480693	487357	461262	10.0 10.0	10.0 10.0	10.0	10.0	10.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
d9-N-EtFOSE-M	PFDA	Ave	932395 793283	895779 729669	899631	895166	804462	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtPFOSA	PFDA	Ave	503514 466901	491218 414921	482870	506067	466938	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2 PFTeDA	PFDA	Ave	3678501 3389295	3791032 3002912	3703106	3768011	3303906	10.0 10.0	10.0 10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD
LID1F = Linear 1/Conc IsoDil FZ

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-20482/1	20JUL09MCAL-09.d
Level 2	IC 410-20482/2	20JUL09MCAL-10.d
Level 3	IC 410-20482/3	20JUL09MCAL-11.d
Level 4	IC 410-20482/4	20JUL09MCAL-12.d
Level 5	ICISAV 410-20482/5	20JUL09MCAL-13.d
Level 6	IC 410-20482/6	20JUL09MCAL-14.d
Level 7	IC 410-20482/7	20JUL09MCAL-15.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanoic acid	31.9 -1.6	12.4	5.6	-2.4	6.6	0.5	50 30	30	30	30	30	30
Perfluoropentanoic acid	27.3 -1.0	11.0	1.6	0.5	5.4	-0.5	50 30	30	30	30	30	30
Perfluorobutanesulfonic acid	11.4 -2.5	-2.2	-3.2	0.1	3.8	3.5	50 30	30	30	30	30	30
4:2 Fluorotelomer sulfonic acid	11.7 -2.9	-1.5	0.2	2.5	7.8	2.2	50 30	30	30	30	30	30
Perfluorohexanoic acid	18.3 -0.5	6.4	0.7	-5.2	8.9	-1.9	50 30	30	30	30	30	30
Perfluoropentanesulfonic acid	14.1 -1.7	4.2	-1.2	0.3	10.1	-0.7	50 30	30	30	30	30	30
HFPODA	9.2 -4.3	-0.5	-1.4	2.7	8.3	4.9	50 30	30	30	30	30	30
Perfluoroheptanoic acid	19.3 -2.5	8.9	12.5	0.4	10.1	0.3	50 30	30	30	30	30	30
Perfluorohexanesulfonic acid	20.0 0.2	1.3	-0.1	-5.2	4.6	-1.6	50 30	30	30	30	30	30
DONA	12.9 -0.6	2.2	6.2	-2.1	4.6	-0.6	50 30	30	30	30	30	30
6:2 Fluorotelomer sulfonic acid	39.6 -3.5	5.2	10.9	9.9	13.9	-0.9	50 30	30	30	30	30	30
Perfluoroheptanesulfonic acid	4.9 0.3	3.6	-0.9	-4.1	2.9	-1.1	50 30	30	30	30	30	30
Perfluorooctanoic acid	24.8 -2.0	15.3	3.2	-0.3	3.2	2.4	50 30	30	30	30	30	30
Perfluorooctanesulfonic acid	25.0 0.6	0.8	2.0	-4.4	1.5	-1.3	50 30	30	30	30	30	30
Perfluorononanoic acid	6.1 -3.4	4.9	1.4	-1.1	7.7	3.9	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
9Cl-PF3ONS	20.6 1.3	-2.0	-0.8	-4.2	-0.1	-1.9	50 30	30	30	30	30	30
Perfluorononanesulfonic acid	4.0 1.5	-5.3	-0.1	-0.1	-0.4	-2.7	50 30	30	30	30	30	30
Perfluorodecanoic acid	17.4 -1.8	5.6	-0.1	-0.9	5.9	1.3	50 30	30	30	30	30	30
8:2 Fluorotelomer sulfonic acid	6.3 -2.5	-3.0	1.6	1.5	4.2	3.1	50 30	30	30	30	30	30
Perfluorooctanesulfonamide	0.6 -1.1	2.0	1.9	-3.1	6.9	-0.1	50 30	30	30	30	30	30
NMeFOSAA	13.4 -1.5	4.5	1.3	2.9	6.4	-0.2	50 30	30	30	30	30	30
Perfluorodecanesulfonic acid	13.1 0.3	-1.2	2.5	-4.7	1.2	-0.4	50 30	30	30	30	30	30
Perfluoroundecanoic acid	17.7 -1.3	0.8	6.1	1.2	4.2	0.3	50 30	30	30	30	30	30
NEtFOSAA	2.7 -0.9	0.3	-2.0	-3.8	5.5	0.3	50 30	30	30	30	30	30
11Cl-PF3OUdS	9.4 0.7	3.0	2.4	-1.6	1.1	-1.6	50 30	30	30	30	30	30
Perfluorododecanoic acid	27.4 -0.9	12.7	3.2	-0.5	5.0	-0.5	50 30	30	30	30	30	30
10:2 FTS	1.0 -2.0	8.7	-0.5	-7.5	2.6	4.1	50 30	30	30	30	30	30
NMeFOSE	-1.4 -0.5	2.6	2.1	-3.9	3.7	0.1	50 30	30	30	30	30	30
NMeFOSA	-2.9 -2.7	9.5	5.8	1.3	8.9	1.4	50 30	30	30	30	30	30
Perfluorododecanesulfonic acid	12.6 -1.1	3.6	2.5	-0.5	3.8	0.5	50 30	30	30	30	30	30
NEtFOSE	6.0 -1.8	9.7	-2.9	-5.1	3.3	3.2	50 30	30	30	30	30	30
NEtFOSA	2.4 -1.4	0.8	-2.3	-3.7	1.6	2.9	50 30	30	30	30	30	30
Perfluorotridecanoic acid	14.6 -3.4	3.6	6.1	3.3	9.8	2.0	50 30	30	30	30	30	30
Perfluorotetradecanoic acid	20.2 -2.5	7.5	4.5	0.7	8.6	1.1	50 30	30	30	30	30	30
Perfluorohexadecanoic acid	29.7 -2.9	9.1	3.9	-1.4	6.2	3.1	50 30	30	30	30	30	30
Perfluorooctadecanoic acid	8.0 -1.5	-3.5	0.6	-3.9	5.5	1.4	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
13C4 PFBA	-0.8 -3.9	3.7	4.1	1.9	-1.8	-3.2	30 30	30	30	30	30	30
13C5 PFPeA	-5.5 -3.7	2.6	7.4	-1.9	0.0	1.2	30 30	30	30	30	30	30
13C3 PFBS	-7.0 -6.1	4.7	10.1	-0.9	0.1	-0.8	30 30	30	30	30	30	30
M2-4:2 FTS	3.4 -3.3	1.2	4.0	-2.7	-0.3	-2.3	30 30	30	30	30	30	30
13C5 PFHxA	1.0 -5.2	2.4	3.9	3.8	-4.0	-2.0	30 30	30	30	30	30	30
13C3 HFPO-DA	0.1 4.6	3.4	4.1	-2.6	-3.5	-6.2	30 30	30	30	30	30	30
13C4 PFHpA	0.9 -3.7	1.4	-1.5	1.8	1.9	-0.8	30 30	30	30	30	30	30
13C3 PFHxS	-2.0 -4.4	-0.7	2.2	1.6	3.5	-0.2	30 30	30	30	30	30	30
M2-6:2 FTS	3.9 -2.0	4.2	3.0	-5.1	-2.4	-1.6	30 30	30	30	30	30	30
13C8 PFOA	-0.9 -2.7	1.4	3.0	-0.2	2.6	-3.2	30 30	30	30	30	30	30
13C8 PFOS	1.2 -2.0	6.7	1.0	-3.4	1.0	-4.6	30 30	30	30	30	30	30
13C9 PFNA	5.4 0.6	2.7	3.7	-3.3	-2.3	-6.7	30 30	30	30	30	30	30
13C6 PFDA	1.9 -8.7	3.8	8.3	0.4	0.3	-6.1	30 30	30	30	30	30	30
M2-8:2 FTS	8.3 -9.4	-0.2	6.7	3.0	1.1	-9.5	30 30	30	30	30	30	30
13C8 FOSA	7.6 -4.6	1.8	4.5	-0.6	-6.8	-1.9	30 30	30	30	30	30	30
d3-NMeFOSAA	3.4 -2.3	0.3	5.1	-3.6	0.6	-3.6	30 30	30	30	30	30	30
13C7 PFUnA	-0.6 -7.3	5.9	5.8	0.2	0.7	-4.7	30 30	30	30	30	30	30
d5-NEtFOSAA	3.5 -7.1	1.7	7.0	-0.7	-0.6	-3.9	30 30	30	30	30	30	30
13C2-PFDoDA	2.3 -7.6	3.0	6.8	0.2	-0.4	-4.3	30 30	30	30	30	30	30
d7-N-MeFOSE-M	6.8 -4.5	3.0	3.6	-2.1	-1.9	-5.0	30 30	30	30	30	30	30
d3-NMePFOSA	1.1 2.0	-1.2	1.8	-4.7	1.1	-0.1	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
d9-N-EtFOSE-M	7.0 -5.4	1.7	7.2	-1.6	-0.9	-8.0	30 30	30	30	30	30	30
d5-NEtPFOSA	3.1 -4.0	-0.4	2.7	-0.7	2.7	-3.4	30 30	30	30	30	30	30
13C2 PFTeDA	2.0 -6.0	4.0	6.6	0.1	-1.6	-5.0	30 30	30	30	30	30	30

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Lab Sample ID: ICV 410-21880/9 Calibration Date: 07/13/2020 14:13

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL13MCAL-17.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8892		2.19	2.00	9.4	30.0
Perfluoropentanoic acid	LID1F		0.9489		2.12	2.00	5.9	30.0
Perfluorobutanesulfonic acid	LID1F		0.9843		1.73	1.77	-2.5	30.0
Perfluorohexanoic acid	LID1F		0.7442		2.03	2.00	1.6	30.0
HFPODA	LID1F		1.981		1.75	2.00	-12.5	30.0
Perfluoroheptanoic acid	LID1F		1.196		2.10	2.00	5.1	30.0
Perfluorohexanesulfonic acid	LID1F		0.9822		1.88	1.89	-0.4	30.0
DONA	LID1F		1.349		1.94	1.88	3.0	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8982		1.95	1.90	2.4	30.0
Perfluorooctanoic acid	LID1F		0.6907		1.98	2.00	-1.1	30.0
Perfluorooctanesulfonic acid	LID1F		0.9295		1.73	1.91	-9.7	30.0
Perfluorononanoic acid	LID1F		0.7876		1.86	2.00	-7.0	30.0
9Cl-PF3ONS	LID1F		2.105		1.74	1.86	-6.4	30.0
Perfluorodecanoic acid	LID1F		0.5408		1.94	2.00	-3.2	30.0
NMeFOSAA	LID1F		1.087		2.28	2.00	14.0	30.0
Perfluorodecanesulfonic acid	LID1F		0.5334		1.99	1.93	3.6	30.0
Perfluoroundecanoic acid	LID1F		0.5127		2.10	2.00	5.1	30.0
NEtFOSAA	LID1F		0.9705		2.04	2.00	2.2	30.0
11Cl-PF3OUdS	LID1F		1.579		1.65	1.88	-12.3	30.0
Perfluorododecanoic acid	LID1F		0.6358		2.32	2.00	15.8	30.0
Perfluorotridecanoic acid	LID1F		0.8820		2.41	2.00	20.7	30.0
Perfluorotetradecanoic acid	LID1F		0.9386		2.11	2.00	5.6	30.0
13C4 PFBA	Ave	1.110	1.011		9.10	10.0	-9.0	30.0
13C5 PFPeA	Ave	0.8798	0.8057		9.16	10.0	-8.4	30.0
13C3 PFBS	Ave	0.4382	0.3957		8.45	9.36	-9.7	30.0
M2-4:2 FTS	Ave	0.0956	0.0886		8.65	9.34	-7.3	30.0
13C5 PFHxA	Ave	1.443	1.356		9.40	10.0	-6.0	30.0
13C3 HFPO-DA	Ave	0.2830	0.2916		10.3	10.0	3.1	30.0
13C3 PFHxS	Ave	0.4556	0.4280		8.89	9.46	-6.1	30.0
13C4 PFHpA	Ave	1.058	0.9544		9.02	10.0	-9.8	30.0
M2-6:2 FTS	Ave	0.0785	0.0775		9.38	9.50	-1.3	30.0
13C8 PFOA	Ave	1.373	1.287		9.37	10.0	-6.3	30.0
13C8 PFOS	Ave	1.014	0.9808		9.25	9.57	-3.3	30.0
13C9 PFNA	Ave	2.195	2.189		9.98	10.0	-0.2	30.0
13C6 PFDA	Ave	1.629	1.499		9.20	10.0	-8.0	30.0
M2-8:2 FTS	Ave	0.1121	0.1068		9.13	9.58	-4.7	30.0
13C8 FOSA	Ave	1.193	1.082		9.07	10.0	-9.3	30.0
d3-NMeFOSAA	Ave	0.3112	0.2701		8.68	10.0	-13.2	30.0
13C7 PFUnA	Ave	1.490	1.399		9.39	10.0	-6.1	30.0
d5-NEtFOSAA	Ave	0.2452	0.2427		9.90	10.0	-1.0	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Lab Sample ID: ICV 410-21880/9 Calibration Date: 07/13/2020 14:13

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL13MCAL-17.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C2-PFDoDA	Ave	1.816	1.514		8.33	10.0	-16.7	30.0
d7-N-MeFOSE-M	Ave	0.2323	0.2172		9.35	10.0	-6.5	30.0
d3-NMePFOSA	Ave	0.1221	0.1059		8.68	10.0	-13.2	30.0
d9-N-EtFOSE-M	Ave	0.2364	0.2077		8.79	10.0	-12.1	30.0
d5-NEtPFOSA	Ave	0.0999	0.0904		9.05	10.0	-9.5	30.0
13C2 PFTeDA	Ave	1.429	1.288		9.02	10.0	-9.8	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Lab Sample ID: CCV 410-22831/70 Calibration Date: 07/16/2020 01:41

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL15-90.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8321		2.05	2.00	2.4	30.0
Perfluoropentanoic acid	LID1F		0.9327		2.08	2.00	4.1	30.0
Perfluorobutanesulfonic acid	LID1F		1.002		1.76	1.77	-0.7	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		1.758		1.97	1.87	5.2	30.0
Perfluorohexanoic acid	LID1F		0.7406		2.02	2.00	1.1	30.0
Perfluoropentanesulfonic acid	LID1F		0.5083		2.06	1.88	9.6	30.0
HFPODA	LID1F		1.998		1.76	2.00	-11.8	30.0
Perfluoroheptanoic acid	LID1F		1.264		2.22	2.00	11.0	30.0
Perfluorohexanesulfonic acid	LID1F		0.9936		1.84	1.82	0.8	30.0
DONA	LID1F		1.411		2.04	1.89	7.8	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		1.755		2.10	1.90	10.5	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8812		1.91	1.90	0.5	30.0
Perfluorooctanoic acid	LID1F		0.7152		2.05	2.00	2.5	30.0
Perfluorooctanesulfonic acid	LID1F		1.044		1.88	1.85	1.4	30.0
Perfluorononanoic acid	LID1F		0.9350		2.21	2.00	10.5	30.0
9Cl-PF3ONS	LID1F		2.208		1.83	1.86	-1.8	30.0
Perfluorononanesulfonic acid	LID1F		0.7013		2.07	1.92	7.7	30.0
Perfluorodecanoic acid	LID1F		0.5768		2.06	2.00	3.2	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		1.691		2.04	1.92	6.3	30.0
Perfluorooctanesulfonamide	LID1F		0.9657		2.01	2.00	0.4	30.0
NMeFOSAA	LID1F		1.065		2.23	2.00	11.7	30.0
Perfluorodecanesulfonic acid	LID1F		0.4592		1.72	1.93	-10.8	30.0
Perfluoroundecanoic acid	LID1F		0.5307		2.18	2.00	8.8	30.0
NEtFOSAA	LID1F		1.005		2.12	2.00	5.9	30.0
11Cl-PF3OUdS	LID1F		1.777		1.83	1.86	-1.4	30.0
Perfluorododecanoic acid	LID1F		0.5723		2.08	2.00	4.2	30.0
10:2 FTS	LID1F		2.409		2.52	1.93	30.9*	30.0
NMeFOSE	LID1F		0.9141		1.95	2.00	-2.5	30.0
NMeFOSA	LID1F		1.032		1.96	2.00	-2.1	30.0
Perfluorododecanesulfonic acid	LID1F		0.2695		2.06	1.94	6.5	30.0
NEtFOSE	LID1F		0.7182		1.92	2.00	-4.1	30.0
Perfluorotridecanoic acid	LID1F		0.8548		2.34	2.00	17.0	30.0
NEtFOSA	LID1F		1.074		2.18	2.00	9.1	30.0
Perfluorotetradecanoic acid	LID1F		0.8905		2.00	2.00	0.2	30.0
Perfluorohexadecanoic acid	LID1F		0.5125		1.98	2.00	-0.8	30.0
Perfluorooctadecanoic acid	LID1F		0.4192		1.74	2.00	-13.2	30.0
13C4 PFBA	Ave	1.110	1.126		10.1	10.0	1.4	30.0
13C5 PFPeA	Ave	0.8798	0.8794		10.0	10.0	-0.0	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Lab Sample ID: CCV 410-22831/70 Calibration Date: 07/16/2020 01:41

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL15-90.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.4382	0.4065		8.68	9.36	-7.2	30.0
M2-4:2 FTS	Ave	0.0956	0.0947		9.26	9.34	-0.9	30.0
13C5 PFHxA	Ave	1.443	1.637		11.3	10.0	13.5	30.0
13C3 HFPO-DA	Ave	0.2830	0.3478		12.3	10.0	22.9	30.0
13C3 PFHxS	Ave	0.4556	0.5092		10.6	9.46	11.8	30.0
13C4 PFHpA	Ave	1.058	1.162		11.0	10.0	9.8	30.0
M2-6:2 FTS	Ave	0.0785	0.0761		9.21	9.50	-3.0	30.0
13C8 PFOA	Ave	1.373	1.433		10.4	10.0	4.4	30.0
13C8 PFOS	Ave	1.014	1.058		9.98	9.57	4.3	30.0
13C9 PFNA	Ave	2.195	2.126		9.69	10.0	-3.1	30.0
13C6 PFDA	Ave	1.629	1.652		10.1	10.0	1.4	30.0
M2-8:2 FTS	Ave	0.1121	0.1117		9.54	9.58	-0.4	30.0
13C8 FOSA	Ave	1.193	1.314		11.0	10.0	10.2	30.0
d3-NMeFOSAA	Ave	0.3112	0.3700		11.9	10.0	18.9	30.0
13C7 PFUnA	Ave	1.490	1.557		10.4	10.0	4.5	30.0
d5-NEtFOSAA	Ave	0.2452	0.2887		11.8	10.0	17.7	30.0
13C2-PFDoDA	Ave	1.816	1.897		10.4	10.0	4.4	30.0
d7-N-MeFOSE-M	Ave	0.2323	0.2393		10.3	10.0	3.0	30.0
d3-NMePFOSA	Ave	0.1221	0.1236		10.1	10.0	1.3	30.0
d9-N-EtFOSE-M	Ave	0.2364	0.2498		10.6	10.0	5.7	30.0
d5-NEtPFOSA	Ave	0.0999	0.1025		10.3	10.0	2.6	30.0
13C2 PFTeDA	Ave	1.429	1.620		11.3	10.0	13.4	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Lab Sample ID: CCV 410-22831/79 Calibration Date: 07/16/2020 03:02

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL15-99.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.7975		7.85	8.00	-1.9	30.0
Perfluoropentanoic acid	LID1F		0.8314		7.43	8.00	-7.2	30.0
Perfluorobutanesulfonic acid	LID1F		0.9712		6.81	7.08	-3.8	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		1.836		8.21	7.47	9.8	30.0
Perfluorohexanoic acid	LID1F		0.7580		8.28	8.00	3.5	30.0
Perfluoropentanesulfonic acid	LID1F		0.4699		7.60	7.50	1.3	30.0
HFPODA	LID1F		2.349		8.30	8.00	3.8	30.0
Perfluoroheptanoic acid	LID1F		1.197		8.41	8.00	5.1	30.0
Perfluorohexanesulfonic acid	LID1F		0.9284		6.87	7.30	-5.8	30.0
DONA	LID1F		1.451		8.38	7.56	10.8	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		1.640		7.83	7.58	3.2	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8291		7.20	7.62	-5.4	30.0
Perfluorooctanoic acid	LID1F		0.7018		8.04	8.00	0.5	30.0
Perfluorononanoic acid	LID1F		0.8683		8.21	8.00	2.6	30.0
Perfluorooctanesulfonic acid	LID1F		0.9491		6.83	7.40	-7.7	30.0
9Cl-PF3ONS	LID1F		2.088		6.91	7.44	-7.2	30.0
Perfluorononanesulfonic acid	LID1F		0.6309		7.44	7.68	-3.2	30.0
Perfluorodecanoic acid	LID1F		0.4994		7.15	8.00	-10.6	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		1.554		7.49	7.66	-2.3	30.0
Perfluorooctanesulfonamide	LID1F		1.001		8.32	8.00	4.0	30.0
NMeFOSAA	LID1F		1.049		8.80	8.00	10.0	30.0
Perfluorodecanesulfonic acid	LID1F		0.4813		7.21	7.71	-6.5	30.0
Perfluoroundecanoic acid	LID1F		0.4621		7.58	8.00	-5.3	30.0
NEtFOSAA	LID1F		0.9945		8.38	8.00	4.8	30.0
11Cl-PF3OUdS	LID1F		1.632		6.74	7.44	-9.4	30.0
Perfluorododecanoic acid	LID1F		0.5731		8.35	8.00	4.3	30.0
10:2 FTS	LID1F		2.589		10.8	7.71	40.7*	30.0
NMeFOSA	LID1F		1.080		8.20	8.00	2.5	30.0
NMeFOSE	LID1F		0.9336		7.97	8.00	-0.4	30.0
Perfluorododecanesulfonic acid	LID1F		0.2447		7.49	7.74	-3.3	30.0
NEtFOSE	LID1F		0.7278		7.78	8.00	-2.8	30.0
Perfluorotridecanoic acid	LID1F		0.8845		9.69	8.00	21.1	30.0
NEtFOSA	LID1F		0.9615		7.82	8.00	-2.3	30.0
Perfluorotetradecanoic acid	LID1F		0.9191		8.28	8.00	3.4	30.0
Perfluorohexadecanoic acid	LID1F		0.4132		6.40	8.00	-20.0	30.0
Perfluorooctadecanoic acid	LID1F		0.3646		6.04	8.00	-24.5	30.0
13C4 PFBA	Ave	1.110	1.091		9.83	10.0	-1.7	30.0
13C5 PFPeA	Ave	0.8798	0.8944		10.2	10.0	1.7	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Lab Sample ID: CCV 410-22831/79 Calibration Date: 07/16/2020 03:02

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL15-99.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.4382	0.3846		8.22	9.36	-12.2	30.0
M2-4:2 FTS	Ave	0.0956	0.0917		8.96	9.34	-4.1	30.0
13C5 PFHxA	Ave	1.443	1.521		10.5	10.0	5.4	30.0
13C3 HFPO-DA	Ave	0.2830	0.2783		9.83	10.0	-1.7	30.0
13C4 PFHpA	Ave	1.058	1.106		10.5	10.0	4.6	30.0
13C3 PFHxS	Ave	0.4556	0.4919		10.2	9.46	8.0	30.0
M2-6:2 FTS	Ave	0.0785	0.0751		9.09	9.50	-4.3	30.0
13C8 PFOA	Ave	1.373	1.403		10.2	10.0	2.2	30.0
13C8 PFOS	Ave	1.014	0.998		9.41	9.57	-1.6	30.0
13C9 PFNA	Ave	2.195	1.976		9.00	10.0	-10.0	30.0
13C6 PFDA	Ave	1.629	1.618		9.93	10.0	-0.7	30.0
M2-8:2 FTS	Ave	0.1121	0.1120		9.57	9.58	-0.0	30.0
13C8 FOSA	Ave	1.193	1.231		10.3	10.0	3.2	30.0
d3-NMeFOSAA	Ave	0.3112	0.3590		11.5	10.0	15.4	30.0
13C7 PFUnA	Ave	1.490	1.624		10.9	10.0	9.0	30.0
d5-NEtFOSAA	Ave	0.2452	0.3044		12.4	10.0	24.1	30.0
13C2-PFDoDA	Ave	1.816	1.814		9.98	10.0	-0.2	30.0
d7-N-MeFOSE-M	Ave	0.2323	0.2334		10.0	10.0	0.5	30.0
d3-NMePFOSA	Ave	0.1221	0.1164		9.54	10.0	-4.6	30.0
d9-N-EtFOSE-M	Ave	0.2364	0.2563		10.8	10.0	8.4	30.0
d5-NEtPFOSA	Ave	0.0999	0.1096		11.0	10.0	9.8	30.0
13C2 PFTeDA	Ave	1.429	1.836		12.8	10.0	28.5	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Lab Sample ID: ICV 410-20482/9 Calibration Date: 07/09/2020 11:26

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09MCAL-17.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8868		2.15	2.00	7.4	30.0
Perfluoropentanoic acid	LID1F		1.006		2.14	2.00	7.1	30.0
Perfluorobutanesulfonic acid	LID1F		1.018		1.79	1.77	1.1	30.0
Perfluorohexanoic acid	LID1F		0.8083		2.07	2.00	3.5	30.0
HFPODA	LID1F		2.602		2.04	2.00	2.2	30.0
Perfluoroheptanoic acid	LID1F		1.110		2.15	2.00	7.3	30.0
Perfluorohexanesulfonic acid	LID1F		1.019		1.92	1.89	1.3	30.0
DONA	LID1F		1.450		1.87	1.88	-0.6	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9191		1.96	1.90	2.9	30.0
Perfluorooctanoic acid	LID1F		0.8632		2.05	2.00	2.3	30.0
Perfluorooctanesulfonic acid	LID1F		0.9279		1.73	1.91	-9.4	30.0
Perfluorononanoic acid	LID1F		0.8496		2.03	2.00	1.4	30.0
9Cl-PF3ONS	LID1F		1.689		1.90	1.86	1.9	30.0
Perfluorodecanoic acid	LID1F		0.8204		1.98	2.00	-1.0	30.0
NMeFOSAA	LID1F		1.003		2.04	2.00	1.9	30.0
Perfluorodecanesulfonic acid	LID1F		0.9664		2.07	1.93	7.4	30.0
Perfluoroundecanoic acid	LID1F		0.8224		2.07	2.00	3.7	30.0
NEtFOSAA	LID1F		0.9614		2.08	2.00	4.0	30.0
11Cl-PF3OUdS	LID1F		1.309		1.87	1.88	-0.5	30.0
Perfluorododecanoic acid	LID1F		0.8947		2.07	2.00	3.7	30.0
Perfluorotridecanoic acid	LID1F		0.8186		2.11	2.00	5.4	30.0
Perfluorotetradecanoic acid	LID1F		0.8561		2.03	2.00	1.4	30.0
13C4 PFBA	Ave	1.092	1.000		9.15	10.0	-8.5	30.0
13C5 PFPeA	Ave	0.9016	0.8521		9.45	10.0	-5.5	30.0
13C3 PFBS	Ave	0.7001	0.6518		8.71	9.36	-6.9	30.0
M2-4:2 FTS	Ave	0.0495	0.0470		8.85	9.34	-5.2	30.0
13C5 PFHxA	Ave	0.8606	0.8070		9.38	10.0	-6.2	30.0
13C3 HFPO-DA	Ave	0.1062	0.0949		8.94	10.0	-10.6	30.0
13C4 PFHpA	Ave	0.9047	0.8106		8.96	10.0	-10.4	30.0
13C3 PFHxS	Ave	0.5384	0.4807		8.44	9.46	-10.7	30.0
M2-6:2 FTS	Ave	0.0256	0.0240		8.90	9.50	-6.3	30.0
13C8 PFOA	Ave	0.9813	0.9018		9.19	10.0	-8.1	30.0
13C8 PFOS	Ave	1.008	0.9218		8.75	9.57	-8.6	30.0
13C9 PFNA	Ave	1.723	1.578		9.16	10.0	-8.4	30.0
13C6 PFDA	Ave	1.105	1.040		9.42	10.0	-5.8	30.0
M2-8:2 FTS	Ave	0.0168	0.0163		9.27	9.58	-3.2	30.0
13C8 FOSA	Ave	0.9199	0.8850		9.62	10.0	-3.8	30.0
d3-NMeFOSAA	Ave	0.3098	0.3078		9.94	10.0	-0.6	30.0
13C7 PFUnA	Ave	1.113	1.030		9.26	10.0	-7.4	30.0
d5-NEtFOSAA	Ave	0.2737	0.2636		9.63	10.0	-3.7	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Lab Sample ID: ICV 410-20482/9 Calibration Date: 07/09/2020 11:26

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09MCAL-17.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C2-PFDoDA	Ave	0.7781	0.7476		9.61	10.0	-3.9	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1708		9.50	10.0	-5.0	30.0
d3-NMePFOSA	Ave	0.1118	0.1054		9.43	10.0	-5.7	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.1962		9.87	10.0	-1.3	30.0
d5-NEtPFOSA	Ave	0.1114	0.1093		9.82	10.0	-1.8	30.0
13C2 PFTeDA	Ave	0.8227	0.7669		9.32	10.0	-6.8	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Lab Sample ID: CCV 410-20936/125 Calibration Date: 07/10/2020 08:18

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-127.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8000		7.75	8.00	-3.1	30.0
Perfluoropentanoic acid	LID1F		0.9454		8.05	8.00	0.6	30.0
Perfluorobutanesulfonic acid	LID1F		0.9565		6.72	7.08	-5.0	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.286		7.35	7.47	-1.6	30.0
Perfluorohexanoic acid	LID1F		0.7504		7.69	8.00	-3.9	30.0
Perfluoropentanesulfonic acid	LID1F		0.8628		7.43	7.50	-0.9	30.0
HFPODA	LID1F		2.694		8.47	8.00	5.9	30.0
Perfluoroheptanoic acid	LID1F		1.041		8.05	8.00	0.7	30.0
Perfluorohexanesulfonic acid	LID1F		0.9912		7.19	7.30	-1.5	30.0
DONA	LID1F		1.447		7.50	7.56	-0.8	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.019		7.95	7.58	4.8	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8867		7.56	7.62	-0.8	30.0
Perfluorooctanoic acid	LID1F		0.9022		8.55	8.00	6.9	30.0
Perfluorooctanesulfonic acid	LID1F		1.000		7.23	7.40	-2.3	30.0
Perfluorononanoic acid	LID1F		0.8125		7.76	8.00	-3.1	30.0
9Cl-PF3ONS	LID1F		1.676		7.53	7.44	1.2	30.0
Perfluorononanesulfonic acid	LID1F		0.8814		7.77	7.68	1.2	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		7.551		7.29	7.66	-4.9	30.0
Perfluorodecanoic acid	LID1F		0.8280		7.99	8.00	-0.1	30.0
Perfluorooctanesulfonamide	LID1F		0.9892		7.86	8.00	-1.8	30.0
NMeFOSAA	LID1F		0.9385		7.63	8.00	-4.6	30.0
Perfluorodecanesulfonic acid	LID1F		0.8908		7.64	7.71	-1.0	30.0
Perfluoroundecanoic acid	LID1F		0.7938		8.01	8.00	0.1	30.0
NEtFOSAA	LID1F		0.8721		7.55	8.00	-5.6	30.0
11Cl-PF3OUdS	LID1F		1.352		7.64	7.44	2.7	30.0
Perfluorododecanoic acid	LID1F		0.8565		7.94	8.00	-0.7	30.0
10:2 FTS	LID1F		6.451		7.60	7.71	-1.4	30.0
NMeFOSA	LID1F		1.043		8.03	8.00	0.4	30.0
NMeFOSE	LID1F		0.9775		7.72	8.00	-3.5	30.0
Perfluorododecanesulfonic acid	LID1F		0.8868		7.97	7.74	2.9	30.0
NEtFOSE	LID1F		0.9860		7.78	8.00	-2.7	30.0
Perfluorotridecanoic acid	LID1F		0.7902		8.14	8.00	1.7	30.0
NEtFOSA	LID1F		0.9891		7.67	8.00	-4.1	30.0
Perfluorotetradecanoic acid	LID1F		0.8196		7.76	8.00	-2.9	30.0
Perfluorohexadecanoic acid	LID1F		0.6779		7.95	8.00	-0.6	30.0
Perfluorooctadecanoic acid	LID1F		0.3281		7.66	8.00	-4.2	30.0
13C4 PFBA	Ave	1.092	1.092		10.0	10.0	0.0	30.0
13C5 PFPeA	Ave	0.9016	0.8734		9.69	10.0	-3.1	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Lab Sample ID: CCV 410-20936/125 Calibration Date: 07/10/2020 08:18

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-127.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.7001	0.6541		8.75	9.36	-6.6	30.0
M2-4:2 FTS	Ave	0.0495	0.0469		8.84	9.34	-5.3	30.0
13C5 PFHxA	Ave	0.8606	0.8866		10.3	10.0	3.0	30.0
13C3 HFPO-DA	Ave	0.1062	0.1072		10.1	10.0	0.9	30.0
13C4 PFHpA	Ave	0.9047	0.9015		9.96	10.0	-0.4	30.0
13C3 PFHxS	Ave	0.5384	0.5106		8.97	9.46	-5.2	30.0
M2-6:2 FTS	Ave	0.0256	0.0249		9.22	9.50	-3.0	30.0
13C8 PFOA	Ave	0.9813	0.9496		9.68	10.0	-3.2	30.0
13C8 PFOS	Ave	1.008	1.008		9.57	9.57	0.0	30.0
13C9 PFNA	Ave	1.723	1.833		10.6	10.0	6.4	30.0
13C6 PFDA	Ave	1.105	1.137		10.3	10.0	2.9	30.0
M2-8:2 FTS	Ave	0.0168	0.0172		9.82	9.58	2.5	30.0
13C8 FOSA	Ave	0.9199	0.9187		9.99	10.0	-0.1	30.0
d3-NMeFOSAA	Ave	0.3098	0.3176		10.3	10.0	2.5	30.0
13C7 PFUnA	Ave	1.113	1.147		10.3	10.0	3.1	30.0
d5-NEtFOSAA	Ave	0.2737	0.2933		10.7	10.0	7.2	30.0
13C2-PFDoDA	Ave	0.7781	0.8424		10.8	10.0	8.3	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1850		10.3	10.0	2.9	30.0
d3-NMePFOSA	Ave	0.1118	0.1079		9.66	10.0	-3.4	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.2053		10.3	10.0	3.3	30.0
d5-NEtPFOSA	Ave	0.1114	0.1145		10.3	10.0	2.8	30.0
13C2 PFTeDA	Ave	0.8227	0.8745		10.6	10.0	6.3	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Lab Sample ID: CCV 410-20936/139 Calibration Date: 07/10/2020 10:30

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-141.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8676		21.0	20.0	5.1	30.0
Perfluoropentanoic acid	LID1F		0.9812		20.9	20.0	4.5	30.0
Perfluorobutanesulfonic acid	LID1F		1.052		18.5	17.7	4.5	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.503		19.6	18.7	4.9	30.0
Perfluorohexanoic acid	LID1F		0.7821		20.0	20.0	0.2	30.0
Perfluoropentanesulfonic acid	LID1F		0.9221		19.9	18.8	5.9	30.0
HFPODA	LID1F		2.759		21.7	20.0	8.4	30.0
Perfluoroheptanoic acid	LID1F		1.070		20.7	20.0	3.4	30.0
Perfluorohexanesulfonic acid	LID1F		1.011		18.3	18.2	0.5	30.0
DONA	LID1F		1.520		19.7	18.9	4.2	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.055		20.0	19.0	5.6	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9406		20.0	19.0	5.3	30.0
Perfluorooctanoic acid	LID1F		0.9117		21.6	20.0	8.0	30.0
Perfluorooctanesulfonic acid	LID1F		1.025		18.5	18.5	0.0	30.0
Perfluorononanoic acid	LID1F		0.8850		21.1	20.0	5.6	30.0
9Cl-PF3ONS	LID1F		1.780		20.0	18.6	7.5	30.0
Perfluorononanesulfonic acid	LID1F		0.9131		20.1	19.2	4.8	30.0
Perfluorodecanoic acid	LID1F		0.8660		20.9	20.0	4.5	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		8.164		19.7	19.2	2.8	30.0
Perfluorooctanesulfonamide	LID1F		1.052		20.9	20.0	4.4	30.0
NMeFOSAA	LID1F		1.053		21.4	20.0	7.0	30.0
Perfluorodecanesulfonic acid	LID1F		0.9346		20.0	19.3	3.9	30.0
Perfluoroundecanoic acid	LID1F		0.8586		21.7	20.0	8.3	30.0
NEtFOSAA	LID1F		0.9774		21.2	20.0	5.8	30.0
11Cl-PF3OUdS	LID1F		1.357		19.2	18.6	3.0	30.0
Perfluorododecanoic acid	LID1F		0.9747		22.6	20.0	13.0	30.0
10:2 FTS	LID1F		6.900		20.3	19.3	5.4	30.0
NMeFOSA	LID1F		1.126		21.7	20.0	8.4	30.0
NMeFOSE	LID1F		1.066		21.1	20.0	5.3	30.0
Perfluorododecanesulfonic acid	LID1F		0.9459		21.3	19.4	9.8	30.0
NEtFOSE	LID1F		1.065		21.0	20.0	5.1	30.0
Perfluorotridecanoic acid	LID1F		0.8479		21.8	20.0	9.1	30.0
NEtFOSA	LID1F		1.096		21.2	20.0	6.2	30.0
Perfluorotetradecanoic acid	LID1F		0.9021		21.4	20.0	6.8	30.0
Perfluorohexadecanoic acid	LID1F		0.7345		21.5	20.0	7.7	30.0
Perfluorooctadecanoic acid	LID1F		0.3589		21.0	20.0	4.8	30.0
13C4 PFBA	Ave	1.092	1.072		9.81	10.0	-1.9	30.0
13C5 PFPeA	Ave	0.9016	0.8751		9.71	10.0	-2.9	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Lab Sample ID: CCV 410-20936/139 Calibration Date: 07/10/2020 10:30

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-141.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.7001	0.6592		8.81	9.36	-5.8	30.0
M2-4:2 FTS	Ave	0.0495	0.0484		9.12	9.34	-2.4	30.0
13C5 PFHxA	Ave	0.8606	0.8582		9.97	10.0	-0.3	30.0
13C3 HFPO-DA	Ave	0.1062	0.1002		9.43	10.0	-5.7	30.0
13C4 PFHpA	Ave	0.9047	0.9193		10.2	10.0	1.6	30.0
13C3 PFHxS	Ave	0.5384	0.5363		9.42	9.46	-0.4	30.0
M2-6:2 FTS	Ave	0.0256	0.0263		9.73	9.50	2.4	30.0
13C8 PFOA	Ave	0.9813	0.9653		9.84	10.0	-1.6	30.0
13C8 PFOS	Ave	1.008	1.024		9.72	9.57	1.6	30.0
13C9 PFNA	Ave	1.723	1.768		10.3	10.0	2.6	30.0
13C6 PFDA	Ave	1.105	1.092		9.89	10.0	-1.1	30.0
M2-8:2 FTS	Ave	0.0168	0.0166		9.46	9.58	-1.3	30.0
13C8 FOSA	Ave	0.9199	0.9040		9.83	10.0	-1.7	30.0
d3-NMeFOSAA	Ave	0.3098	0.3040		9.81	10.0	-1.9	30.0
13C7 PFUnA	Ave	1.113	1.065		9.58	10.0	-4.2	30.0
d5-NEtFOSAA	Ave	0.2737	0.2649		9.68	10.0	-3.2	30.0
13C2-PFDoDA	Ave	0.7781	0.7500		9.64	10.0	-3.6	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1741		9.68	10.0	-3.2	30.0
d3-NMePFOSA	Ave	0.1118	0.1044		9.34	10.0	-6.6	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.1908		9.60	10.0	-4.0	30.0
d5-NEtPFOSA	Ave	0.1114	0.1044		9.38	10.0	-6.2	30.0
13C2 PFTeDA	Ave	0.8227	0.7930		9.64	10.0	-3.6	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Lab Sample ID: CCV 410-20936/150 Calibration Date: 07/10/2020 12:12

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-152.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8640		2.09	2.00	4.7	30.0
Perfluoropentanoic acid	LID1F		0.9672		2.06	2.00	3.0	30.0
Perfluorobutanesulfonic acid	LID1F		0.9728		1.71	1.77	-3.4	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.530		1.98	1.87	5.7	30.0
Perfluorohexanoic acid	LID1F		0.7650		1.96	2.00	-2.0	30.0
Perfluoropentanesulfonic acid	LID1F		0.8934		1.92	1.88	2.6	30.0
HFPODA	LID1F		2.719		2.14	2.00	6.8	30.0
Perfluoroheptanoic acid	LID1F		1.062		2.05	2.00	2.7	30.0
Perfluorohexanesulfonic acid	LID1F		1.008		1.83	1.82	0.2	30.0
DONA	LID1F		1.498		1.94	1.89	2.7	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.418		2.15	1.90	13.2	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8547		1.82	1.90	-4.3	30.0
Perfluorooctanoic acid	LID1F		0.9576		2.27	2.00	13.4	30.0
Perfluorooctanesulfonic acid	LID1F		0.9818		1.78	1.85	-4.1	30.0
Perfluorononanoic acid	LID1F		0.8211		1.96	2.00	-2.0	30.0
9Cl-PF3ONS	LID1F		1.691		1.90	1.86	2.1	30.0
Perfluorononanesulfonic acid	LID1F		0.8902		1.96	1.92	2.2	30.0
Perfluorodecanoic acid	LID1F		0.8791		2.12	2.00	6.0	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		8.301		2.00	1.92	4.6	30.0
Perfluorooctanesulfonamide	LID1F		0.9568		1.90	2.00	-5.0	30.0
NMeFOSAA	LID1F		0.9854		2.00	2.00	0.1	30.0
Perfluorodecanesulfonic acid	LID1F		0.9062		1.94	1.93	0.8	30.0
Perfluoroundecanoic acid	LID1F		0.8216		2.07	2.00	3.6	30.0
NEtFOSAA	LID1F		0.9146		1.98	2.00	-1.0	30.0
11Cl-PF3OUdS	LID1F		1.331		1.88	1.86	1.1	30.0
Perfluorododecanoic acid	LID1F		0.9185		2.13	2.00	6.5	30.0
10:2 FTS	LID1F		6.838		2.01	1.93	4.5	30.0
NMeFOSA	LID1F		1.082		2.08	2.00	4.2	30.0
NMeFOSE	LID1F		0.9663		1.91	2.00	-4.6	30.0
Perfluorododecanesulfonic acid	LID1F		0.8999		2.02	1.94	4.5	30.0
Perfluorotridecanoic acid	LID1F		0.8101		2.09	2.00	4.3	30.0
NEtFOSE	LID1F		1.037		2.05	2.00	2.3	30.0
NEtFOSA	LID1F		1.013		1.97	2.00	-1.7	30.0
Perfluorotetradecanoic acid	LID1F		0.8768		2.08	2.00	3.8	30.0
Perfluorohexadecanoic acid	LID1F		0.7119		2.09	2.00	4.4	30.0
Perfluorooctadecanoic acid	LID1F		0.3406		1.99	2.00	-0.6	30.0
13C4 PFBA	Ave	1.092	1.137		10.4	10.0	4.1	30.0
13C5 PFPeA	Ave	0.9016	0.9178		10.2	10.0	1.8	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Lab Sample ID: CCV 410-20936/150 Calibration Date: 07/10/2020 12:12

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-152.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.7001	0.6865		9.18	9.36	-1.9	30.0
M2-4:2 FTS	Ave	0.0495	0.0593		11.2	9.34	19.6	30.0
13C5 PFHxA	Ave	0.8606	0.9228		10.7	10.0	7.2	30.0
13C3 HFPO-DA	Ave	0.1062	0.1046		9.85	10.0	-1.5	30.0
13C4 PFHpA	Ave	0.9047	0.9278		10.3	10.0	2.5	30.0
13C3 PFHxS	Ave	0.5384	0.5616		9.87	9.46	4.3	30.0
M2-6:2 FTS	Ave	0.0256	0.0261		9.66	9.50	1.7	30.0
13C8 PFOA	Ave	0.9813	0.9937		10.1	10.0	1.3	30.0
13C8 PFOS	Ave	1.008	1.050		9.96	9.57	4.1	30.0
13C9 PFNA	Ave	1.723	1.830		10.6	10.0	6.2	30.0
13C6 PFDA	Ave	1.105	1.155		10.5	10.0	4.6	30.0
M2-8:2 FTS	Ave	0.0168	0.0186		10.6	9.58	10.5	30.0
13C8 FOSA	Ave	0.9199	1.003		10.9	10.0	9.1	30.0
d3-NMeFOSAA	Ave	0.3098	0.3389		10.9	10.0	9.4	30.0
13C7 PFUnA	Ave	1.113	1.194		10.7	10.0	7.4	30.0
d5-NEtFOSAA	Ave	0.2737	0.3011		11.0	10.0	10.0	30.0
13C2-PFDoDA	Ave	0.7781	0.8316		10.7	10.0	6.9	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1946		10.8	10.0	8.3	30.0
d3-NMePFOSA	Ave	0.1118	0.1178		10.5	10.0	5.4	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.2117		10.6	10.0	6.5	30.0
d5-NEtPFOSA	Ave	0.1114	0.1179		10.6	10.0	5.9	30.0
13C2 PFTeDA	Ave	0.8227	0.8757		10.6	10.0	6.4	30.0

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 10:14

Analysis Batch Number: 20482 End Date: 07/09/2020 11:36

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 410-20482/1		07/09/2020 10:14	1	20JUL09MCAL-09.d	Gemini C18 50mm 3(mm)
IC 410-20482/2		07/09/2020 10:23	1	20JUL09MCAL-10.d	Gemini C18 50mm 3(mm)
IC 410-20482/3		07/09/2020 10:32	1	20JUL09MCAL-11.d	Gemini C18 50mm 3(mm)
IC 410-20482/4		07/09/2020 10:41	1	20JUL09MCAL-12.d	Gemini C18 50mm 3(mm)
ICISAV 410-20482/5		07/09/2020 10:50	1	20JUL09MCAL-13.d	Gemini C18 50mm 3(mm)
IC 410-20482/6		07/09/2020 10:59	1	20JUL09MCAL-14.d	Gemini C18 50mm 3(mm)
IC 410-20482/7		07/09/2020 11:08	1	20JUL09MCAL-15.d	Gemini C18 50mm 3(mm)
ICB 410-20482/8		07/09/2020 11:17	1	20JUL09MCAL-16.d	Gemini C18 50mm 3(mm)
ICV 410-20482/9		07/09/2020 11:26	1	20JUL09MCAL-17.d	Gemini C18 50mm 3(mm)
WDM 410-20482/10		07/09/2020 11:36	1	20JUL09MCAL-18.d	Gemini C18 50mm 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 14:37

Analysis Batch Number: 20936 End Date: 07/10/2020 12:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 410-20936/11		07/09/2020 14:37	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 14:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 14:58	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:07	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:16	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:25	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:34	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:43	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:52	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:01	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:19	1		Gemini C18 50mm 3(mm)
CCV 410-20936/23		07/09/2020 16:28	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:37	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:55	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:04	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:13	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:23	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:32	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:41	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:50	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 18:08	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 18:17	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 18:26	1		Gemini C18 50mm 3(mm)
CCV 410-20936/37		07/09/2020 18:35	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 18:44	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 18:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 19:02	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 19:11	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 19:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 19:29	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 19:39	1		Gemini C18 50mm 3(mm)
CCV 410-20936/45		07/09/2020 19:49	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 19:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:19	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:28	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:37	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:55	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:04	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:13	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:22	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 14:37

Analysis Batch Number: 20936 End Date: 07/10/2020 12:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/09/2020 21:32	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:41	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:50	1		Gemini C18 50mm 3(mm)
CCV 410-20936/59		07/09/2020 21:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:29	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 23:05	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 23:14	1		Gemini C18 50mm 3(mm)
CCV 410-20936/68		07/09/2020 23:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 23:34	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 23:44	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 23:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 00:02	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 00:12	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 00:21	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 00:30	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 00:39	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 00:48	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 00:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 01:06	1		Gemini C18 50mm 3(mm)
CCV 410-20936/80		07/10/2020 01:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 01:25	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 01:36	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 01:45	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 01:54	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:03	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:12	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:21	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:30	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:39	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:48	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 03:07	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 03:16	1		Gemini C18 50mm 3(mm)
CCV 410-20936/94		07/10/2020 03:25	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 03:35	1		Gemini C18 50mm 3(mm)
CCV 410-20936/96		07/10/2020 03:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 03:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:24	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 14:37

Analysis Batch Number: 20936 End Date: 07/10/2020 12:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/10/2020 04:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:43	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:02	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:11	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:29	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:47	1		Gemini C18 50mm 3(mm)
CCV 410-20936/110		07/10/2020 05:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:07	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:17	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:26	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:05	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:14	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:23	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:32	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:41	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:50	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:09	1		Gemini C18 50mm 3(mm)
CCV 410-20936/125		07/10/2020 08:18	1	20JUL09-127.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:28	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:42	1		Gemini C18 50mm 3(mm)
MB 410-19257/1-A		07/10/2020 10:01	1	20JUL09-138.d	Gemini C18 50mm 3(mm)
LCS 410-19257/2-A		07/10/2020 10:12	1	20JUL09-139.d	Gemini C18 50mm 3(mm)
410-6410-1		07/10/2020 10:21	1	20JUL09-140.d	Gemini C18 50mm 3(mm)
CCV 410-20936/139		07/10/2020 10:30	1	20JUL09-141.d	Gemini C18 50mm 3(mm)
410-6410-2		07/10/2020 10:40	1	20JUL09-142.d	Gemini C18 50mm 3(mm)
410-6410-3		07/10/2020 10:51	1	20JUL09-143.d	Gemini C18 50mm 3(mm)
410-6410-4		07/10/2020 11:00	1	20JUL09-144.d	Gemini C18 50mm 3(mm)
410-6410-5 RA		07/10/2020 11:09	1	20JUL09-145.d	Gemini C18 50mm 3(mm)
410-6410-6		07/10/2020 11:18	1	20JUL09-146.d	Gemini C18 50mm 3(mm)
410-6410-7		07/10/2020 11:27	1	20JUL09-147.d	Gemini C18 50mm 3(mm)
410-6410-8		07/10/2020 11:36	1	20JUL09-148.d	Gemini C18 50mm 3(mm)
410-6410-9		07/10/2020 11:45	1	20JUL09-149.d	Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 14:37

Analysis Batch Number: 20936 End Date: 07/10/2020 12:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
410-6410-9 MS		07/10/2020 11:54	1	20JUL09-150.d	Gemini C18 50mm 3(mm)
410-6410-9 MSD		07/10/2020 12:03	1	20JUL09-151.d	Gemini C18 50mm 3(mm)
CCV 410-20936/150		07/10/2020 12:12	1	20JUL09-152.d	Gemini C18 50mm 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Instrument ID: 27632 Start Date: 07/13/2020 13:01

Analysis Batch Number: 21880 End Date: 07/13/2020 14:22

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 410-21880/1		07/13/2020 13:01	1	20JUL13MCAL-09.d	Gemini C18 50mm 3(mm)
IC 410-21880/2		07/13/2020 13:10	1	20JUL13MCAL-10.d	Gemini C18 50mm 3(mm)
IC 410-21880/3		07/13/2020 13:19	1	20JUL13MCAL-11.d	Gemini C18 50mm 3(mm)
IC 410-21880/4		07/13/2020 13:28	1	20JUL13MCAL-12.d	Gemini C18 50mm 3(mm)
ICISAV 410-21880/5		07/13/2020 13:37	1	20JUL13MCAL-13.d	Gemini C18 50mm 3(mm)
IC 410-21880/6		07/13/2020 13:46	1	20JUL13MCAL-14.d	Gemini C18 50mm 3(mm)
IC 410-21880/7		07/13/2020 13:55	1	20JUL13MCAL-15.d	Gemini C18 50mm 3(mm)
ICB 410-21880/8		07/13/2020 14:04	1	20JUL13MCAL-16.d	Gemini C18 50mm 3(mm)
ICV 410-21880/9		07/13/2020 14:13	1	20JUL13MCAL-17.d	Gemini C18 50mm 3(mm)
WDM 410-21880/10		07/13/2020 14:22	1	20JUL13MCAL-18.d	Gemini C18 50mm 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Instrument ID: 27632 Start Date: 07/15/2020 15:23

Analysis Batch Number: 22831 End Date: 07/16/2020 03:02

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 410-22831/1		07/15/2020 15:23	1		Gemini C18 50mm 3(mm)
CCV 410-22831/4		07/15/2020 15:50	1		Gemini C18 50mm 3(mm)
CCV 410-22831/13		07/15/2020 17:12	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 17:21	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 17:30	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 17:39	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 17:48	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 17:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 18:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 18:15	1		Gemini C18 50mm 3(mm)
CCV 410-22831/21		07/15/2020 18:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 18:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 18:42	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 18:52	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 19:01	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 19:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 19:19	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 19:28	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 19:37	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 19:46	1		Gemini C18 50mm 3(mm)
CCV 410-22831/31		07/15/2020 19:55	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 20:04	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 20:13	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 20:22	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 20:31	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 20:40	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 20:49	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 20:58	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 21:08	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 21:17	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 21:26	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 21:35	1		Gemini C18 50mm 3(mm)
CCV 410-22831/43		07/15/2020 21:44	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 21:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 22:02	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 22:11	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 22:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 22:29	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 22:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 22:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 22:56	1		Gemini C18 50mm 3(mm)
CCV 410-22831/52		07/15/2020 23:05	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 23:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 23:24	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 23:33	100		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6410-1

SDG No.:

Instrument ID: 27632 Start Date: 07/15/2020 15:23

Analysis Batch Number: 22831 End Date: 07/16/2020 03:02

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/15/2020 23:42	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 23:51	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 00:00	100		Gemini C18 50mm 3(mm)
CCV 410-22831/61		07/16/2020 00:27	1		Gemini C18 50mm 3(mm)
CCV 410-22831/70		07/16/2020 01:41	1	20JUL15-90.d	Gemini C18 50mm 3(mm)
410-6410-5		07/16/2020 01:50	1	20JUL15-91.d	Gemini C18 50mm 3(mm)
410-6410-5 DL		07/16/2020 01:59	10	20JUL15-92.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 02:08	100		Gemini C18 50mm 3(mm)
410-6410-7 DL		07/16/2020 02:17	10	20JUL15-94.d	Gemini C18 50mm 3(mm)
410-6410-9 DL		07/16/2020 02:26	10	20JUL15-95.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 02:35	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 02:53	1		Gemini C18 50mm 3(mm)
CCV 410-22831/79		07/16/2020 03:02	1	20JUL15-99.d	Gemini C18 50mm 3(mm)

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-6410-1

SDG No.:

Batch Number: 19257 Batch Start Date: 07/03/20 08:37 Batch Analyst: Barnhart, Toby B

Batch Method: EPA 537 (mod) Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	PFC_MS_MODWX 00015	PFC_SS_MODX 00020
MB 410-19257/1		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL		25 uL
LCS 410-19257/2		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL	40 uL	25 uL
410-6410-A-1	EQB-WL-063020	EPA 537 (mod), EPA 537 (Mod)	T	290.98 g	27.23 g	263.8 mL	1 mL		25 uL
410-6410-A-2	MSA-FB-063020	EPA 537 (mod), EPA 537 (Mod)	T	303.24 g	27.14 g	276.1 mL	1 mL		25 uL
410-6410-A-3	MSA-MW-44S-063020	EPA 537 (mod), EPA 537 (Mod)	T	294.26 g	27.27 g	267 mL	1 mL		25 uL
410-6410-A-4	MSA-MW-46S-063020	EPA 537 (mod), EPA 537 (Mod)	T	294.55 g	27.34 g	267.2 mL	1 mL		25 uL
410-6410-A-5	MSA-MW-35S-063020	EPA 537 (mod), EPA 537 (Mod)	T	288.13 g	27.27 g	260.9 mL	1 mL		25 uL
410-6410-A-6	MSA-DUP-1-063020	EPA 537 (mod), EPA 537 (Mod)	T	294.79 g	27.62 g	267.2 mL	1 mL		25 uL
410-6410-A-7	MSA-DMW-5S-063020	EPA 537 (mod), EPA 537 (Mod)	T	310.67 g	27.45 g	283.2 mL	1 mL		25 uL
410-6410-A-8	MSA-DMW-5I-063020	EPA 537 (mod), EPA 537 (Mod)	T	326.05 g	27.21 g	298.8 mL	1 mL		25 uL
410-6410-A-9	MSA-DMW-4S-063020	EPA 537 (mod), EPA 537 (Mod)	T	316.39 g	27.23 g	289.2 mL	1 mL		25 uL
410-6410-A-9 MS	MSA-DMW-4S-063020	EPA 537 (mod), EPA 537 (Mod)	T	316.57 g	26.97 g	289.6 mL	1 mL	40 uL	25 uL
410-6410-A-9 MSD	MSA-DMW-4S-063020	EPA 537 (mod), EPA 537 (Mod)	T	314.42 g	27.16 g	287.3 mL	1 mL	40 uL	25 uL

Lab Sample ID	Client Sample ID	Method Chain	Basis	AnalysisComment					

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-6410-1

SDG No.:

Batch Number: 19257 Batch Start Date: 07/03/20 08:37 Batch Analyst: Barnhart, Toby B

Batch Method: EPA 537 (mod) Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	AnalysisComment					
MB 410-19257/1		EPA 537 (mod), EPA 537 (Mod)							
LCS 410-19257/2		EPA 537 (mod), EPA 537 (Mod)							
410-6410-A-1	EQB-WL-063020	EPA 537 (mod), EPA 537 (Mod)	T						
410-6410-A-2	MSA-FB-063020	EPA 537 (mod), EPA 537 (Mod)	T						
410-6410-A-3	MSA-MW-44S-063020	EPA 537 (mod), EPA 537 (Mod)	T						
410-6410-A-4	MSA-MW-46S-063020	EPA 537 (mod), EPA 537 (Mod)	T	Vacuum was required					
410-6410-A-5	MSA-MW-35S-063020	EPA 537 (mod), EPA 537 (Mod)	T						
410-6410-A-6	MSA-DUP-1-063020	EPA 537 (mod), EPA 537 (Mod)	T						
410-6410-A-7	MSA-DMW-5S-063020	EPA 537 (mod), EPA 537 (Mod)	T						
410-6410-A-8	MSA-DMW-5I-063020	EPA 537 (mod), EPA 537 (Mod)	T						
410-6410-A-9	MSA-DMW-4S-063020	EPA 537 (mod), EPA 537 (Mod)	T						
410-6410-A-9 MS	MSA-DMW-4S-063020	EPA 537 (mod), EPA 537 (Mod)	T						
410-6410-A-9 MSD	MSA-DMW-4S-063020	EPA 537 (mod), EPA 537 (Mod)	T						

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-6410-1

SDG No.:

Batch Number: 19257 Batch Start Date: 07/03/20 08:37 Batch Analyst: Barnhart, Toby B

Batch Method: EPA 537 (mod) Batch End Date:

Batch Notes	
Balance ID	B629764122
Collection Tube Witness	ABP 30938
H2O ID	House A372
Manifold ID	4, 5
Methanol ID	DX907-IN
Analyst ID - IS Reagent Drop Witness	ABP 30938
Solvent Lot #	3090607032033A; 3317607022033A
Solvent Name	1:1 ACN:MeOH; 0.3% NH4OH in MeOH
SPE Cartridge Lot ID	6508813-04

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TETRA TECH **INTERNAL CORRESPONDENCE**

TO: **S. BRENNER** **DATE:** **OCTOBER 14, 2020**

FROM: **GLORIA SCHIFINO** **COPIES:** **DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS)**
MARTIN STATE AIRPORT
SAMPLE DELIVERY GROUP (SDG) 410-6630-1

SAMPLES: 5/Aqueous
GSP-FD03-070220 GSP-MW-12-070220 GSP-MW-14-070220
GSP-MW-20-070220 GSP-MW-23I-070220

1/Field Blanks (FBs)
MSA-FB-070220

1/Equipment Blank/PFAS
EQB-WL-070220

Overview

The sample set for Martin State Airport, SDG 410-6630-1, consisted of five (5) aqueous samples, one (1) field blank sample and one (1) equipment blank. All samples were analyzed for perfluorinated alkyl acids.

The samples were collected by Tetra Tech on July 2, 2020 and analyzed by Eurofins Lancaster Laboratories. PFAS groundwater analyses were conducted in accordance with EPA method 537 modified analytical and reporting protocols.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, mass calibration, mass spectral acquisition rate, instrument sensitivity check, peak asymmetry factor, initial/continuing calibrations, ion transitions, laboratory method results, extracted internal standard recoveries, laboratory control sample results, chromatographic resolution, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

Major

No major issues were identified.

Minor

Detected results reported below the reporting limit (RL) but above the detection limit (DL) were qualified as estimated (J).

Notes

The following extracted internal standard recoveries for 6:2 FTS and 8:2 FTS were above quality control limit for the following sample GSP-MW-12-070220. No validation actions were required due to the affected sample results were nondetected.

The matrix spike/matrix spike duplicate recoveries for PFHxS were high in sample GSP-MW-12-070220. No action was required because the sample concentration was greater than 4 times the spike added concentration.

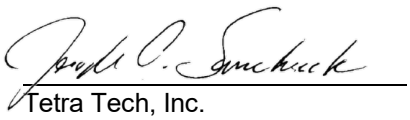
Non-detected results were reported to the reporting limit.

Executive Summary

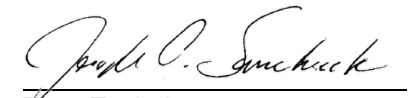
Laboratory Performance: No issues were identified.

Other Factors Affecting Data Quality: Results below the RL were estimated.

The data for these analyses were reviewed with reference to the Environmental Protection Agency document EPA 910-R-18-001 “Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537”, (November 2018). The text of this report has been formulated to address only those areas affecting data quality.



for Tetra Tech, Inc.
Gloria Schifino
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

Data Qualifier Definitions

The following definitions provide brief explanations of the validation qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted detection limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value is the estimated concentration in the sample.
R	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
UR	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

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: 09023	NSAMPLE	EQB-WL-070220			GSP-FD03-070220			GSP-MW-12-070220			GSP-MW-14-070220		
SDG: 410-6630-1	LAB_ID	410-6630-7			410-6630-2			410-6630-3			410-6630-4		
FRACTION: PFAS	SAMP_DATE	7/2/2020			7/2/2020			7/2/2020			7/2/2020		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/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
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		4.3	U		49	U		4.8	U		4.8	U	
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		2.6	U		30	U		2.9	U		2.9	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)		1.7	U		68			13			3.3		
PERFLUOROBUTANESULFONIC ACID (PFBS)		1.7	U		60			67			0.67	J	P
PERFLUOROHEPTANOIC ACID (PFHPA)		1.7	U		53			12			2.4		
PERFLUOROHEXANESULFONIC ACID (PFHXS)		1.7	U		270			220			1.4	J	P
PERFLUORONONANOIC ACID (PFNA)		1.7	U		20	U		3.4			1.2	J	P
PERFLUOROOCTANESULFONIC ACID (PFOS)		1.7	U		10	J	P	65			5.6		

PROJ_NO: 09023	NSAMPLE	GSP-MW-20-070220			GSP-MW-23I-070220			MSA-FB-070220		
SDG: 410-6630-1	LAB_ID	410-6630-5			410-6630-6			410-6630-1		
FRACTION: PFAS	SAMP_DATE	7/2/2020			7/2/2020			7/2/2020		
MEDIA: WATER	QC_TYPE	NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L		
	PCT_SOLIDS	0.0			0.0			0.0		
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		50	U		4.3	U		4.7	U	
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		30	U		2.6	U		2.8	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)		66			8.4			1.9	U	
PERFLUOROBUTANESULFONIC ACID (PFBS)		62			4.4			1.9	U	
PERFLUOROHEPTANOIC ACID (PFHPA)		44			6.7			1.9	U	
PERFLUOROHEXANESULFONIC ACID (PFHXS)		280			27			1.9	U	
PERFLUORONONANOIC ACID (PFNA)		20	U		1.5	J	P	1.9	U	
PERFLUOROOCTANESULFONIC ACID (PFOS)		8.2	J	P	29			1.9	U	

Appendix B

Results as Reported by the Laboratory

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6630-1

SDG No.:

Client Sample ID: MSA-FB-070220 Lab Sample ID: 410-6630-1

Matrix: Water Lab File ID: 20JUL09-73.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/02/2020 09:15

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 09:12

Sample wt/vol: 263.4(mL) Date Analyzed: 07/09/2020 23:53

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.7	1.9
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.95
375-73-5	Perfluorobutanesulfonic acid	ND		1.9	0.47
375-85-9	Perfluoroheptanoic acid	ND		1.9	0.47
355-46-4	Perfluorohexanesulfonic acid	ND		1.9	0.47
375-95-1	Perfluorononanoic acid	ND		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	ND		1.9	0.47
335-67-1	Perfluorooctanoic acid	ND		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	124		29-182
STL02280	M2-8:2 FTS	138		37-169
STL02337	13C3 PFBS	113		23-175
STL01892	13C4 PFHpA	112		33-140
STL01052	13C8 PFOA	112		52-124
STL01054	13C8 PFOS	107		52-121
STL02581	13C3 PFHxS	112		35-143
STL02578	13C9 PFNA	113		48-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6630-1

SDG No.:

Client Sample ID: GSP-FD03-070220 Lab Sample ID: 410-6630-2

Matrix: Water Lab File ID: 20JUL09-74.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/02/2020 00:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 09:12

Sample wt/vol: 25.3(mL) Date Analyzed: 07/10/2020 00:02

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		49	20
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		30	9.9
375-73-5	Perfluorobutanesulfonic acid	60		20	4.9
375-85-9	Perfluoroheptanoic acid	53		20	4.9
355-46-4	Perfluorohexanesulfonic acid	270		20	4.9
375-95-1	Perfluorononanoic acid	ND		20	4.9
1763-23-1	Perfluorooctanesulfonic acid	10	J	20	4.9
335-67-1	Perfluorooctanoic acid	68		20	4.9

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	159		29-182
STL02280	M2-8:2 FTS	135		37-169
STL02337	13C3 PFBS	148		23-175
STL01892	13C4 PFHpA	108		33-140
STL01052	13C8 PFOA	107		52-124
STL01054	13C8 PFOS	104		52-121
STL02581	13C3 PFHxS	107		35-143
STL02578	13C9 PFNA	111		48-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6630-1

SDG No.:

Client Sample ID: GSP-MW-12-070220 Lab Sample ID: 410-6630-3

Matrix: Water Lab File ID: 20JUL09-75.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/02/2020 11:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 09:12

Sample wt/vol: 259(mL) Date Analyzed: 07/10/2020 00:12

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.8	1.9
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.9	0.97
375-73-5	Perfluorobutanesulfonic acid	67		1.9	0.48
375-85-9	Perfluoroheptanoic acid	12		1.9	0.48
355-46-4	Perfluorohexanesulfonic acid	220		1.9	0.48
375-95-1	Perfluorononanoic acid	3.4		1.9	0.48
1763-23-1	Perfluorooctanesulfonic acid	65		1.9	0.48
335-67-1	Perfluorooctanoic acid	13		1.9	0.48

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	204	*5	29-182
STL02280	M2-8:2 FTS	176	*5	37-169
STL02337	13C3 PFBS	144		23-175
STL01892	13C4 PFHpA	108		33-140
STL01052	13C8 PFOA	115		52-124
STL01054	13C8 PFOS	109		52-121
STL02581	13C3 PFHxS	108		35-143
STL02578	13C9 PFNA	127		48-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6630-1

SDG No.:

Client Sample ID: GSP-MW-14-070220 Lab Sample ID: 410-6630-4

Matrix: Water Lab File ID: 20JUL09-78.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/02/2020 09:10

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 09:12

Sample wt/vol: 261.8(mL) Date Analyzed: 07/10/2020 00:39

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.8	1.9
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.9	0.95
375-73-5	Perfluorobutanesulfonic acid	0.67	J	1.9	0.48
375-85-9	Perfluoroheptanoic acid	2.4		1.9	0.48
355-46-4	Perfluorohexanesulfonic acid	1.4	J	1.9	0.48
375-95-1	Perfluorononanoic acid	1.2	J	1.9	0.48
1763-23-1	Perfluorooctanesulfonic acid	5.6		1.9	0.48
335-67-1	Perfluorooctanoic acid	3.3		1.9	0.48

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	132		29-182
STL02280	M2-8:2 FTS	129		37-169
STL02337	13C3 PFBS	129		23-175
STL01892	13C4 PFHpA	114		33-140
STL01052	13C8 PFOA	108		52-124
STL01054	13C8 PFOS	112		52-121
STL02581	13C3 PFHxS	113		35-143
STL02578	13C9 PFNA	117		48-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6630-1

SDG No.:

Client Sample ID: GSP-MW-20-070220 Lab Sample ID: 410-6630-5

Matrix: Water Lab File ID: 20JUL09-79.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/02/2020 10:44

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 09:12

Sample wt/vol: 25.1(mL) Date Analyzed: 07/10/2020 00:48

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		50	20
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		30	10
375-73-5	Perfluorobutanesulfonic acid	62		20	5.0
375-85-9	Perfluoroheptanoic acid	44		20	5.0
355-46-4	Perfluorohexanesulfonic acid	280		20	5.0
375-95-1	Perfluorononanoic acid	ND		20	5.0
1763-23-1	Perfluorooctanesulfonic acid	8.2	J	20	5.0
335-67-1	Perfluorooctanoic acid	66		20	5.0

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	157		29-182
STL02280	M2-8:2 FTS	151		37-169
STL02337	13C3 PFBS	152		23-175
STL01892	13C4 PFHpA	113		33-140
STL01052	13C8 PFOA	110		52-124
STL01054	13C8 PFOS	111		52-121
STL02581	13C3 PFHxS	110		35-143
STL02578	13C9 PFNA	115		48-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6630-1

SDG No.:

Client Sample ID: GSP-MW-23I-070220 Lab Sample ID: 410-6630-6

Matrix: Water Lab File ID: 20JUL09-80.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/02/2020 11:50

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 09:12

Sample wt/vol: 289(mL) Date Analyzed: 07/10/2020 00:57

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.3	1.7
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.6	0.87
375-73-5	Perfluorobutanesulfonic acid	4.4		1.7	0.43
375-85-9	Perfluoroheptanoic acid	6.7		1.7	0.43
355-46-4	Perfluorohexanesulfonic acid	27		1.7	0.43
375-95-1	Perfluorononanoic acid	1.5	J	1.7	0.43
1763-23-1	Perfluorooctanesulfonic acid	29		1.7	0.43
335-67-1	Perfluorooctanoic acid	8.4		1.7	0.43

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	130		29-182
STL02280	M2-8:2 FTS	121		37-169
STL02337	13C3 PFBS	108		23-175
STL01892	13C4 PFHpA	90		33-140
STL01052	13C8 PFOA	86		52-124
STL01054	13C8 PFOS	88		52-121
STL02581	13C3 PFHxS	87		35-143
STL02578	13C9 PFNA	93		48-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6630-1

SDG No.:

Client Sample ID: EQB-WL-070220 Lab Sample ID: 410-6630-7

Matrix: Water Lab File ID: 20JUL09-81.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/02/2020 07:30

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 09:12

Sample wt/vol: 291.2(mL) Date Analyzed: 07/10/2020 01:06

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.3	1.7
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.6	0.86
375-73-5	Perfluorobutanesulfonic acid	ND		1.7	0.43
375-85-9	Perfluoroheptanoic acid	ND		1.7	0.43
355-46-4	Perfluorohexanesulfonic acid	ND		1.7	0.43
375-95-1	Perfluorononanoic acid	ND		1.7	0.43
1763-23-1	Perfluorooctanesulfonic acid	ND		1.7	0.43
335-67-1	Perfluorooctanoic acid	ND		1.7	0.43

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	109		29-182
STL02280	M2-8:2 FTS	109		37-169
STL02337	13C3 PFBS	100		23-175
STL01892	13C4 PFHpA	100		33-140
STL01052	13C8 PFOA	98		52-124
STL01054	13C8 PFOS	95		52-121
STL02581	13C3 PFHxS	98		35-143
STL02578	13C9 PFNA	101		48-130

Appendix C

Support Documentation

410-6630 Chain of Custody

Chain of Custody Record 321391

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

am: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Samantha Brenner	Site Contact: P. O'Brien	Date: 7/2/20	COC No:
Company Name: Tetra Tech	Tel/Fax: 301-528-3052	Lab Contact: Stephen Gordon	Carrier: Fedex	1 of 1 COCs
Address: 20251 Century Blvd., Suite 200	Analysis Turnaround Time			Sampler:
City/State/Zip: Germantown, MD 20875	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 301-528-5552	TAT if different from Below			Walk-in Client:
Fax: 301-528-5080	☐ 2 weeks			Lab Sampling:
Project Name: MSA PFAS GW Round 2	☐ 1 week Standard			
Site: MSA	☐ 2 days			Job / SDG No.:
P O # 112EC04023	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFAS (Method 537)	Sample Specific Notes:
MSA-FB-070220	7/2/20	0915	G	GW	2	N	N	X	Trizma preserved FRB
GSP-FD03-070220	7/2/20	0000	G	GW	2	N	N	X	
GSP-MW-12-070220	7/2/20	1100	G	GW	6	N	Y	X	MS/MSD
GSP-MW-14-070220	7/2/20	0910	G	GW	2	N	N	X	
GSP-MW-20-070220	↓	1014	↓	↓	2	N	N	X	
GSP-MW-23I-070220	↓	1150	↓	↓	2	N	N	X	
EQB-WL-070220	↓	0730	↓	↓	2	N	N	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	Tetra Tech	7/2/20	[signature]	ETA	7/2/20 1245
[signature]	E+A	7/2/20 1305	[signature]	EarcLab	7-2-20 1305
[signature]	EarcLab	7-2-20 16:00	Received in Laboratory by: [signature]	[signature]	7-2-20 1625

Qualifiers

LCMS

Qualifier	Qualifier Description
*5	Isotope dilution analyte is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job Narrative
410-6630-1

Receipt
The samples were received on 7/3/2020 4:25 PM; the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 0.0°C and 0.1°C

Receipt Exceptions
The container label for the following sample did not match the information listed on the Chain-of-Custody (COC): EQB-WL-070220 (410-6630-7). The container labels list GSP-WL, while the COC lists EQB-WL. Sample ID used per the bottle label.

LCMS
Method PFC_IDA: The recovery for the labeled isotope(s) is outside the QC acceptance limits as noted on the QC Summary for the following sample: GSP-MW-12-070220 (410-6630-3), GSP-MW-12-070220 (410-6630-3[MS]) and GSP-MW-12-070220 (410-6630-3[MSD]) . The recovery for the labeled isotope(s) is also outside the QC acceptance limits in the associated matrix spike and matrix spike duplicate, indicating a matrix effect.

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

Method Summary

Client: Tetra Tech, Inc. Job ID: 410-6630-1
Project/Site: MSA PFAS GW Round 2

Method	Method Description	Protocol	Laboratory
EPA 537 (Mod)	EPA 537 Isotope Dilution	EPA	ELLE
EPA 537 (mod)	EPA 537 Isotope Dilution	EPA	ELLE

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: Tetra Tech, Inc.
Job ID: 410-6630-1
Project/Site: MSA PFAS GW Round 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
410-6630-1	MSA-FB-070220	Water	07/02/20 09:15	07/03/20 16:25	
410-6630-2	GSP-FD03-070220	Water	07/02/20 00:00	07/03/20 16:25	
410-6630-3	GSP-MW-12-070220	Water	07/02/20 11:00	07/03/20 16:25	
410-6630-4	GSP-MW-14-070220	Water	07/02/20 09:10	07/03/20 16:25	
410-6630-5	GSP-MW-20-070220	Water	07/02/20 10:44	07/03/20 16:25	
410-6630-6	GSP-MW-23I-070220	Water	07/02/20 11:50	07/03/20 16:25	
410-6630-7	EQB-WL-070220	Water	07/02/20 07:30	07/03/20 16:25	

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6630-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C3PFBS #	C4PFHA #	C3PFHS #	M262FTS #	C8PFOA #	C8PFOS #	C9PFNA #	M282FTS #
MSA-FB-070220	410-6630-1	113	112	112	124	112	107	113	138
GSP-FD03-070220	410-6630-2	148	108	107	159	107	104	111	135
GSP-MW-12-070220	410-6630-3	144	108	108	204 *5	115	109	127	176 *5
GSP-MW-14-070220	410-6630-4	129	114	113	132	108	112	117	129
GSP-MW-20-070220	410-6630-5	152	113	110	157	110	111	115	151
GSP-MW-23I-070220	410-6630-6	108	90	87	130	86	88	93	121
EQB-WL-070220	410-6630-7	100	100	98	109	98	95	101	109
	MB 410-19908/1-A	103	108	107	125	108	107	110	119
	LCS 410-19908/2-A	111	111	109	125	109	104	107	128
GSP-MW-12-070220 MS	410-6630-3 MS	130	100	99	172	106	103	116	150
GSP-MW-12-070220 MSD	410-6630-3 MSD	131	107	105	179	111	104	120	167

	QC LIMITS
C3PFBS = 13C3 PFBS	23-175
C4PFHA = 13C4 PFHpA	33-140
C3PFHS = 13C3 PFHxS	35-143
M262FTS = M2-6:2 FTS	29-182
C8PFOA = 13C8 PFOA	52-124
C8PFOS = 13C8 PFOS	52-121
C9PFNA = 13C9 PFNA	48-130
M282FTS = M2-8:2 FTS	37-169

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6630-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL09-72.d

Lab ID: LCS 410-19908/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
6:2 Fluorotelomer sulfonic acid	24.3	25.8	106	56-140	
8:2 Fluorotelomer sulfonic acid	24.5	26.1	106	58-143	
Perfluorobutanesulfonic acid	22.6	21.8	96	67-135	
Perfluoroheptanoic acid	25.6	26.0	102	69-144	
Perfluorohexanesulfonic acid	24.2	23.4	97	63-132	
Perfluorononanoic acid	25.6	25.1	98	66-144	
Perfluorooctanesulfonic acid	24.5	22.6	92	53-129	
Perfluorooctanoic acid	25.6	27.3	107	67-139	
M2-6:2 FTS	38.0	47.5	125	29-182	
M2-8:2 FTS	38.3	49.0	128	37-169	
13C3 PFBS	37.4	41.7	111	23-175	
13C4 PFHpA	40.0	44.4	111	33-140	
13C8 PFOA	40.0	43.5	109	52-124	
13C8 PFOS	38.3	39.7	104	52-121	
13C3 PFHxS	37.8	41.2	109	35-143	
13C9 PFNA	40.0	42.9	107	48-130	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM III
LCMS MATRIX SPIKE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6630-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL09-76.d

Lab ID: 410-6630-3 MS Client ID: GSP-MW-12-070220 MS

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC	QC LIMITS REC	#
6:2 Fluorotelomer sulfonic acid	23.7	ND	27.8	117	56-140	
8:2 Fluorotelomer sulfonic acid	24.0	ND	24.8	103	58-143	
Perfluorobutanesulfonic acid	22.1	67	93.3	120	67-135	
Perfluoroheptanoic acid	25.0	12	37.6	103	69-144	
Perfluorohexanesulfonic acid	23.7	220	265	171	63-132	4
Perfluorononanoic acid	25.0	3.4	29.2	103	66-144	
Perfluorooctanesulfonic acid	23.9	65	86.4	91	53-129	
Perfluorooctanoic acid	25.0	13	41.8	116	67-139	
M2-6:2 FTS	37.2	75	63.8	172	29-182	
M2-8:2 FTS	37.5	65	56.4	150	37-169	
13C3 PFBS	36.6	52	47.7	130	23-175	
13C4 PFHpA	39.1	42	39.3	100	33-140	
13C8 PFOA	39.1	44	41.6	106	52-124	
13C8 PFOS	37.4	40	38.6	103	52-121	
13C3 PFHxS	37.0	40	36.6	99	35-143	
13C9 PFNA	39.1	49	45.3	116	48-130	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6630-1

SDG No.:

Client Sample ID: GSP-MW-12-070220 MS Lab Sample ID: 410-6630-3 MS

Matrix: Water Lab File ID: 20JUL09-76.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/02/2020 11:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 09:12

Sample wt/vol: 255.6(mL) Date Analyzed: 07/10/2020 00:21

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	27.8		4.9	2.0
39108-34-4	8:2 Fluorotelomer sulfonic acid	24.8		2.9	0.98
375-73-5	Perfluorobutanesulfonic acid	93.3		2.0	0.49
375-85-9	Perfluoroheptanoic acid	37.6		2.0	0.49
355-46-4	Perfluorohexanesulfonic acid	265		2.0	0.49
375-95-1	Perfluorononanoic acid	29.2		2.0	0.49
1763-23-1	Perfluorooctanesulfonic acid	86.4		2.0	0.49
335-67-1	Perfluorooctanoic acid	41.8		2.0	0.49

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	172		29-182
STL02280	M2-8:2 FTS	150		37-169
STL02337	13C3 PFBS	130		23-175
STL01892	13C4 PFHpA	100		33-140
STL01052	13C8 PFOA	106		52-124
STL01054	13C8 PFOS	103		52-121
STL02581	13C3 PFHxS	99		35-143
STL02578	13C9 PFNA	116		48-130

FORM III
LCMS MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6630-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL09-77.d

Lab ID: 410-6630-3 MSD Client ID: GSP-MW-12-070220 MSD

COMPOUND	SPIKE ADDED (ng/L)	MSD CONCENTRATION (ng/L)	MSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
6:2 Fluorotelomer sulfonic acid	24.0	28.3	118	2	30	56-140	
8:2 Fluorotelomer sulfonic acid	24.3	23.2	96	6	30	58-143	
Perfluorobutanesulfonic acid	22.4	95.3	128	2	30	67-135	
Perfluoroheptanoic acid	25.3	35.9	95	5	30	69-144	
Perfluorohexanesulfonic acid	24.0	253	118	5	30	63-132	4
Perfluorononanoic acid	25.3	28.3	98	3	30	66-144	
Perfluorooctanesulfonic acid	24.2	87.8	95	2	30	53-129	
Perfluorooctanoic acid	25.3	39.5	105	6	30	67-139	
M2-6:2 FTS	37.6	67.4	179			29-182	
M2-8:2 FTS	37.9	63.2	167			37-169	
13C3 PFBS	37.1	48.5	131			23-175	
13C4 PFHpA	39.6	42.5	107			33-140	
13C8 PFOA	39.6	43.8	111			52-124	
13C8 PFOS	37.9	39.5	104			52-121	
13C3 PFHxS	37.5	39.4	105			35-143	
13C9 PFNA	39.6	47.4	120			48-130	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6630-1

SDG No.:

Client Sample ID: GSP-MW-12-070220 MSD Lab Sample ID: 410-6630-3 MSD

Matrix: Water Lab File ID: 20JUL09-77.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/02/2020 11:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 09:12

Sample wt/vol: 252.6(mL) Date Analyzed: 07/10/2020 00:30

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	28.3		4.9	2.0
39108-34-4	8:2 Fluorotelomer sulfonic acid	23.2		3.0	0.99
375-73-5	Perfluorobutanesulfonic acid	95.3		2.0	0.49
375-85-9	Perfluoroheptanoic acid	35.9		2.0	0.49
355-46-4	Perfluorohexanesulfonic acid	253		2.0	0.49
375-95-1	Perfluorononanoic acid	28.3		2.0	0.49
1763-23-1	Perfluorooctanesulfonic acid	87.8		2.0	0.49
335-67-1	Perfluorooctanoic acid	39.5		2.0	0.49

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	179		29-182
STL02280	M2-8:2 FTS	167		37-169
STL02337	13C3 PFBS	131		23-175
STL01892	13C4 PFHpA	107		33-140
STL01052	13C8 PFOA	111		52-124
STL01054	13C8 PFOS	104		52-121
STL02581	13C3 PFHxS	105		35-143
STL02578	13C9 PFNA	120		48-130

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6630-1

SDG No.:

Lab File ID: 20JUL09-71.d Lab Sample ID: MB 410-19908/1-A

Matrix: Water Date Extracted: 07/07/2020 09:12

Instrument ID: 30733 Date Analyzed: 07/09/2020 23:34

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 410-19908/2-A	20JUL09-72.d	07/09/2020 23:44
MSA-FB-070220	410-6630-1	20JUL09-73.d	07/09/2020 23:53
GSP-FD03-070220	410-6630-2	20JUL09-74.d	07/10/2020 00:02
GSP-MW-12-070220	410-6630-3	20JUL09-75.d	07/10/2020 00:12
GSP-MW-12-070220 MS	410-6630-3 MS	20JUL09-76.d	07/10/2020 00:21
GSP-MW-12-070220 MSD	410-6630-3 MSD	20JUL09-77.d	07/10/2020 00:30
GSP-MW-14-070220	410-6630-4	20JUL09-78.d	07/10/2020 00:39
GSP-MW-20-070220	410-6630-5	20JUL09-79.d	07/10/2020 00:48
GSP-MW-23I-070220	410-6630-6	20JUL09-80.d	07/10/2020 00:57
EQB-WL-070220	410-6630-7	20JUL09-81.d	07/10/2020 01:06

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6630-1

SDG No.:

Client Sample ID: Lab Sample ID: MB 410-19908/1-A

Matrix: Water Lab File ID: 20JUL09-71.d

Analysis Method: EPA 537 (Mod) Date Collected:

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 09:12

Sample wt/vol: 250(mL) Date Analyzed: 07/09/2020 23:34

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		5.0	2.0
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		3.0	1.0
375-73-5	Perfluorobutanesulfonic acid	ND		2.0	0.50
375-85-9	Perfluoroheptanoic acid	ND		2.0	0.50
355-46-4	Perfluorohexanesulfonic acid	ND		2.0	0.50
375-95-1	Perfluorononanoic acid	ND		2.0	0.50
1763-23-1	Perfluorooctanesulfonic acid	ND		2.0	0.50
335-67-1	Perfluorooctanoic acid	ND		2.0	0.50

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	125		29-182
STL02280	M2-8:2 FTS	119		37-169
STL02337	13C3 PFBS	103		23-175
STL01892	13C4 PFHpA	108		33-140
STL01052	13C8 PFOA	108		52-124
STL01054	13C8 PFOS	107		52-121
STL02581	13C3 PFHxS	107		35-143
STL02578	13C9 PFNA	110		48-130

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6630-1

SDG No.:

Instrument ID: 30733 Calibration Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/09/2020 11:08

Calibration ID: 6664

		13C3PFBA		13PFOA		PFOS	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1810897	3.54	2342094	5.26	1136098	5.58
UPPER LIMIT		2716346	3.74	3513141	5.46	1704147	5.78
LOWER LIMIT		905449	3.34	1171047	5.06	568049	5.38
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-20482/8		1707938	3.53	2312321	5.26	1072027	5.58
ICV 410-20482/9		1899600	3.53	2526066	5.25	1207497	5.58
CCV 410-20936/68		2000358	3.57	2542793	5.25	1150684	5.57
MB 410-19908/1-A		1994870	3.57	2488181	5.25	1181830	5.57
LCS 410-19908/2-A		1930061	3.54	2458436	5.25	1229203	5.57
410-6630-1	MSA-FB-070220	1947082	3.54	2538632	5.25	1250928	5.56
410-6630-2	GSP-FD03-070220	1356215	3.53	2597031	5.25	1179104	5.56
410-6630-3	GSP-MW-12-070220	1459787	3.53	2573877	5.24	1157373	5.56
410-6630-3 MS	GSP-MW-12-070220 MS	1480092	3.53	2620017	5.24	1202311	5.56
410-6630-3 MSD	GSP-MW-12-070220 MSD	1505535	3.53	2511438	5.25	1081173	5.56
410-6630-4	GSP-MW-14-070220	1723724	3.53	2522389	5.24	1125855	5.56
410-6630-5	GSP-MW-20-070220	1316500	3.54	2514429	5.25	1112737	5.57
410-6630-6	GSP-MW-23I-070220	1768664	3.53	2790972	5.24	1233368	5.56
410-6630-7	EQB-WL-070220	2001247	3.52	2645923	5.24	1262027	5.56
CCV 410-20936/80		1912869	3.57	2357895	5.24	1121967	5.56

13C3PFBA = 13C3-PFBA
13PFOA = 13C2 PFOA
PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6630-1

SDG No.:

Instrument ID: 30733 Calibration Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/09/2020 11:08

Calibration ID: 6664

		PFDA					
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		2137017	5.91				
UPPER LIMIT		3205526	6.11				
LOWER LIMIT		1068509	5.71				
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-20482/8		2052405	5.91				
ICV 410-20482/9		2272200	5.91				
CCV 410-20936/68		2155111	5.89				
MB 410-19908/1-A		2172988	5.89				
LCS 410-19908/2-A		2159888	5.90				
410-6630-1	MSA-FB-070220	2190810	5.89				
410-6630-2	GSP-FD03-070220	1965945	5.89				
410-6630-3	GSP-MW-12-070220	2070361	5.89				
410-6630-3 MS	GSP-MW-12-070220 MS	2296085	5.89				
410-6630-3 MSD	GSP-MW-12-070220 MSD	1749898	5.89				
410-6630-4	GSP-MW-14-070220	2118640	5.89				
410-6630-5	GSP-MW-20-070220	1817745	5.89				
410-6630-6	GSP-MW-23I-070220	2089355	5.89				
410-6630-7	EQB-WL-070220	2385793	5.89				
CCV 410-20936/80		2150111	5.89				

PFDA = 13C2 PFDA

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6630-1

SDG No.:

Lab Sample ID: ICV 410-20482/9 Calibration Date: 07/09/2020 11:26

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09MCAL-17.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8868		2.15	2.00	7.4	30.0
Perfluoropentanoic acid	LID1F		1.006		2.14	2.00	7.1	30.0
Perfluorobutanesulfonic acid	LID1F		1.018		1.79	1.77	1.1	30.0
Perfluorohexanoic acid	LID1F		0.8083		2.07	2.00	3.5	30.0
HFPODA	LID1F		2.602		2.04	2.00	2.2	30.0
Perfluoroheptanoic acid	LID1F		1.110		2.15	2.00	7.3	30.0
Perfluorohexanesulfonic acid	LID1F		1.019		1.92	1.89	1.3	30.0
DONA	LID1F		1.450		1.87	1.88	-0.6	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9191		1.96	1.90	2.9	30.0
Perfluorooctanoic acid	LID1F		0.8632		2.05	2.00	2.3	30.0
Perfluorooctanesulfonic acid	LID1F		0.9279		1.73	1.91	-9.4	30.0
Perfluorononanoic acid	LID1F		0.8496		2.03	2.00	1.4	30.0
9Cl-PF3ONS	LID1F		1.689		1.90	1.86	1.9	30.0
Perfluorodecanoic acid	LID1F		0.8204		1.98	2.00	-1.0	30.0
NMeFOSAA	LID1F		1.003		2.04	2.00	1.9	30.0
Perfluorodecanesulfonic acid	LID1F		0.9664		2.07	1.93	7.4	30.0
Perfluoroundecanoic acid	LID1F		0.8224		2.07	2.00	3.7	30.0
NEtFOSAA	LID1F		0.9614		2.08	2.00	4.0	30.0
11Cl-PF3OUdS	LID1F		1.309		1.87	1.88	-0.5	30.0
Perfluorododecanoic acid	LID1F		0.8947		2.07	2.00	3.7	30.0
Perfluorotridecanoic acid	LID1F		0.8186		2.11	2.00	5.4	30.0
Perfluorotetradecanoic acid	LID1F		0.8561		2.03	2.00	1.4	30.0
13C4 PFBA	Ave	1.092	1.000		9.15	10.0	-8.5	30.0
13C5 PFPeA	Ave	0.9016	0.8521		9.45	10.0	-5.5	30.0
13C3 PFBS	Ave	0.7001	0.6518		8.71	9.36	-6.9	30.0
M2-4:2 FTS	Ave	0.0495	0.0470		8.85	9.34	-5.2	30.0
13C5 PFHxA	Ave	0.8606	0.8070		9.38	10.0	-6.2	30.0
13C3 HFPO-DA	Ave	0.1062	0.0949		8.94	10.0	-10.6	30.0
13C4 PFHpA	Ave	0.9047	0.8106		8.96	10.0	-10.4	30.0
13C3 PFHxS	Ave	0.5384	0.4807		8.44	9.46	-10.7	30.0
M2-6:2 FTS	Ave	0.0256	0.0240		8.90	9.50	-6.3	30.0
13C8 PFOA	Ave	0.9813	0.9018		9.19	10.0	-8.1	30.0
13C8 PFOS	Ave	1.008	0.9218		8.75	9.57	-8.6	30.0
13C9 PFNA	Ave	1.723	1.578		9.16	10.0	-8.4	30.0
13C6 PFDA	Ave	1.105	1.040		9.42	10.0	-5.8	30.0
M2-8:2 FTS	Ave	0.0168	0.0163		9.27	9.58	-3.2	30.0
13C8 FOSA	Ave	0.9199	0.8850		9.62	10.0	-3.8	30.0
d3-NMeFOSAA	Ave	0.3098	0.3078		9.94	10.0	-0.6	30.0
13C7 PFUnA	Ave	1.113	1.030		9.26	10.0	-7.4	30.0
d5-NEtFOSAA	Ave	0.2737	0.2636		9.63	10.0	-3.7	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6630-1

SDG No.:

Lab Sample ID: ICV 410-20482/9 Calibration Date: 07/09/2020 11:26

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09MCAL-17.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C2-PFDoDA	Ave	0.7781	0.7476		9.61	10.0	-3.9	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1708		9.50	10.0	-5.0	30.0
d3-NMePFOSA	Ave	0.1118	0.1054		9.43	10.0	-5.7	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.1962		9.87	10.0	-1.3	30.0
d5-NEtPFOSA	Ave	0.1114	0.1093		9.82	10.0	-1.8	30.0
13C2 PFTeDA	Ave	0.8227	0.7669		9.32	10.0	-6.8	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6630-1

SDG No.:

Lab Sample ID: CCV 410-20936/68 Calibration Date: 07/09/2020 23:24

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-70.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8590		20.8	20.0	4.1	30.0
Perfluoropentanoic acid	LID1F		1.018		21.7	20.0	8.3	30.0
Perfluorobutanesulfonic acid	LID1F		1.043		18.3	17.7	3.6	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.623		20.3	18.7	8.5	30.0
Perfluorohexanoic acid	LID1F		0.8228		21.1	20.0	5.4	30.0
Perfluoropentanesulfonic acid	LID1F		0.9482		20.4	18.8	8.9	30.0
HFPODA	LID1F		2.743		21.6	20.0	7.8	30.0
Perfluoroheptanoic acid	LID1F		1.165		22.5	20.0	12.6	30.0
Perfluorohexanesulfonic acid	LID1F		1.033		18.7	18.2	2.7	30.0
DONA	LID1F		1.583		20.5	18.9	8.5	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.429		21.5	19.0	13.4	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9449		20.1	19.0	5.8	30.0
Perfluorooctanoic acid	LID1F		0.9056		21.5	20.0	7.3	30.0
Perfluorooctanesulfonic acid	LID1F		1.066		19.3	18.5	4.2	30.0
Perfluorononanoic acid	LID1F		0.8666		20.7	20.0	3.4	30.0
9Cl-PF3ONS	LID1F		1.867		21.0	18.6	12.7	30.0
Perfluorononanesulfonic acid	LID1F		0.9754		21.5	19.2	12.0	30.0
Perfluorodecanoic acid	LID1F		0.8817		21.3	20.0	6.4	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		8.609		20.8	19.2	8.5	30.0
Perfluorooctanesulfonamide	LID1F		1.031		20.5	20.0	2.4	30.0
NMeFOSAA	LID1F		1.055		21.5	20.0	7.3	30.0
Perfluorodecanesulfonic acid	LID1F		0.9721		20.8	19.3	8.1	30.0
Perfluoroundecanoic acid	LID1F		0.8383		21.1	20.0	5.7	30.0
NEtFOSAA	LID1F		0.9233		20.0	20.0	-0.0	30.0
11Cl-PF3OUdS	LID1F		1.478		20.9	18.6	12.2	30.0
Perfluorododecanoic acid	LID1F		0.8960		20.8	20.0	3.9	30.0
10:2 FTS	LID1F		7.143		21.0	19.3	9.1	30.0
NMeFOSE	LID1F		1.071		21.1	20.0	5.7	30.0
NMeFOSA	LID1F		1.109		21.4	20.0	6.8	30.0
Perfluorododecanesulfonic acid	LID1F		0.9611		21.6	19.4	11.6	30.0
NEtFOSE	LID1F		1.055		20.8	20.0	4.1	30.0
Perfluorotridecanoic acid	LID1F		0.8228		21.2	20.0	5.9	30.0
NEtFOSA	LID1F		1.056		20.5	20.0	2.4	30.0
Perfluorotetradecanoic acid	LID1F		0.8834		20.9	20.0	4.6	30.0
Perfluorohexadecanoic acid	LID1F		0.7247		21.3	20.0	6.3	30.0
Perfluorooctadecanoic acid	LID1F		0.3523		20.6	20.0	2.8	30.0
13C4 PFBA	Ave	1.092	1.073		9.83	10.0	-1.7	30.0
13C5 PFPeA	Ave	0.9016	0.8575		9.51	10.0	-4.9	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6630-1

SDG No.:

Lab Sample ID: CCV 410-20936/68 Calibration Date: 07/09/2020 23:24

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-70.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.7001	0.6414		8.57	9.36	-8.4	30.0
M2-4:2 FTS	Ave	0.0495	0.0456		8.59	9.34	-8.0	30.0
13C5 PFHxA	Ave	0.8606	0.8412		9.77	10.0	-2.3	30.0
13C3 HFPO-DA	Ave	0.1062	0.0964		9.07	10.0	-9.3	30.0
13C4 PFHpA	Ave	0.9047	0.8553		9.45	10.0	-5.5	30.0
13C3 PFHxS	Ave	0.5384	0.5012		8.81	9.46	-6.9	30.0
M2-6:2 FTS	Ave	0.0256	0.0240		8.90	9.50	-6.3	30.0
13C8 PFOA	Ave	0.9813	0.9478		9.66	10.0	-3.4	30.0
13C8 PFOS	Ave	1.008	0.9813		9.31	9.57	-2.7	30.0
13C9 PFNA	Ave	1.723	1.776		10.3	10.0	3.1	30.0
13C6 PFDA	Ave	1.105	1.127		10.2	10.0	2.0	30.0
M2-8:2 FTS	Ave	0.0168	0.0166		9.48	9.58	-1.0	30.0
13C8 FOSA	Ave	0.9199	0.9416		10.2	10.0	2.4	30.0
d3-NMeFOSAA	Ave	0.3098	0.3154		10.2	10.0	1.8	30.0
13C7 PFUnA	Ave	1.113	1.158		10.4	10.0	4.1	30.0
d5-NEtFOSAA	Ave	0.2737	0.2902		10.6	10.0	6.0	30.0
13C2-PFDoDA	Ave	0.7781	0.8191		10.5	10.0	5.3	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1816		10.1	10.0	1.0	30.0
d3-NMePFOSA	Ave	0.1118	0.1095		9.80	10.0	-2.0	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.2024		10.2	10.0	1.8	30.0
d5-NEtPFOSA	Ave	0.1114	0.1132		10.2	10.0	1.7	30.0
13C2 PFTeDA	Ave	0.8227	0.8544		10.4	10.0	3.9	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6630-1

SDG No.:

Lab Sample ID: CCV 410-20936/80 Calibration Date: 07/10/2020 01:15

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-82.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8696		2.11	2.00	5.3	30.0
Perfluoropentanoic acid	LID1F		0.9721		2.07	2.00	3.5	30.0
Perfluorobutanesulfonic acid	LID1F		0.997		1.75	1.77	-1.0	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.375		1.89	1.87	1.1	30.0
Perfluorohexanoic acid	LID1F		0.7907		2.03	2.00	1.3	30.0
Perfluoropentanesulfonic acid	LID1F		0.8654		1.86	1.88	-0.6	30.0
HFPODA	LID1F		2.610		2.05	2.00	2.5	30.0
Perfluoroheptanoic acid	LID1F		1.107		2.14	2.00	7.0	30.0
Perfluorohexanesulfonic acid	LID1F		1.015		1.84	1.82	0.9	30.0
DONA	LID1F		1.454		1.88	1.89	-0.3	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.033		1.99	1.90	5.1	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8532		1.82	1.90	-4.5	30.0
Perfluorooctanoic acid	LID1F		0.9035		2.14	2.00	7.0	30.0
Perfluorooctanesulfonic acid	LID1F		1.012		1.83	1.85	-1.2	30.0
Perfluorononanoic acid	LID1F		0.8046		1.92	2.00	-4.0	30.0
9Cl-PF3ONS	LID1F		1.797		2.02	1.86	8.5	30.0
Perfluorononanesulfonic acid	LID1F		0.9348		2.06	1.92	7.3	30.0
Perfluorodecanoic acid	LID1F		0.8294		2.00	2.00	0.0	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		7.685		1.85	1.92	-3.2	30.0
Perfluorooctanesulfonamide	LID1F		1.023		2.03	2.00	1.6	30.0
NMeFOSAA	LID1F		0.9939		2.02	2.00	1.0	30.0
Perfluorodecanesulfonic acid	LID1F		0.9342		2.00	1.93	3.9	30.0
Perfluoroundecanoic acid	LID1F		0.8372		2.11	2.00	5.6	30.0
NEtFOSAA	LID1F		0.9104		1.97	2.00	-1.5	30.0
11Cl-PF3OUdS	LID1F		1.386		1.96	1.86	5.3	30.0
Perfluorododecanoic acid	LID1F		0.9296		2.16	2.00	7.8	30.0
10:2 FTS	LID1F		6.567		1.93	1.93	0.3	30.0
NMeFOSA	LID1F		1.016		1.96	2.00	-2.2	30.0
NMeFOSE	LID1F		1.029		2.03	2.00	1.6	30.0
Perfluorododecanesulfonic acid	LID1F		0.9158		2.06	1.94	6.3	30.0
NEtFOSE	LID1F		1.042		2.06	2.00	2.8	30.0
Perfluorotridecanoic acid	LID1F		0.8257		2.13	2.00	6.3	30.0
NEtFOSA	LID1F		1.023		1.98	2.00	-0.8	30.0
Perfluorotetradecanoic acid	LID1F		0.8844		2.09	2.00	4.7	30.0
Perfluorohexadecanoic acid	LID1F		0.7213		2.12	2.00	5.8	30.0
Perfluorooctadecanoic acid	LID1F		0.3411		1.99	2.00	-0.4	30.0
13C4 PFBA	Ave	1.092	1.130		10.3	10.0	3.4	30.0
13C5 PFPeA	Ave	0.9016	0.9013		10.0	10.0	-0.0	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6630-1

SDG No.:

Lab Sample ID: CCV 410-20936/80 Calibration Date: 07/10/2020 01:15

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-82.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.7001	0.6959		9.30	9.36	-0.6	30.0
M2-4:2 FTS	Ave	0.0495	0.0529		9.97	9.34	6.8	30.0
13C5 PFHxA	Ave	0.8606	0.9096		10.6	10.0	5.7	30.0
13C3 HFPO-DA	Ave	0.1062	0.1001		9.43	10.0	-5.7	30.0
13C4 PFHpA	Ave	0.9047	0.9706		10.7	10.0	7.3	30.0
13C3 PFHxS	Ave	0.5384	0.5622		9.88	9.46	4.4	30.0
M2-6:2 FTS	Ave	0.0256	0.0276		10.2	9.50	7.6	30.0
13C8 PFOA	Ave	0.9813	1.004		10.2	10.0	2.3	30.0
13C8 PFOS	Ave	1.008	1.030		9.77	9.57	2.2	30.0
13C9 PFNA	Ave	1.723	1.846		10.7	10.0	7.1	30.0
13C6 PFDA	Ave	1.105	1.146		10.4	10.0	3.8	30.0
M2-8:2 FTS	Ave	0.0168	0.0183		10.4	9.58	9.0	30.0
13C8 FOSA	Ave	0.9199	0.9693		10.5	10.0	5.4	30.0
d3-NMeFOSAA	Ave	0.3098	0.3256		10.5	10.0	5.1	30.0
13C7 PFUnA	Ave	1.113	1.155		10.4	10.0	3.9	30.0
d5-NEtFOSAA	Ave	0.2737	0.2992		10.9	10.0	9.3	30.0
13C2-PFDoDA	Ave	0.7781	0.8105		10.4	10.0	4.2	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1818		10.1	10.0	1.1	30.0
d3-NMePFOSA	Ave	0.1118	0.1139		10.2	10.0	1.9	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.1993		10.0	10.0	0.3	30.0
d5-NEtPFOSA	Ave	0.1114	0.1145		10.3	10.0	2.8	30.0
13C2 PFTeDA	Ave	0.8227	0.8602		10.5	10.0	4.6	30.0

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6630-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 10:14

Analysis Batch Number: 20482 End Date: 07/09/2020 11:36

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 410-20482/1		07/09/2020 10:14	1	20JUL09MCAL-09.d	Gemini C18 50mm 3(mm)
IC 410-20482/2		07/09/2020 10:23	1	20JUL09MCAL-10.d	Gemini C18 50mm 3(mm)
IC 410-20482/3		07/09/2020 10:32	1	20JUL09MCAL-11.d	Gemini C18 50mm 3(mm)
IC 410-20482/4		07/09/2020 10:41	1	20JUL09MCAL-12.d	Gemini C18 50mm 3(mm)
ICISAV 410-20482/5		07/09/2020 10:50	1	20JUL09MCAL-13.d	Gemini C18 50mm 3(mm)
IC 410-20482/6		07/09/2020 10:59	1	20JUL09MCAL-14.d	Gemini C18 50mm 3(mm)
IC 410-20482/7		07/09/2020 11:08	1	20JUL09MCAL-15.d	Gemini C18 50mm 3(mm)
ICB 410-20482/8		07/09/2020 11:17	1	20JUL09MCAL-16.d	Gemini C18 50mm 3(mm)
ICV 410-20482/9		07/09/2020 11:26	1	20JUL09MCAL-17.d	Gemini C18 50mm 3(mm)
WDM 410-20482/10		07/09/2020 11:36	1	20JUL09MCAL-18.d	Gemini C18 50mm 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6630-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 14:37

Analysis Batch Number: 20936 End Date: 07/10/2020 12:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 410-20936/11		07/09/2020 14:37	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 14:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 14:58	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:07	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:16	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:25	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:34	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:43	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:52	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:01	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:19	1		Gemini C18 50mm 3(mm)
CCV 410-20936/23		07/09/2020 16:28	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:37	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:55	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:04	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:13	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:23	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:32	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:41	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:50	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 18:08	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 18:17	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 18:26	1		Gemini C18 50mm 3(mm)
CCV 410-20936/37		07/09/2020 18:35	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 18:44	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 18:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 19:02	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 19:11	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 19:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 19:29	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 19:39	1		Gemini C18 50mm 3(mm)
CCV 410-20936/45		07/09/2020 19:49	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 19:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:19	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:28	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:37	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:55	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:04	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:13	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:22	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6630-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 14:37

Analysis Batch Number: 20936 End Date: 07/10/2020 12:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/09/2020 21:32	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:41	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:50	1		Gemini C18 50mm 3(mm)
CCV 410-20936/59		07/09/2020 21:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:29	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 23:05	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 23:14	1		Gemini C18 50mm 3(mm)
CCV 410-20936/68		07/09/2020 23:24	1	20JUL09-70.d	Gemini C18 50mm 3(mm)
MB 410-19908/1-A		07/09/2020 23:34	1	20JUL09-71.d	Gemini C18 50mm 3(mm)
LCS 410-19908/2-A		07/09/2020 23:44	1	20JUL09-72.d	Gemini C18 50mm 3(mm)
410-6630-1		07/09/2020 23:53	1	20JUL09-73.d	Gemini C18 50mm 3(mm)
410-6630-2		07/10/2020 00:02	1	20JUL09-74.d	Gemini C18 50mm 3(mm)
410-6630-3		07/10/2020 00:12	1	20JUL09-75.d	Gemini C18 50mm 3(mm)
410-6630-3 MS		07/10/2020 00:21	1	20JUL09-76.d	Gemini C18 50mm 3(mm)
410-6630-3 MSD		07/10/2020 00:30	1	20JUL09-77.d	Gemini C18 50mm 3(mm)
410-6630-4		07/10/2020 00:39	1	20JUL09-78.d	Gemini C18 50mm 3(mm)
410-6630-5		07/10/2020 00:48	1	20JUL09-79.d	Gemini C18 50mm 3(mm)
410-6630-6		07/10/2020 00:57	1	20JUL09-80.d	Gemini C18 50mm 3(mm)
410-6630-7		07/10/2020 01:06	1	20JUL09-81.d	Gemini C18 50mm 3(mm)
CCV 410-20936/80		07/10/2020 01:15	1	20JUL09-82.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 01:25	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 01:36	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 01:45	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 01:54	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:03	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:12	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:21	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:30	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:39	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:48	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 03:07	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 03:16	1		Gemini C18 50mm 3(mm)
CCV 410-20936/94		07/10/2020 03:25	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 03:35	1		Gemini C18 50mm 3(mm)
CCV 410-20936/96		07/10/2020 03:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 03:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:24	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6630-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 14:37

Analysis Batch Number: 20936 End Date: 07/10/2020 12:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/10/2020 04:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:43	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:02	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:11	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:29	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:47	1		Gemini C18 50mm 3(mm)
CCV 410-20936/110		07/10/2020 05:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:07	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:17	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:26	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:05	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:14	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:23	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:32	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:41	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:50	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:09	1		Gemini C18 50mm 3(mm)
CCV 410-20936/125		07/10/2020 08:18	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:28	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:42	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 10:01	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 10:12	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 10:21	1		Gemini C18 50mm 3(mm)
CCV 410-20936/139		07/10/2020 10:30	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 10:40	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 10:51	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:00	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:09	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:18	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:27	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:36	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:45	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6630-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 14:37

Analysis Batch Number: 20936 End Date: 07/10/2020 12:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/10/2020 11:54	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 12:03	1		Gemini C18 50mm 3(mm)
CCV 410-20936/150		07/10/2020 12:12	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-6630-1

SDG No.:

Batch Number: 19908 Batch Start Date: 07/07/20 09:12 Batch Analyst: Prince, Austin P

Batch Method: EPA 537 (mod) Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	PFC_MS_MODWX 00015	PFC_SS_MODX 00020
MB 410-19908/1		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL		25 uL
LCS 410-19908/2		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL	40 uL	25 uL
410-6630-A-1	MSA-FB-070220	EPA 537 (mod), EPA 537 (Mod)	T	290.33 g	26.89 g	263.4 mL	1 mL		25 uL
410-6630-A-2	GSP-FD03-070220	EPA 537 (mod), EPA 537 (Mod)	T	45.33 g	20.04 g	25.3 mL	1 mL		25 uL
410-6630-A-3	GSP-MW-12-070220	EPA 537 (mod), EPA 537 (Mod)	T	287.18 g	28.15 g	259 mL	1 mL		25 uL
410-6630-A-3 MS	GSP-MW-12-070220	EPA 537 (mod), EPA 537 (Mod)	T	283.46 g	27.84 g	255.6 mL	1 mL	40 uL	25 uL
410-6630-A-3 MSD	GSP-MW-12-070220	EPA 537 (mod), EPA 537 (Mod)	T	280.33 g	27.69 g	252.6 mL	1 mL	40 uL	25 uL
410-6630-A-4	GSP-MW-14-070220	EPA 537 (mod), EPA 537 (Mod)	T	289.10 g	27.33 g	261.8 mL	1 mL		25 uL
410-6630-A-5	GSP-MW-20-070220	EPA 537 (mod), EPA 537 (Mod)	T	45.46 g	20.32 g	25.1 mL	1 mL		25 uL
410-6630-A-6	GSP-MW-23I-070220	EPA 537 (mod), EPA 537 (Mod)	T	316.85 g	27.84 g	289 mL	1 mL		25 uL
410-6630-A-7	EQB-WL-070220	EPA 537 (mod), EPA 537 (Mod)	T	318.52 g	27.33 g	291.2 mL	1 mL		25 uL

Lab Sample ID	Client Sample ID	Method Chain	Basis	AnalysisComment					
MB 410-19908/1		EPA 537 (mod), EPA 537 (Mod)							
LCS 410-19908/2		EPA 537 (mod), EPA 537 (Mod)							

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-6630-1

SDG No.:

Batch Number: 19908 Batch Start Date: 07/07/20 09:12 Batch Analyst: Prince, Austin P

Batch Method: EPA 537 (mod) Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	AnalysisComment					
410-6630-A-1	MSA-FB-070220	EPA 537 (mod), EPA 537 (Mod)	T						
410-6630-A-2	GSP-FD03-070220	EPA 537 (mod), EPA 537 (Mod)	T	25 mL of sample was diluted to 250 mL with milli q h2o in a clean QC bottle.					
410-6630-A-3	GSP-MW-12-070220	EPA 537 (mod), EPA 537 (Mod)	T						
410-6630-A-3 MS	GSP-MW-12-070220	EPA 537 (mod), EPA 537 (Mod)	T						
410-6630-A-3 MSD	GSP-MW-12-070220	EPA 537 (mod), EPA 537 (Mod)	T						
410-6630-A-4	GSP-MW-14-070220	EPA 537 (mod), EPA 537 (Mod)	T						
410-6630-A-5	GSP-MW-20-070220	EPA 537 (mod), EPA 537 (Mod)	T	25 mL of sample was diluted to 250 mL with milli q h2o in a clean QC bottle.					
410-6630-A-6	GSP-MW-23I-070220	EPA 537 (mod), EPA 537 (Mod)	T						
410-6630-A-7	EQB-WL-070220	EPA 537 (mod), EPA 537 (Mod)	T						

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-6630-1

SDG No.:

Batch Number: 19908 Batch Start Date: 07/07/20 09:12 Batch Analyst: Prince, Austin P

Batch Method: EPA 537 (mod) Batch End Date:

Batch Notes	
Balance ID	B629764122
Collection Tube Witness	NF33365
H2O ID	House A372
Manifold ID	1
Methanol ID	DX907-IN
Pipette/Syringe/Dispenser ID	PFAS 9, PFAS 10
Analyst ID - IS Reagent Drop Witness	NF33365
Solvent Lot #	3093807072033A, 3093807062033A
Solvent Name	1:1 ACN:MEOH, 0.3% NH4OH:MEOH
SPE Cartridge Lot ID	6509790-02

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TETRA TECH **INTERNAL CORRESPONDENCE**

TO: **S. BRENNER** **DATE:** **OCTOBER 14, 2020**

FROM: **GLORIA SCHIFINO** **COPIES:** **DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS)**
MARTIN STATE AIRPORT
SAMPLE DELIVERY GROUP (SDG) 410-6631-1

SAMPLES: 8/Aqueous

GSP-MW-19-070120 GSP-MW-9-070120
MSA-DUP-2-070120 MSA-MW-50S-070120
MSA-MW-51S-070120 MSA-PMW-6S-070120
MSA-Pond 1-070120 MSA-Pond 2-070120

1/Field Blank (FB)

MSA-FB-070120

1/Equipment Blank/PFAS

EQB-WL-070120

Overview

The sample set for Martin State Airport, SDG 410-6631-1, consisted of eight (8) aqueous samples, one (1) field blank sample and one (1) equipment blank. All samples were analyzed for perfluorinated alkyl acids. One (1) field duplicate pairs (MSA-DUP-2-070120/ GSP-MW-19-070120) were included in this SDG.

The samples were collected by Tetra Tech on July 1, 2020 and analyzed by Eurofins Lancaster Laboratories. PFAS groundwater analyses were conducted in accordance with EPA method 537 modified analytical and reporting protocols.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, mass calibration, mass spectral acquisition rate, instrument sensitivity check, peak asymmetry factor, initial/continuing calibrations, ion transitions, laboratory method results, extracted internal standard recoveries, laboratory control sample results, chromatographic resolution, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

Major

No major issues were identified.

Minor

Detected results reported below the reporting limit (RL) but above the detection limit (DL) were qualified as estimated (J).

Notes

The extracted internal standard recovery for 6:2 FTS was above quality control limits for sample MSA-Pond 1-070120. No validation action was required because the associated result was nondetected.

Non-detected results were reported to the reporting limit (RL).

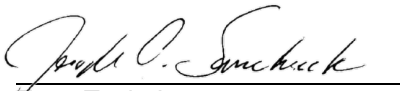
The number of analytes reported by the laboratory in samples MSA-Pond 1-070120 and MSA-Pond 2-070120 was 12 analytes. The other samples in this SDG have 8 analytes reported by the laboratory.

Executive Summary

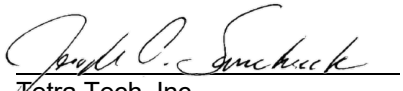
Laboratory Performance: No issues were identified.

Other Factors Affecting Data Quality: Results below the LOQ were estimated.

The data for these analyses were reviewed with reference to the Environmental Protection Agency document EPA 910-R-18-001 "Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537", (November 2018). The text of this report has been formulated to address only those areas affecting data quality.



for Tetra Tech, Inc.
Gloria Schifino
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

Data Qualifier Definitions

The following definitions provide brief explanations of the validation qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted detection limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value is the estimated concentration in the sample.
R	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
UR	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

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: 09023	NSAMPLE	EQB-WL-070120			GSP-MW-19-070120			GSP-MW-9-070120			MSA-DUP-2-070120		
SDG: 410-6631-1	LAB_ID	410-6631-1			410-6631-4			410-6631-5			410-6631-3		
FRACTION: PFAS	SAMP_DATE	7/1/2020			7/1/2020			7/1/2020			7/1/2020		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF										GSP-MW-19-070120		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		4.5	U		4.7	U		4.5	U		4.7	U	
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		2.7	U		2.8	U		2.7	U		2.8	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)		1.8	U		1.2	J	GP	6.6			0.84	J	GP
PERFLUOROBUTANESULFONIC ACID (PFBS)		1.8	U		1.2	J	P	2			1.2	J	P
PERFLUOROBUTANOIC ACID (PFBA)													
PERFLUORODECANOIC ACID (PFDA)													
PERFLUOROHEPTANOIC ACID (PFHPA)		1.8	U		1.2	J	P	3.8			0.93	J	P
PERFLUOROHEXANESULFONIC ACID (PFHXS)		1.8	U		1.9	U		6.6			1.9	U	
PERFLUOROHEXANOIC ACID (PFHXA)													
PERFLUORONONANOIC ACID (PFNA)		1.8	U		1.9	U		2.8			1.9	U	
PERFLUOROOCTANESULFONIC ACID (PFOS)		1.8	U		1.9	U		25			1.9	U	
PERFLUOROPENTANOIC ACID (PFPEA)													

PROJ_NO: 09023	NSAMPLE	MSA-FB-070120			MSA-MW-50S-070120			MSA-MW-51S-070120			MSA-MW-51S-070120DL		
SDG: 410-6631-1	LAB_ID	410-6631-2			410-6631-6			410-6631-7			410-6631-7		
FRACTION: PFAS	SAMP_DATE	7/1/2020			7/1/2020			7/1/2020			7/1/2020		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/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
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		4.5	U		4.2	U		4.2	U				
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		2.7	U		2.5	U		2.5	U				
PENTADECAFLUOROOCTANOIC ACID (PFOA)		1.8	U		62			140					
PERFLUOROBUTANESULFONIC ACID (PFBS)		1.8	U		13			22					
PERFLUOROBUTANOIC ACID (PFBA)													
PERFLUORODECANOIC ACID (PFDA)													
PERFLUOROHEPTANOIC ACID (PFHPA)		1.8	U		10			21					
PERFLUOROHEXANESULFONIC ACID (PFHXS)		1.8	U		300						460		
PERFLUOROHEXANOIC ACID (PFHXA)													
PERFLUORONONANOIC ACID (PFNA)		1.8	U		0.75	J	P	2.8					
PERFLUOROOCTANESULFONIC ACID (PFOS)		1.8	U		30			140					
PERFLUOROPENTANOIC ACID (PFPEA)													

PROJ_NO: 09023	NSAMPLE	MSA-PMW-6S-070120			MSA-PMW-6S-070120DL			MSA-Pond 1-070120			MSA-Pond 2-070120		
SDG: 410-6631-1	LAB_ID	410-6631-8			410-6631-8			410-6631-10			410-6631-9		
FRACTION: PFAS	SAMP_DATE	7/1/2020			7/1/2020			7/1/2020			7/1/2020		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/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
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		180						4.8	U		4.5	U	
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		25	J	P				2.9	U		2.7	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)		2300						3.3			12		
PERFLUOROBUTANESULFONIC ACID (PFBS)		62						1.9	U		1.7	J	P
PERFLUOROBUTANOIC ACID (PFBA)								8.4			13		
PERFLUORODECANOIC ACID (PFDA)								0.6	J	P	0.68	J	P
PERFLUOROHEPTANOIC ACID (PFHPA)		220						2.7			6.2		
PERFLUOROHEXANESULFONIC ACID (PFHXS)					4900			1.2	J	P	2		
PERFLUOROHEXANOIC ACID (PFHXA)								3.5			10		
PERFLUORONONANOIC ACID (PFNA)		25						1.6	J	P	2.1		
PERFLUOROOCTANESULFONIC ACID (PFOS)					7800			5.4			7.6		
PERFLUOROPENTANOIC ACID (PFPEA)								4.5			9.8		

Appendix B

Results as Reported by the Laboratory

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Client Sample ID: EQB-WL-070120 Lab Sample ID: 410-6631-1

Matrix: Water Lab File ID: 20JUL09-35.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/01/2020 08:30

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 08:07

Sample wt/vol: 278.7(mL) Date Analyzed: 07/09/2020 17:59

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	ND		1.8	0.45
335-67-1	Perfluorooctanoic acid	ND		1.8	0.45
375-95-1	Perfluorononanoic acid	ND		1.8	0.45
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.5	1.8
375-73-5	Perfluorobutanesulfonic acid	ND		1.8	0.45
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.7	0.90
355-46-4	Perfluorohexanesulfonic acid	ND		1.8	0.45
1763-23-1	Perfluorooctanesulfonic acid	ND		1.8	0.45

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	90		33-140
STL01052	13C8 PFOA	91		52-124
STL02578	13C9 PFNA	94		48-130
STL02337	13C3 PFBS	95		23-175
STL02581	13C3 PFHxS	90		35-143
STL01054	13C8 PFOS	87		52-121
STL02279	M2-6:2 FTS	100		29-182
STL02280	M2-8:2 FTS	101		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Client Sample ID: MSA-FB-070120 Lab Sample ID: 410-6631-2

Matrix: Water Lab File ID: 20JUL09-36.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/01/2020 09:15

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 08:07

Sample wt/vol: 279.1(mL) Date Analyzed: 07/09/2020 18:08

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	ND		1.8	0.45
335-67-1	Perfluorooctanoic acid	ND		1.8	0.45
375-95-1	Perfluorononanoic acid	ND		1.8	0.45
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.5	1.8
375-73-5	Perfluorobutanesulfonic acid	ND		1.8	0.45
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.7	0.90
355-46-4	Perfluorohexanesulfonic acid	ND		1.8	0.45
1763-23-1	Perfluorooctanesulfonic acid	ND		1.8	0.45

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	102		33-140
STL01052	13C8 PFOA	104		52-124
STL02578	13C9 PFNA	103		48-130
STL02337	13C3 PFBS	104		23-175
STL02581	13C3 PFHxS	102		35-143
STL01054	13C8 PFOS	98		52-121
STL02279	M2-6:2 FTS	112		29-182
STL02280	M2-8:2 FTS	109		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Client Sample ID: MSA-DUP-2-070120 Lab Sample ID: 410-6631-3

Matrix: Water Lab File ID: 20JUL09-37.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/01/2020 00:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 08:07

Sample wt/vol: 264.8(mL) Date Analyzed: 07/09/2020 18:17

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	0.93	J	1.9	0.47
335-67-1	Perfluorooctanoic acid	0.84	J	1.9	0.47
375-95-1	Perfluorononanoic acid	ND		1.9	0.47
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.7	1.9
375-73-5	Perfluorobutanesulfonic acid	1.2	J	1.9	0.47
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.94
355-46-4	Perfluorohexanesulfonic acid	ND		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	ND		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	96		33-140
STL01052	13C8 PFOA	94		52-124
STL02578	13C9 PFNA	98		48-130
STL02337	13C3 PFBS	139		23-175
STL02581	13C3 PFHxS	95		35-143
STL01054	13C8 PFOS	100		52-121
STL02279	M2-6:2 FTS	114		29-182
STL02280	M2-8:2 FTS	121		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Client Sample ID: GSP-MW-19-070120 Lab Sample ID: 410-6631-4

Matrix: Water Lab File ID: 20JUL09-38.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/01/2020 09:40

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 08:07

Sample wt/vol: 268.1(mL) Date Analyzed: 07/09/2020 18:26

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	1.2	J	1.9	0.47
335-67-1	Perfluorooctanoic acid	1.2	J	1.9	0.47
375-95-1	Perfluorononanoic acid	ND		1.9	0.47
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.7	1.9
375-73-5	Perfluorobutanesulfonic acid	1.2	J	1.9	0.47
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.93
355-46-4	Perfluorohexanesulfonic acid	ND		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	ND		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	102		33-140
STL01052	13C8 PFOA	105		52-124
STL02578	13C9 PFNA	107		48-130
STL02337	13C3 PFBS	145		23-175
STL02581	13C3 PFHxS	106		35-143
STL01054	13C8 PFOS	102		52-121
STL02279	M2-6:2 FTS	122		29-182
STL02280	M2-8:2 FTS	120		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Client Sample ID: GSP-MW-9-070120 Lab Sample ID: 410-6631-5

Matrix: Water Lab File ID: 20JUL09-40.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/01/2020 13:35

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 08:07

Sample wt/vol: 277.3(mL) Date Analyzed: 07/09/2020 18:44

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	3.8		1.8	0.45
335-67-1	Perfluorooctanoic acid	6.6		1.8	0.45
375-95-1	Perfluorononanoic acid	2.8		1.8	0.45
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.5	1.8
375-73-5	Perfluorobutanesulfonic acid	2.0		1.8	0.45
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.7	0.90
355-46-4	Perfluorohexanesulfonic acid	6.6		1.8	0.45
1763-23-1	Perfluorooctanesulfonic acid	25		1.8	0.45

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	92		33-140
STL01052	13C8 PFOA	96		52-124
STL02578	13C9 PFNA	102		48-130
STL02337	13C3 PFBS	121		23-175
STL02581	13C3 PFHxS	91		35-143
STL01054	13C8 PFOS	90		52-121
STL02279	M2-6:2 FTS	153		29-182
STL02280	M2-8:2 FTS	129		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Client Sample ID: MSA-MW-50S-070120 Lab Sample ID: 410-6631-6

Matrix: Water Lab File ID: 20JUL09-41.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/01/2020 10:15

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 08:07

Sample wt/vol: 297.7(mL) Date Analyzed: 07/09/2020 18:53

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	10		1.7	0.42
335-67-1	Perfluorooctanoic acid	62		1.7	0.42
375-95-1	Perfluorononanoic acid	0.75	J	1.7	0.42
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.2	1.7
375-73-5	Perfluorobutanesulfonic acid	13		1.7	0.42
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.5	0.84
355-46-4	Perfluorohexanesulfonic acid	300		1.7	0.42
1763-23-1	Perfluorooctanesulfonic acid	30		1.7	0.42

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	86		33-140
STL01052	13C8 PFOA	95		52-124
STL02578	13C9 PFNA	97		48-130
STL02337	13C3 PFBS	136		23-175
STL02581	13C3 PFHxS	88		35-143
STL01054	13C8 PFOS	90		52-121
STL02279	M2-6:2 FTS	129		29-182
STL02280	M2-8:2 FTS	123		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Client Sample ID: MSA-MW-51S-070120 Lab Sample ID: 410-6631-7

Matrix: Water Lab File ID: 20JUL09-42.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/01/2020 11:22

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 08:07

Sample wt/vol: 294.2(mL) Date Analyzed: 07/09/2020 19:02

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	21		1.7	0.42
335-67-1	Perfluorooctanoic acid	140		1.7	0.42
375-95-1	Perfluorononanoic acid	2.8		1.7	0.42
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.2	1.7
375-73-5	Perfluorobutanesulfonic acid	22		1.7	0.42
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.5	0.85
1763-23-1	Perfluorooctanesulfonic acid	140		1.7	0.42

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	88		33-140
STL01052	13C8 PFOA	101		52-124
STL02578	13C9 PFNA	110		48-130
STL02337	13C3 PFBS	173		23-175
STL02581	13C3 PFHxS	91		35-143
STL01054	13C8 PFOS	98		52-121
STL02279	M2-6:2 FTS	176		29-182
STL02280	M2-8:2 FTS	153		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Client Sample ID: MSA-MW-51S-070120 DL Lab Sample ID: 410-6631-7 DL

Matrix: Water Lab File ID: 20JUL13-53.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/01/2020 11:22

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 08:07

Sample wt/vol: 294.2(mL) Date Analyzed: 07/13/2020 20:00

Con. Extract Vol.: 1(mL) Dilution Factor: 10

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 21758 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
355-46-4	Perfluorohexanesulfonic acid	460		17	4.2

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02581	13C3 PFHxS	96		35-143

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Client Sample ID: MSA-PMW-6S-070120 Lab Sample ID: 410-6631-8

Matrix: Water Lab File ID: 20JUL09-43.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/01/2020 12:43

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 08:07

Sample wt/vol: 25.5(mL) Date Analyzed: 07/09/2020 19:11

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	220		20	4.9
335-67-1	Perfluorooctanoic acid	2300		20	4.9
375-95-1	Perfluorononanoic acid	25		20	4.9
27619-97-2	6:2 Fluorotelomer sulfonic acid	180		49	20
375-73-5	Perfluorobutanesulfonic acid	62		20	4.9
39108-34-4	8:2 Fluorotelomer sulfonic acid	25	J	29	9.8

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	93		33-140
STL01052	13C8 PFOA	95		52-124
STL02578	13C9 PFNA	105		48-130
STL02337	13C3 PFBS	105		23-175
STL02581	13C3 PFHxS	90		35-143
STL01054	13C8 PFOS	93		52-121
STL02279	M2-6:2 FTS	129		29-182
STL02280	M2-8:2 FTS	116		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Client Sample ID: MSA-PMW-6S-070120 DL Lab Sample ID: 410-6631-8 DL

Matrix: Water Lab File ID: 20JUL14-129.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/01/2020 12:43

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 08:07

Sample wt/vol: 25.5(mL) Date Analyzed: 07/15/2020 03:41

Con. Extract Vol.: 1(mL) Dilution Factor: 10

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22577 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
355-46-4	Perfluorohexanesulfonic acid	4900		200	49
1763-23-1	Perfluorooctanesulfonic acid	7800		200	49

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02581	13C3 PFHxS	94		35-143
STL01054	13C8 PFOS	84		52-121

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Client Sample ID: MSA-Pond 2-070120 Lab Sample ID: 410-6631-9

Matrix: Water Lab File ID: 20JUL09-44.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/01/2020 14:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 08:07

Sample wt/vol: 279.1(mL) Date Analyzed: 07/09/2020 19:20

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.5	1.8
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.7	0.90
375-73-5	Perfluorobutanesulfonic acid	1.7	J	1.8	0.45
375-22-4	Perfluorobutanoic acid	13		4.5	1.8
335-76-2	Perfluorodecanoic acid	0.68	J	1.8	0.45
375-85-9	Perfluoroheptanoic acid	6.2		1.8	0.45
355-46-4	Perfluorohexanesulfonic acid	2.0		1.8	0.45
307-24-4	Perfluorohexanoic acid	10		1.8	0.45
375-95-1	Perfluorononanoic acid	2.1		1.8	0.45
1763-23-1	Perfluorooctanesulfonic acid	7.6		1.8	0.45
335-67-1	Perfluorooctanoic acid	12		1.8	0.45
2706-90-3	Perfluoropentanoic acid	9.8		1.8	0.45

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	179		29-182
STL02280	M2-8:2 FTS	158		37-169
STL02337	13C3 PFBS	164		23-175
STL01892	13C4 PFHpA	100		33-140
STL01893	13C5 PFPeA	141		38-150
STL01052	13C8 PFOA	105		52-124
STL01054	13C8 PFOS	100		52-121
STL02581	13C3 PFHxS	101		35-143
STL02577	13C5 PFHxA	90		36-137
STL02579	13C6 PFDA	98		50-124
STL02578	13C9 PFNA	114		48-130
STL00992	13C4 PFBA	104		43-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Client Sample ID: MSA-Pond 1-070120 Lab Sample ID: 410-6631-10

Matrix: Water Lab File ID: 20JUL09-45.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/01/2020 14:30

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 08:07

Sample wt/vol: 260.9(mL) Date Analyzed: 07/09/2020 19:29

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.8	1.9
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.9	0.96
375-73-5	Perfluorobutanesulfonic acid	ND		1.9	0.48
375-22-4	Perfluorobutanoic acid	8.4		4.8	1.9
335-76-2	Perfluorodecanoic acid	0.60	J	1.9	0.48
375-85-9	Perfluoroheptanoic acid	2.7		1.9	0.48
355-46-4	Perfluorohexanesulfonic acid	1.2	J	1.9	0.48
307-24-4	Perfluorohexanoic acid	3.5		1.9	0.48
375-95-1	Perfluorononanoic acid	1.6	J	1.9	0.48
1763-23-1	Perfluorooctanesulfonic acid	5.4		1.9	0.48
335-67-1	Perfluorooctanoic acid	3.3		1.9	0.48
2706-90-3	Perfluoropentanoic acid	4.5		1.9	0.48

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	205	*5	29-182
STL02280	M2-8:2 FTS	163		37-169
STL02337	13C3 PFBS	141		23-175
STL01892	13C4 PFHpA	89		33-140
STL01893	13C5 PFPeA	117		38-150
STL01052	13C8 PFOA	96		52-124
STL01054	13C8 PFOS	92		52-121
STL02581	13C3 PFHxS	92		35-143
STL02577	13C5 PFHxA	82		36-137
STL02579	13C6 PFDA	93		50-124
STL02578	13C9 PFNA	102		48-130
STL00992	13C4 PFBA	89		43-130

Appendix C

Support Documentation

ANALYTE	ORIGINAL GSP-MW-19-070120	DUPLICATE MSA-DUP-2-070120	RL	RPD	RPD > 30% Aqueous	ORIGINAL SAMPLE CONC >2xRL	DUPLICATE SAMPLE CONC >2xRL	DIFFERENCE >2XRL
PENTADECAFLUOROOCTANOIC ACID (PFOA)	1.2	0.84	0	35.29	TRUE	TRUE	TRUE	TRUE
PERFLUOROBUTANESULFONIC ACID (PFBS)	1.2	1.2	0	0.00	FALSE	TRUE	TRUE	FALSE
PERFLUOROHEPTANOIC ACID (PFHPA)	1.2	0.93	0	25.35	FALSE	TRUE	TRUE	TRUE

410-6631 Chain of Custody

Chain of Custody Record

321392

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Samantha Benner	Site Contact: P. O'Brien	Date: 7/1/20	COC No:
Company Name: TetraTech	Tel/Fax: 301-528-3052	Lab Contact: Stephen Gordon	Carrier: Fedex	1 of 1 COCs
Address: 20251 Century Blvd. Suite 200	Analysis Turnaround Time			Sampler:
City/State/Zip: Germantown, MD 20874	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 301-528-5552	TAT if different from Below			Walk-in Client:
Fax: 301-528-5080	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day — Standard			Lab Sampling:
Project Name: MSA PFAS GW Round 2				Job / SDG No.:
Site: MSA				
PO# 112E09023				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFAS (Method 537)	Sample Specific Notes:
EQB-WL-070120	7/1/20	0830	G	GW	2	N	N	X	
MSA-FB-070120		0915	G	GW	2			X	
MSA-DUP-2-070120		0000	G	GW	2			X	
658-MW-19-070120		0940	G	GW	2			X	
658-MW-9-070120		1335	G	GW	2			X	
MSA-MW-50s-070120		1015			2			X	
MSA-MW-51s-070120		1122			2			X	
MSA-PMW-6s-070120		1243			2			X	
MSA-Pond2-070120		1400			2			X	
MSA-Pond1-070120		1430			2			X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: _____ Corr'd: _____	Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	TetraTech	7/1/20		BSA	7/1/20 1520
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	BSA	7/2/20 1700		EnviroLab	7-2-20 13:05
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
	EnviroLab	7-2-20 16:00			7-2-20 1605

Definitions/Glossary

Client: Tetra Tech, Inc. Job ID: 410-6631-1
Project/Site: MSA PFAS GW Round 2

Qualifiers

LCMS

Qualifier	Qualifier Description
*5	Isotope dilution analyte is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Comments
No additional comments.

Receipt
The samples were received on 7/2/2020 4:25 PM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 0.0º C and 0.1º C.

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

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

Method Summary

Client: Tetra Tech, Inc. Job ID: 410-6631-1
Project/Site: MSA PFAS GW Round 2

Method	Method Description	Protocol	Laboratory
EPA 537 (Mod)	EPA 537 Isotope Dilution	EPA	ELLE
EPA 537 (mod)	EPA 537 Isotope Dilution	EPA	ELLE

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: Tetra Tech, Inc.
Job ID: 410-6631-1
Project/Site: MSA PFAS GW Round 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
410-6631-1	EQB-WL-070120	Water	07/01/20 08:30	07/02/20 16:25	
410-6631-2	MSA-FB-070120	Water	07/01/20 09:15	07/02/20 16:25	
410-6631-3	MSA-DUP-2-070120	Water	07/01/20 00:00	07/02/20 16:25	
410-6631-4	GSP-MW-19-070120	Water	07/01/20 09:40	07/02/20 16:25	
410-6631-5	GSP-MW-9-070120	Water	07/01/20 13:35	07/02/20 16:25	
410-6631-6	MSA-MW-50S-070120	Water	07/01/20 10:15	07/02/20 16:25	
410-6631-7	MSA-MW-51S-070120	Water	07/01/20 11:22	07/02/20 16:25	
410-6631-8	MSA-PMW-6S-070120	Water	07/01/20 12:43	07/02/20 16:25	
410-6631-9	MSA-Pond 2-070120	Water	07/01/20 14:00	07/02/20 16:25	
410-6631-10	MSA-Pond 1-070120	Water	07/01/20 14:30	07/02/20 16:25	

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6631-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C3PFBS #	C4PFHA #	C3PFHS #	M262FTS #	C8PFOA #	C8PFOS #	C9PFNA #	M282FTS #
EQB-WL-070120	410-6631-1	95	90	90	100	91	87	94	101
MSA-FB-070120	410-6631-2	104	102	102	112	104	98	103	109
MSA-DUP-2-070120	410-6631-3	139	96	95	114	94	100	98	121
GSP-MW-19-070120	410-6631-4	145	102	106	122	105	102	107	120
GSP-MW-9-070120	410-6631-5	121	92	91	153	96	90	102	129
MSA-MW-50S-070120	410-6631-6	136	86	88	129	95	90	97	123
MSA-MW-51S-070120	410-6631-7	173	88	91	176	101	98	110	153
MSA-PMW-6S-070120	410-6631-8	105	93	90	129	95	93	105	116

	QC LIMITS
C3PFBS = 13C3 PFBS	23-175
C4PFHA = 13C4 PFHpA	33-140
C3PFHS = 13C3 PFHxS	35-143
M262FTS = M2-6:2 FTS	29-182
C8PFOA = 13C8 PFOA	52-124
C8PFOS = 13C8 PFOS	52-121
C9PFNA = 13C9 PFNA	48-130
M282FTS = M2-8:2 FTS	37-169

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6631-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C3PFHS #
MSA-MW-51S-070120 DL	410-6631-7 DL	96

	QC LIMITS
C3PFHS = 13C3 PFHxS	35-143

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6631-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C3PFHS #	C8PFOS #
MSA-PMW-6S-070120 DL	410-6631-8 DL	94	84

	QC LIMITS
C3PFHS = 13C3 PFHxS	35-143
C8PFOS = 13C8 PFOS	52-121

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6631-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	PFBA #	PFPeA #	C3PFBS #	13C5PHA #	C4PFHA #	C3PFHS #	M262FTS #	C8PFOA #
MSA-Pond 2-070120	410-6631-9	104	141	164	90	100	101	179	105
MSA-Pond 1-070120	410-6631-10	89	117	141	82	89	92	205 *5	96
	MB 410-19879/1-A	105	109	105	104	103	99	112	103
	LCS 410-19879/2-A	100	107	101	102	100	95	110	100
	LCSD 410-19879/3-A	105	111	107	109	107	106	115	105

	QC LIMITS
PFBA = 13C4 PFBA	43-130
PFPeA = 13C5 PFPeA	38-150
C3PFBS = 13C3 PFBS	23-175
13C5PHA = 13C5 PFHxA	36-137
C4PFHA = 13C4 PFHpA	33-140
C3PFHS = 13C3 PFHxS	35-143
M262FTS = M2-6:2 FTS	29-182
C8PFOA = 13C8 PFOA	52-124

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6631-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C8PFOS #	C9PFNA #	C6PFDA #	M282FTS #
MSA-Pond 2-070120	410-6631-9	100	114	98	158
MSA-Pond 1-070120	410-6631-10	92	102	93	163
	MB 410-19879/1-A	102	107	110	118
	LCS 410-19879/2-A	98	101	95	104
	LCSD 410-19879/3-A	102	104	107	123

	QC LIMITS
C8PFOS = 13C8 PFOS	52-121
C9PFNA = 13C9 PFNA	48-130
C6PFDA = 13C6 PFDA	50-124
M282FTS = M2-8:2 FTS	37-169

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6631-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL09-27.d

Lab ID: LCS 410-19879/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
6:2 Fluorotelomer sulfonic acid	24.3	26.9	111	56-140	
Perfluorobutanoic acid	25.6	27.2	106	63-160	
Perfluorobutanesulfonic acid	22.6	22.6	100	67-135	
Perfluorodecanoic acid	25.6	25.5	100	66-141	
8:2 Fluorotelomer sulfonic acid	24.5	25.7	105	58-143	
Perfluoroheptanoic acid	25.6	26.4	103	69-144	
Perfluorohexanesulfonic acid	24.2	24.4	101	63-132	
Perfluorohexanoic acid	25.6	25.5	100	69-139	
Perfluorononanoic acid	25.6	25.9	101	66-144	
Perfluorooctanesulfonic acid	24.5	22.3	91	53-129	
Perfluorooctanoic acid	25.6	26.9	105	67-139	
Perfluoropentanoic acid	25.6	26.1	102	73-135	
13C3 PFBS	37.4	37.8	101	23-175	
M2-6:2 FTS	38.0	41.7	110	29-182	
13C4 PFHpA	40.0	40.1	100	33-140	
M2-8:2 FTS	38.3	39.8	104	37-169	
13C5 PFPeA	40.0	42.7	107	38-150	
13C8 PFOA	40.0	39.9	100	52-124	
13C8 PFOS	38.3	37.7	98	52-121	
13C3 PFHxS	37.8	36.1	95	35-143	
13C5 PFHxA	40.0	40.8	102	36-137	
13C6 PFDA	40.0	38.1	95	50-124	
13C9 PFNA	40.0	40.4	101	48-130	
13C4 PFBA	40.0	40.0	100	43-130	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Client Sample ID: Lab Sample ID: LCS 410-19879/2-A

Matrix: Water Lab File ID: 20JUL09-27.d

Analysis Method: EPA 537 (Mod) Date Collected:

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 08:07

Sample wt/vol: 250(mL) Date Analyzed: 07/09/2020 16:46

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	26.9		5.0	2.0
375-22-4	Perfluorobutanoic acid	27.2		5.0	2.0
375-73-5	Perfluorobutanesulfonic acid	22.6		2.0	0.50
335-76-2	Perfluorodecanoic acid	25.5		2.0	0.50
39108-34-4	8:2 Fluorotelomer sulfonic acid	25.7		3.0	1.0
375-85-9	Perfluoroheptanoic acid	26.4		2.0	0.50
355-46-4	Perfluorohexanesulfonic acid	24.4		2.0	0.50
307-24-4	Perfluorohexanoic acid	25.5		2.0	0.50
375-95-1	Perfluorononanoic acid	25.9		2.0	0.50
1763-23-1	Perfluorooctanesulfonic acid	22.3		2.0	0.50
335-67-1	Perfluorooctanoic acid	26.9		2.0	0.50
2706-90-3	Perfluoropentanoic acid	26.1		2.0	0.50

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02337	13C3 PFBS	101		23-175
STL02279	M2-6:2 FTS	110		29-182
STL01892	13C4 PFHpA	100		33-140
STL02280	M2-8:2 FTS	104		37-169
STL01893	13C5 PFPeA	107		38-150
STL01052	13C8 PFOA	100		52-124
STL01054	13C8 PFOS	98		52-121
STL02581	13C3 PFHxS	95		35-143
STL02577	13C5 PFHxA	102		36-137
STL02579	13C6 PFDA	95		50-124
STL02578	13C9 PFNA	101		48-130
STL00992	13C4 PFBA	100		43-130

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6631-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL09-28.d

Lab ID: LCSD 410-19879/3-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCSD CONCENTRATION (ng/L)	LCSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
6:2 Fluorotelomer sulfonic acid	24.3	27.0	111	1	30	56-140	
Perfluorobutanoic acid	25.6	27.7	108	2	30	63-160	
Perfluorobutanesulfonic acid	22.6	22.8	101	1	30	67-135	
Perfluorodecanoic acid	25.6	25.3	99	1	30	66-141	
8:2 Fluorotelomer sulfonic acid	24.5	24.3	99	6	30	58-143	
Perfluoroheptanoic acid	25.6	25.8	101	2	30	69-144	
Perfluorohexanesulfonic acid	24.2	23.0	95	6	30	63-132	
Perfluorohexanoic acid	25.6	25.8	101	1	30	69-139	
Perfluorononanoic acid	25.6	27.2	106	5	30	66-144	
Perfluorooctanesulfonic acid	24.5	22.5	92	1	30	53-129	
Perfluorooctanoic acid	25.6	30.8	120	13	30	67-139	
Perfluoropentanoic acid	25.6	28.3	111	8	30	73-135	
13C3 PFBS	37.4	40.0	107			23-175	
M2-6:2 FTS	38.0	43.6	115			29-182	
13C4 PFHpA	40.0	42.9	107			33-140	
M2-8:2 FTS	38.3	47.2	123			37-169	
13C5 PFPeA	40.0	44.3	111			38-150	
13C8 PFOA	40.0	41.9	105			52-124	
13C8 PFOS	38.3	38.9	102			52-121	
13C3 PFHxS	37.8	40.1	106			35-143	
13C5 PFHxA	40.0	43.7	109			36-137	
13C6 PFDA	40.0	42.8	107			50-124	
13C9 PFNA	40.0	41.4	104			48-130	
13C4 PFBA	40.0	42.2	105			43-130	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6631-1

SDG No.:

Lab File ID: 20JUL09-26.d Lab Sample ID: MB 410-19879/1-A

Matrix: Water Date Extracted: 07/07/2020 08:07

Instrument ID: 30733 Date Analyzed: 07/09/2020 16:37

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 410-19879/2-A	20JUL09-27.d	07/09/2020 16:46
	LCSD 410-19879/3-A	20JUL09-28.d	07/09/2020 16:55
EQB-WL-070120	410-6631-1	20JUL09-35.d	07/09/2020 17:59
MSA-FB-070120	410-6631-2	20JUL09-36.d	07/09/2020 18:08
MSA-DUP-2-070120	410-6631-3	20JUL09-37.d	07/09/2020 18:17
GSP-MW-19-070120	410-6631-4	20JUL09-38.d	07/09/2020 18:26
GSP-MW-9-070120	410-6631-5	20JUL09-40.d	07/09/2020 18:44
MSA-MW-50S-070120	410-6631-6	20JUL09-41.d	07/09/2020 18:53
MSA-MW-51S-070120	410-6631-7	20JUL09-42.d	07/09/2020 19:02
MSA-PMW-6S-070120	410-6631-8	20JUL09-43.d	07/09/2020 19:11
MSA-Pond 2-070120	410-6631-9	20JUL09-44.d	07/09/2020 19:20
MSA-Pond 1-070120	410-6631-10	20JUL09-45.d	07/09/2020 19:29
MSA-MW-51S-070120 DL	410-6631-7 DL	20JUL13-53.d	07/13/2020 20:00
MSA-PMW-6S-070120 DL	410-6631-8 DL	20JUL14-129.d	07/15/2020 03:41

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Client Sample ID: Lab Sample ID: MB 410-19879/1-A

Matrix: Water Lab File ID: 20JUL09-26.d

Analysis Method: EPA 537 (Mod) Date Collected:

Extraction Method: EPA 537 (mod) Date Extracted: 07/07/2020 08:07

Sample wt/vol: 250(mL) Date Analyzed: 07/09/2020 16:37

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 20936 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		5.0	2.0
375-22-4	Perfluorobutanoic acid	ND		5.0	2.0
375-73-5	Perfluorobutanesulfonic acid	ND		2.0	0.50
335-76-2	Perfluorodecanoic acid	ND		2.0	0.50
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		3.0	1.0
375-85-9	Perfluoroheptanoic acid	ND		2.0	0.50
355-46-4	Perfluorohexanesulfonic acid	ND		2.0	0.50
307-24-4	Perfluorohexanoic acid	ND		2.0	0.50
375-95-1	Perfluorononanoic acid	ND		2.0	0.50
1763-23-1	Perfluorooctanesulfonic acid	ND		2.0	0.50
335-67-1	Perfluorooctanoic acid	ND		2.0	0.50
2706-90-3	Perfluoropentanoic acid	ND		2.0	0.50

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02337	13C3 PFBS	105		23-175
STL02279	M2-6:2 FTS	112		29-182
STL01892	13C4 PFHpA	103		33-140
STL02280	M2-8:2 FTS	118		37-169
STL01893	13C5 PFPeA	109		38-150
STL01052	13C8 PFOA	103		52-124
STL01054	13C8 PFOS	102		52-121
STL02581	13C3 PFHxS	99		35-143
STL02577	13C5 PFHxA	104		36-137
STL02579	13C6 PFDA	110		50-124
STL02578	13C9 PFNA	107		48-130
STL00992	13C4 PFBA	105		43-130

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Instrument ID: 27632 Calibration Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/13/2020 13:55

Calibration ID: 6740

		13C3PFBA		13PFOA		PFOS	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1443380	3.35	1134281	5.05	475947	5.38
UPPER LIMIT		2165070	3.55	1701422	5.25	713921	5.58
LOWER LIMIT		721690	3.15	567141	4.85	237974	5.18
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-21880/8		1259622	3.35	1019246	5.05	427114	5.37
ICV 410-21880/9		1729800	3.34	1337683	5.04	557572	5.37
CCV 410-22577/89		1635931	3.31	1143642	4.99	523417	5.33
410-6631-8 DL	MSA-PMW-6S-070120 DL	1732347	3.32	1215653	5.00	541961	5.33
CCV 410-22577/92		1517134	3.31	1083377	4.99	500610	5.33

13C3PFBA = 13C3-PFBA
13PFOA = 13C2 PFOA
PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Instrument ID: 27632 Calibration Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/13/2020 13:55

Calibration ID: 6740

		PFDA					
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		862620	5.71				
UPPER LIMIT		1293930	5.91				
LOWER LIMIT		431310	5.51				
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-21880/8		734089	5.71				
ICV 410-21880/9		1045892	5.71				
CCV 410-22577/89		889173	5.65				
410-6631-8 DL	MSA-PMW-6S-070120 DL	948329	5.65				
CCV 410-22577/92		828308	5.65				

PFDA = 13C2 PFDA

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Instrument ID: 30733 Calibration Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/09/2020 11:08

Calibration ID: 6664

		13C3PFBA		13PFOA		PFOS	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1810897	3.54	2342094	5.26	1136098	5.58
UPPER LIMIT		2716346	3.74	3513141	5.46	1704147	5.78
LOWER LIMIT		905449	3.34	1171047	5.06	568049	5.38
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-20482/8		1707938	3.53	2312321	5.26	1072027	5.58
ICV 410-20482/9		1899600	3.53	2526066	5.25	1207497	5.58
CCV 410-20936/23		1886468	3.53	2595879	5.24	1236700	5.57
MB 410-19879/1-A		1843433	3.53	2529481	5.25	1162612	5.57
LCS 410-19879/2-A		1931062	3.52	2565237	5.25	1218279	5.57
LCSD 410-19879/3-A		1817532	3.51	2473878	5.25	1177034	5.57
410-6631-1	EQB-WL-070120	1984657	3.54	2710439	5.25	1259584	5.57
410-6631-2	MSA-FB-070120	1770479	3.52	2424990	5.25	1151435	5.57
410-6631-3	MSA-DUP-2-070120	1381471	3.53	2637590	5.25	1215605	5.57
410-6631-4	GSP-MW-19-070120	1287328	3.53	2440390	5.25	1156748	5.56
CCV 410-20936/37		1838810	3.52	2469875	5.26	1165303	5.57
410-6631-5	GSP-MW-9-070120	1461449	3.53	2702010	5.25	1274402	5.57
410-6631-6	MSA-MW-50S-070120	1347487	3.53	2692992	5.24	1272617	5.57
410-6631-7	MSA-MW-51S-070120	967896	3.53	2454810	5.25	1241160	5.57
410-6631-8	MSA-PMW-6S-070120	1813424	3.52	2597491	5.25	1191859	5.56
410-6631-9	MSA-Pond 2-070120	1111292	3.53	2603699	5.25	1202434	5.57
410-6631-10	MSA-Pond 1-070120	1186051	3.53	2520609	5.25	1218012	5.56
CCV 410-20936/45		1972237	3.58	2537709	5.26	1164098	5.58
CCV 410-21758/40		2290645	3.53	3078418	5.25	1420586	5.58
410-6631-7 DL	MSA-MW-51S-070120 DL	1740156	3.55	2327870	5.27	1096407	5.59
CCV 410-21758/51		2013269	3.54	2640169	5.27	1238427	5.60

13C3PFBA = 13C3-PFBA
13PFOA = 13C2 PFOA
PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6631-1

SDG No.:

Instrument ID: 30733 Calibration Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/09/2020 11:08

Calibration ID: 6664

		PFDA					
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		2137017	5.91				
UPPER LIMIT		3205526	6.11				
LOWER LIMIT		1068509	5.71				
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-20482/8		2052405	5.91				
ICV 410-20482/9		2272200	5.91				
CCV 410-20936/23		2304764	5.90				
MB 410-19879/1-A		2185885	5.89				
LCS 410-19879/2-A		2409822	5.90				
LCSD 410-19879/3-A		2184036	5.90				
410-6631-1	EQB-WL-070120	2317988	5.89				
410-6631-2	MSA-FB-070120	2067052	5.90				
410-6631-3	MSA-DUP-2-070120	2252326	5.90				
410-6631-4	GSP-MW-19-070120	2198431	5.89				
CCV 410-20936/37		2231718	5.90				
410-6631-5	GSP-MW-9-070120	2434673	5.90				
410-6631-6	MSA-MW-50S-070120	2365802	5.89				
410-6631-7	MSA-MW-51S-070120	2337252	5.89				
410-6631-8	MSA-PMW-6S-070120	2320599	5.89				
410-6631-9	MSA-Pond 2-070120	2402298	5.89				
410-6631-10	MSA-Pond 1-070120	2455162	5.89				
CCV 410-20936/45		2196658	5.91				
CCV 410-21758/40		2651771	5.91				
410-6631-7 DL	MSA-MW-51S-070120 DL	2057992	5.91				
CCV 410-21758/51		2294308	5.92				

PFDA = 13C2 PFDA

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-21880/1	20JUL13MCAL-09.d
Level 2	IC 410-21880/2	20JUL13MCAL-10.d
Level 3	IC 410-21880/3	20JUL13MCAL-11.d
Level 4	IC 410-21880/4	20JUL13MCAL-12.d
Level 5	ICISAV 410-21880/5	20JUL13MCAL-13.d
Level 6	IC 410-21880/6	20JUL13MCAL-14.d
Level 7	IC 410-21880/7	20JUL13MCAL-15.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid	1.0942 0.8086	0.9410 0.8004	0.8708	0.8075	0.8744	LID1F		0.8127							0.9990		0.9900
Perfluoropentanoic acid	1.1649 0.8961	1.0268 0.8773	0.9175	0.9240	0.9672	LID1F		0.8957							0.9990		0.9900
Perfluorobutanesulfonic acid	1.0096 1.0254	1.0012 0.9953	0.9754	0.9483	1.0668	LID1F		1.0093							0.9990		0.9900
4:2 Fluorotelomer sulfonic acid	1.8279 1.5584	1.8753 1.6923	1.9107	1.6686	1.8203	LID1F		1.6714							0.9970		0.9900
Perfluorohexanoic acid	0.8889 0.7545	0.7911 0.7041	0.8037	0.7438	0.8042	LID1F		0.7324							0.9980		0.9900
Perfluoropentanesulfonic acid	0.5329 0.4398	0.5039 0.4706	0.4603	0.4526	0.4917	LID1F		0.4637							0.9990		0.9900
HFPODA	2.7281 2.5663	2.4548 2.1385	2.2600	2.0309	2.2211	LID1F		2.2642							0.9930		0.9900
Perfluoroheptanoic acid	1.5656 1.1961	1.2701 1.0636	1.3663	1.2508	1.2949	LID1F		1.1387							0.9930		0.9900
Perfluorohexanesulfonic acid	1.1053 1.0089	1.0370 0.9666	0.9551	0.9676	1.0336	LID1F		0.9860							0.9990		0.9900
DONA	1.6160 1.3488	1.3873 1.2472	1.4714	1.4018	1.4601	LID1F		1.3090							0.9960		0.9900
6:2 Fluorotelomer sulfonic acid	1.7276 1.6135	1.6006 1.5337	1.7825	1.6137	1.7642	LID1F		1.5880							0.9980		0.9900
Perfluoroheptanesulfonic acid	1.0152 0.8964	0.8660 0.8646	0.8487	0.8449	0.9029	LID1F		0.8768							1.0000		0.9900
Perfluorooctanoic acid	0.9610 0.7108	0.7432 0.6854	0.6736	0.6824	0.7345	LID1F		0.6981							0.9990		0.9900
Perfluorooctanesulfonic acid	1.2449 1.0644	1.0934 1.0228	0.9650	0.9841	0.9906	LID1F		1.0288							0.9990		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorononanoic acid	0.8664 0.8632	0.9145 0.8285	0.8785	0.8188	0.9009	LID1F		0.8465							0.9990		0.9900
9Cl-PF3ONS	2.4470 2.2699	2.2827 2.2448	2.1367	2.1817	2.2572	LID1F		2.2495							1.0000		0.9900
Perfluorononanesulfonic acid	0.6995 0.6591	0.7009 0.6428	0.6819	0.6563	0.6691	LID1F		0.6514							1.0000		0.9900
Perfluorodecanoic acid	0.5861 0.5574	0.5839 0.5535	0.5190	0.5681	0.5867	LID1F		0.5587							1.0000		0.9900
8:2 Fluorotelomer sulfonic acid	1.8646 1.6757	1.6514 1.5120	1.5427	1.7516	1.7115	LID1F		1.5911							0.9970		0.9900
Perfluorooctanesulfonamide	1.0466 1.0098	0.9586 0.9253	1.0024	0.9229	1.0336	LID1F		0.9616							0.9980		0.9900
NMeFOSAA	1.0122 1.0226	0.9525 0.8888	1.0305	1.0055	1.0748	LID1F		0.9535							0.9940		0.9900
Perfluorodecanesulfonic acid	0.5992 0.5095	0.5835 0.5191	0.5180	0.5180	0.5042	LID1F		0.5150							1.0000		0.9900
Perfluoroundecanoic acid	0.6005 0.5240	0.5215 0.4585	0.5741	0.4920	0.5329	LID1F		0.4880							0.9950		0.9900
NEtFOSAA	1.1603 0.9177	0.8977 0.9441	0.9754	0.9723	1.0408	LID1F		0.9492							0.9980		0.9900
11Cl-PF3OUdS	1.8842 1.8393	1.7714 1.7959	1.6464	1.6938	1.7958	LID1F		1.8018							1.0000		0.9900
Perfluorododecanoic acid	0.7466 0.5554	0.5982 0.5400	0.5811	0.5705	0.5645	LID1F		0.5492							0.9990		0.9900
10:2 FTS	1.9781 1.9103	2.0679 1.7724	2.0445	2.0078	1.9085	LID1F		1.8401							0.9980		0.9900
NMeFOSE	0.9082 0.8761	0.8789 0.9636	0.9286	0.8802	0.9842	LID1F		0.9373							0.9980		0.9900
NMeFOSA	0.9339 1.0768	1.0185 1.0475	0.9778	0.9837	1.0664	LID1F		1.0539							1.0000		0.9900
Perfluorododecanesulfonic acid	0.2663 0.2527	0.2610 0.2536	0.2361	0.2428	0.2570	LID1F		0.2531							1.0000		0.9900
NEtFOSE	0.8375 0.7751	0.7792 0.7396	0.7322	0.7041	0.7469	LID1F		0.7488							0.9990		0.9900
Perfluorotridecanoic acid	0.9053 0.7834	0.8165 0.6822	0.7856	0.7636	0.8175	LID1F		0.7306							0.9940		0.9900
NEtFOSA	0.7918 1.0387	1.0161 0.9533	1.0036	0.9936	0.9965	LID1F		0.9840							0.9980		0.9900
Perfluorotetradecanoic acid	1.0586 0.8914	1.0133 0.8565	0.9986	1.0139	0.9759	LID1F		0.8885							0.9970		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorohexadecanoic acid	0.6883 0.5328	0.5889 0.4952	0.5457	0.5251	0.5715	LID1F		0.5164							0.9970		0.9900
Perfluorooctadecanoic acid	0.5186 0.4927	0.4878 0.4709	0.4817	0.4846	0.5194	LID1F		0.4832							0.9990		0.9900
13C4 PFBA	1.1180 1.0818	1.1605 1.0533	1.1496	1.1105	1.0970	Ave		1.1101				3.4		20.0			
13C5 PFPeA	0.9128 0.8720	0.9027 0.8313	0.8989	0.8702	0.8705	Ave		0.8798				3.1		20.0			
13C3 PFBS	0.4469 0.4313	0.4631 0.4275	0.4428	0.4324	0.4232	Ave		0.4382				3.1		20.0			
M2-4:2 FTS	0.0944 0.0973	0.0956 0.0949	0.0949	0.0984	0.0937	Ave		0.0956				1.8		20.0			
13C5 PFHxA	1.4386 1.4162	1.5172 1.3806	1.4431	1.4812	1.4240	Ave		1.4430				3.1		20.0			
13C3 HFPO-DA	0.2784 0.2523	0.2613 0.2903	0.2830	0.3103	0.3053	Ave		0.2830				7.5		20.0			
13C4 PFHpA	1.0365 1.0276	1.1256 1.0300	1.0560	1.0530	1.0755	Ave		1.0578				3.2		20.0			
13C3 PFHxS	0.4525 0.4256	0.4937 0.4135	0.4850	0.4656	0.4533	Ave		0.4556				6.4		20.0			
M2-6:2 FTS	0.0891 0.0702	0.0928 0.0664	0.0788	0.0786	0.0737	Ave		0.0785				12.3		20.0			
13C8 PFOA	1.3802 1.3197	1.4718 1.2327	1.4351	1.3955	1.3766	Ave		1.3731				5.7		20.0			
13C8 PFOS	0.9861 0.9752	1.0422 0.9686	1.0907	0.9969	1.0376	Ave		1.0139				4.4		20.0			
13C9 PFNA	2.1439 2.1234	2.3636 2.0840	2.3091	2.1904	2.1483	Ave		2.1947				4.7		20.0			
13C6 PFDA	1.7215 1.5056	1.7237 1.5282	1.6448	1.5967	1.6846	Ave		1.6293				5.4		20.0			
M2-8:2 FTS	0.1368 0.0944	0.1254 0.1001	0.1066	0.1092	0.1125	Ave		0.1121				13.0		20.0			
13C8 FOSA	1.3231 1.1050	1.2385 1.1655	1.1311	1.1740	1.2143	Ave		1.1931				6.1		20.0			
d3-NMeFOSAA	0.3102 0.2923	0.3187 0.3408	0.2887	0.3098	0.3180	Ave		0.3112				5.6		20.0			
13C7 PFUnA	1.5358 1.3860	1.5616 1.4895	1.4551	1.4894	1.5154	Ave		1.4904				3.9		20.0			
d5-NEtFOSAA	0.2716 0.2333	0.2463 0.2384	0.2286	0.2450	0.2534	Ave		0.2452				5.8		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
13C2-PFDoDA	1.7377 1.7264	1.9360 1.7453	1.7571	1.9271	1.8852	Ave		1.8164				5.2		20.0			
d7-N-MeFOSE-M	0.2508 0.2258	0.2266 0.2363	0.2223	0.2304	0.2341	Ave		0.2323				4.1		20.0			
d3-NMePFOSA	0.1394 0.1102	0.1190 0.1282	0.1146	0.1180	0.1252	Ave		0.1221				8.0		20.0			
d9-N-EtFOSE-M	0.2627 0.2193	0.2344 0.2421	0.2198	0.2328	0.2436	Ave		0.2364				6.4		20.0			
d5-NEtPFOSA	0.1088 0.0928	0.0967 0.1062	0.0958	0.0961	0.1026	Ave		0.0999				6.0		20.0			
13C2 PFTeDA	1.4494 1.3780	1.4423 1.4675	1.3890	1.4314	1.4421	Ave		1.4285				2.3		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-21880/1	20JUL13MCAL-09.d
Level 2	IC 410-21880/2	20JUL13MCAL-10.d
Level 3	IC 410-21880/3	20JUL13MCAL-11.d
Level 4	IC 410-21880/4	20JUL13MCAL-12.d
Level 5	ICISAV 410-21880/5	20JUL13MCAL-13.d
Level 6	IC 410-21880/6	20JUL13MCAL-14.d
Level 7	IC 410-21880/7	20JUL13MCAL-15.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid		LID1F	69431 11997076	159609 21699496	568737	2307540	5893808	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanoic acid		LID1F	60355 10716753	135471 18772184	468526	2068908	5174022	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorobutanesulfonic acid		LID1F	22664 5367662	59971 9692086	217149	933881	2455186	0.177 44.3	0.443 88.5	1.77	7.08	17.7
4:2 Fluorotelomer sulfonic acid		LID1F	7332 1536385	18875 3162711	76188	301882	752317	0.187 46.7	0.467 93.4	1.87	7.47	18.7
Perfluorohexanoic acid		LID1F	58199 11591241	135324 20502706	521855	2167887	5408586	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanesulfonic acid		LID1F	12678 2440032	31992 4857412	108620	472356	1199342	0.188 46.9	0.469 93.8	1.88	7.50	18.8
HFPODA		LID1F	34561 7023501	72311 13093215	287758	1240060	3203287	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoroheptanoic acid		LID1F	73855 13334156	161195 23106466	649206	2591483	6577812	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexanesulfonic acid		LID1F	20760 4248612	52641 7688445	190062	808498	2018139	0.182 45.6	0.456 91.2	1.82	7.30	18.2
DONA		LID1F	72038 14209258	166389 25604154	660667	2744557	7009023	0.189 47.3	0.473 94.5	1.89	7.56	18.9
6:2 Fluorotelomer sulfonic acid		LID1F	6641 1164970	15874 2035851	59880	236702	581944	0.190 47.4	0.474 94.8	1.90	7.58	19.0
Perfluoroheptanesulfonic acid		LID1F	19904 3940256	45889 7178851	176306	736943	1840412	0.190 47.6	0.476 95.2	1.90	7.62	19.0
Perfluorooctanoic acid		LID1F	60367 10176627	123330 17819051	434956	1873655	4775161	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctanesulfonic acid		LID1F	22427 4651450	52878 8174235	186865	799832	2009892	0.185 46.3	0.463 92.6	1.85	7.40	18.5
Perfluorononanoic acid		LID1F	36667 8875235	108379 15392947	389162	1579833	4088902	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
9Cl-PF3ONS		LID1F	44297 9967823	110928 18027720	415755	1781698	4601723	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorononanesulfonic acid		LID1F	13072 2987403	35160 5328626	136968	553252	1408086	0.192 48.0	0.480 96.0	1.92	7.68	19.2
Perfluorodecanoic acid		LID1F	34802 7038801	90209 12428914	306878	1361542	3438285	0.200 50.0	0.500 100	2.00	8.00	20.0
8:2 Fluorotelomer sulfonic acid		LID1F	8430 1271643	17787 2129847	56622	275027	641449	0.192 47.9	0.479 95.8	1.92	7.66	19.2
Perfluorooctanesulfonamide		LID1F	47764 9358734	106402 15845241	407551	1626363	4366515	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSAA		LID1F	10831 2506871	27205 4450282	106948	467568	1188868	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorodecanesulfonic acid		LID1F	11243 2318979	29390 4321524	104478	438481	1065608	0.193 48.2	0.482 96.4	1.93	7.71	19.3
Perfluoroundecanoic acid		LID1F	31810 6091736	72988 10035051	300247	1099950	2809263	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSAA		LID1F	10870 1796027	19813 3307195	80133	357513	917471	0.200 50.0	0.500 100	2.00	8.00	20.0
11Cl-PF3OUdS		LID1F	34109 8076972	86079 14422884	320345	1383286	3661137	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorododecanoic acid		LID1F	44749 8042843	103792 13848305	367022	1650105	3702240	0.200 50.0	0.500 100	2.00	8.00	20.0
10:2 FTS		LID1F	8999 1458729	22412 2512243	75506	317228	719734	0.193 48.2	0.482 96.4	1.93	7.71	19.3
NMeFOSE		LID1F	7857 1659332	17848 3345516	74211	304475	801539	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSA		LID1F	4491 995516	10862 1972954	40284	174195	464354	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorododecanesulfonic acid		LID1F	5018 1154877	13202 2119602	47809	206401	545361	0.194 48.4	0.484 96.8	1.94	7.74	19.4
NEtFOSE		LID1F	7587 1425894	16371 2631088	57856	246035	632999	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotridecanoic acid		LID1F	54259 11344399	141674 17494575	496169	2208799	5361638	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSA		LID1F	2972 808303	8810 1486807	34546	143370	355680	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotetradecanoic acid		LID1F	52917 10302571	130977 18466864	498582	2178289	4896020	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexadecanoic acid		LID1F	34408 6158348	76124 10677212	272466	1128232	2867156	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctadecanoic acid		LID1F	25925 5694959	63052 10154360	240515	1041196	2605568	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	13C3 PFBA	Ave	3172761 2967355	3392193 2711103	3265430	3571913	3370379	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C5 PFPeA	13C3 PFBA	Ave	2590654 2391896	2638706 2139665	2553330	2798856	2674657	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFBS	13C3 PFBA	Ave	1187092 1107237	1267062 1029883	1177328	1301876	1217071	9.36 9.36	9.36 9.36	9.36	9.36	9.36
M2-4:2 FTS	13PF OA	Ave	200563 197174	201303 186893	199374	226154	206649	9.34 9.34	9.34 9.34	9.34	9.34	9.34
13C5 PFHxA	13PF OA	Ave	3273785 3072617	3421335 2911805	3246481	3643084	3362725	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 HFPO-DA	13PF OA	Ave	633422 547355	589131 612248	636627	763240	721090	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C4 PFHpA	13PF OA	Ave	2358626 2229584	2538267 2172379	2375745	2589725	2539922	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFHxS	13PF OA	Ave	974106 873592	1053086 825076	1032100	1083353	1012703	9.46 9.46	9.46 9.46	9.46	9.46	9.46
M2-6:2 FTS	13PF OA	Ave	192607 144708	198775 133021	168324	183740	165283	9.50 9.50	9.50 9.50	9.50	9.50	9.50
13C8 PFOA	13PF OA	Ave	3140803 2863293	3318758 2599837	3228402	3432261	3250829	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C8 PFOS	PFOS	Ave	930927 903269	999590 825974	1000612	1049925	1048412	9.57 9.57	9.57 9.57	9.57	9.57	9.57
13C9 PFNA	PFOS	Ave	2116048 2056283	2370192 1857996	2214810	2411734	2269415	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C6 PFDA	PFDA	Ave	2968733 2525669	3089643 2245347	2956151	2995795	2930285	10.0 10.0	10.0 10.0	10.0	10.0	10.0
M2-8:2 FTS	PFDA	Ave	226054 151775	215416 140862	183511	196268	187389	9.58 9.58	9.58 9.58	9.58	9.58	9.58
13C8 FOSA	PFDA	Ave	2281818 1853618	2219989 1712452	2032844	2202758	2112267	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMeFOSAA	PFDA	Ave	535016 490279	571252 500717	518928	581266	553080	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C7 PFUnA	PFDA	Ave	2648646 2324946	2799073 2188460	2615147	2794411	2635910	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtFOSAA	PFDA	Ave	468432 391407	441433 350292	410778	459613	440737	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2-PFDoDA	PFDA	Ave	2996738 2896111	3470214 2564330	3157905	3615759	3279252	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d7-N-MeFOSE-M	PFDA	Ave	432562 378809	406159 347192	399598	432371	407198	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMePFOSA	PFDA	Ave	240434 184906	213299 188350	205987	221342	217721	10.0 10.0	10.0 10.0	10.0	10.0	10.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
d9-N-EtFOSE-M	PFDA	Ave	452957 367932	420175 355735	395079	436785	423734	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtPFOSA	PFDA	Ave	187664 155641	173408 155963	172104	180374	178466	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2 PFTeDA	PFDA	Ave	2499498 2311591	2585189 2156163	2496449	2685634	2508441	10.0 10.0	10.0 10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD
LID1F = Linear 1/Conc IsoDil FZ

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-21880/1	20JUL13MCAL-09.d
Level 2	IC 410-21880/2	20JUL13MCAL-10.d
Level 3	IC 410-21880/3	20JUL13MCAL-11.d
Level 4	IC 410-21880/4	20JUL13MCAL-12.d
Level 5	ICISAV 410-21880/5	20JUL13MCAL-13.d
Level 6	IC 410-21880/6	20JUL13MCAL-14.d
Level 7	IC 410-21880/7	20JUL13MCAL-15.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanoic acid	34.6 -1.5	15.8	7.2	-0.6	7.6	-0.5	50 30	30	30	30	30	30
Perfluoropentanoic acid	30.0 -2.1	14.6	2.4	3.2	8.0	0.0	50 30	30	30	30	30	30
Perfluorobutanesulfonic acid	0.0 -1.4	-0.8	-3.4	-6.0	5.7	1.6	50 30	30	30	30	30	30
4:2 Fluorotelomer sulfonic acid	9.4 1.2	12.2	14.3	-0.2	8.9	-6.8	50 30	30	30	30	30	30
Perfluorohexanoic acid	21.4 -3.9	8.0	9.7	1.6	9.8	3.0	50 30	30	30	30	30	30
Perfluoropentanesulfonic acid	14.9 1.5	8.7	-0.7	-2.4	6.0	-5.1	50 30	30	30	30	30	30
HFPODA	20.5 -5.5	8.4	-0.2	-10.3	-1.9	13.3	50 30	30	30	30	30	30
Perfluoroheptanoic acid	37.5 -6.6	11.5	20.0	9.9	13.7	5.0	50 30	30	30	30	30	30
Perfluorohexanesulfonic acid	12.1 -2.0	5.2	-3.1	-1.9	4.8	2.3	50 30	30	30	30	30	30
DONA	23.5 -4.7	6.0	12.4	7.1	11.5	3.0	50 30	30	30	30	30	30
6:2 Fluorotelomer sulfonic acid	8.8 -3.4	0.8	12.2	1.6	11.1	1.6	50 30	30	30	30	30	30
Perfluoroheptanesulfonic acid	15.8 -1.4	-1.2	-3.2	-3.6	3.0	2.2	50 30	30	30	30	30	30
Perfluorooctanoic acid	37.7 -1.8	6.5	-3.5	-2.2	5.2	1.8	50 30	30	30	30	30	30
Perfluorooctanesulfonic acid	21.0 -0.6	6.3	-6.2	-4.3	-3.7	3.5	50 30	30	30	30	30	30
Perfluorononanoic acid	2.4 -2.1	8.0	3.8	-3.3	6.4	2.0	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
9Cl-PF3ONS	8.8 -0.2	1.5	-5.0	-3.0	0.3	0.9	50 30	30	30	30	30	30
Perfluorononanesulfonic acid	7.4 -1.3	7.6	4.7	0.7	2.7	1.2	50 30	30	30	30	30	30
Perfluorodecanoic acid	4.9 -0.9	4.5	-7.1	1.7	5.0	-0.2	50 30	30	30	30	30	30
8:2 Fluorotelomer sulfonic acid	17.2 -5.0	3.8	-3.0	10.1	7.6	5.3	50 30	30	30	30	30	30
Perfluorooctanesulfonamide	8.8 -3.8	-0.3	4.2	-4.0	7.5	5.0	50 30	30	30	30	30	30
NMeFOSAA	6.2 -6.8	-0.1	8.1	5.5	12.7	7.3	50 30	30	30	30	30	30
Perfluorodecanesulfonic acid	16.3 0.8	13.3	0.6	0.6	-2.1	-1.1	50 30	30	30	30	30	30
Perfluoroundecanoic acid	23.1 -6.0	6.9	17.6	0.8	9.2	7.4	50 30	30	30	30	30	30
NEtFOSAA	22.2 -0.5	-5.4	2.8	2.4	9.7	-3.3	50 30	30	30	30	30	30
11Cl-PF3OUdS	4.6 -0.3	-1.7	-8.6	-6.0	-0.3	2.1	50 30	30	30	30	30	30
Perfluorododecanoic acid	36.0 -1.7	8.9	5.8	3.9	2.8	1.1	50 30	30	30	30	30	30
10:2 FTS	7.5 -3.7	12.4	11.1	9.1	3.7	3.8	50 30	30	30	30	30	30
NMeFOSE	-3.1 2.8	-6.2	-0.9	-6.1	5.0	-6.5	50 30	30	30	30	30	30
NMeFOSA	-11.4 -0.6	-3.4	-7.2	-6.7	1.2	2.2	50 30	30	30	30	30	30
Perfluorododecanesulfonic acid	5.2 0.2	3.1	-6.7	-4.1	1.6	-0.2	50 30	30	30	30	30	30
NEtFOSE	11.8 -1.2	4.1	-2.2	-6.0	-0.3	3.5	50 30	30	30	30	30	30
Perfluorotridecanoic acid	23.9 -6.6	11.8	7.5	4.5	11.9	7.2	50 30	30	30	30	30	30
NEtFOSA	-19.5 -3.1	3.3	2.0	1.0	1.3	5.6	50 30	30	30	30	30	30
Perfluorotetradecanoic acid	19.1 -3.6	14.0	12.4	14.1	9.8	0.3	50 30	30	30	30	30	30
Perfluorohexadecanoic acid	33.3 -4.1	14.0	5.7	1.7	10.7	3.2	50 30	30	30	30	30	30
Perfluorooctadecanoic acid	7.3 -2.5	1.0	-0.3	0.3	7.5	2.0	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
13C4 PFBA	0.7 -5.1	4.5	3.6	0.0	-1.2	-2.6	30 30	30	30	30	30	30
13C5 PFPeA	3.8 -5.5	2.6	2.2	-1.1	-1.1	-0.9	30 30	30	30	30	30	30
13C3 PFBS	2.0 -2.4	5.7	1.1	-1.3	-3.4	-1.6	30 30	30	30	30	30	30
M2-4:2 FTS	-1.3 -0.7	0.0	-0.7	3.0	-2.0	1.8	30 30	30	30	30	30	30
13C5 PFHxA	-0.3 -4.3	5.1	0.0	2.7	-1.3	-1.9	30 30	30	30	30	30	30
13C3 HFPO-DA	-1.6 2.6	-7.7	0.0	9.7	7.9	-10.8	30 30	30	30	30	30	30
13C4 PFHpA	-2.0 -2.6	6.4	-0.2	-0.5	1.7	-2.8	30 30	30	30	30	30	30
13C3 PFHxS	-0.7 -9.2	8.4	6.4	2.2	-0.5	-6.6	30 30	30	30	30	30	30
M2-6:2 FTS	13.5 -15.4	18.2	0.3	0.2	-6.2	-10.6	30 30	30	30	30	30	30
13C8 PFOA	0.5 -10.2	7.2	4.5	1.6	0.3	-3.9	30 30	30	30	30	30	30
13C8 PFOS	-2.7 -4.5	2.8	7.6	-1.7	2.3	-3.8	30 30	30	30	30	30	30
13C9 PFNA	-2.3 -5.0	7.7	5.2	-0.2	-2.1	-3.2	30 30	30	30	30	30	30
13C6 PFDA	5.7 -6.2	5.8	1.0	-2.0	3.4	-7.6	30 30	30	30	30	30	30
M2-8:2 FTS	22.0 -10.8	11.9	-5.0	-2.6	0.3	-15.8	30 30	30	30	30	30	30
13C8 FOSA	10.9 -2.3	3.8	-5.2	-1.6	1.8	-7.4	30 30	30	30	30	30	30
d3-NMeFOSAA	-0.3 9.5	2.4	-7.2	-0.5	2.2	-6.1	30 30	30	30	30	30	30
13C7 PFUnA	3.1 -0.1	4.8	-2.4	-0.1	1.7	-7.0	30 30	30	30	30	30	30
d5-NEtFOSAA	10.8 -2.8	0.4	-6.8	-0.1	3.3	-4.9	30 30	30	30	30	30	30
13C2-PFDoDA	-4.3 -3.9	6.6	-3.3	6.1	3.8	-5.0	30 30	30	30	30	30	30
d7-N-MeFOSE-M	8.0 1.7	-2.5	-4.3	-0.8	0.8	-2.8	30 30	30	30	30	30	30
d3-NMePFOSA	14.2 5.0	-2.5	-6.1	-3.4	2.5	-9.7	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
d9-N-EtFOSE-M	11.1 2.4	-0.8	-7.0	-1.5	3.1	-7.2	30 30	30	30	30	30	30
d5-NEtPFOSA	9.0 6.3	-3.1	-4.1	-3.7	2.7	-7.1	30 30	30	30	30	30	30
13C2 PFTeDA	1.5 2.7	1.0	-2.8	0.2	1.0	-3.5	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-20482/1	20JUL09MCAL-09.d
Level 2	IC 410-20482/2	20JUL09MCAL-10.d
Level 3	IC 410-20482/3	20JUL09MCAL-11.d
Level 4	IC 410-20482/4	20JUL09MCAL-12.d
Level 5	ICISAV 410-20482/5	20JUL09MCAL-13.d
Level 6	IC 410-20482/6	20JUL09MCAL-14.d
Level 7	IC 410-20482/7	20JUL09MCAL-15.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid	1.0890 0.8294	0.9278 0.8123	0.8716	0.8058	0.8797	LID1F		0.8255							0.9990		0.9900
Perfluoropentanoic acid	1.1959 0.9345	1.0423 0.9300	0.9542	0.9440	0.9903	LID1F		0.9394							0.9990		0.9900
Perfluorobutanesulfonic acid	1.1226 1.0425	0.9850 0.9825	0.9751	1.0081	1.0459	LID1F		1.0073							0.9990		0.9900
4:2 Fluorotelomer sulfonic acid	3.7276 3.4136	3.2886 3.2415	3.3442	3.4207	3.5995	LID1F		3.3385							0.9990		0.9900
Perfluorohexanoic acid	0.9232 0.7654	0.8307 0.7770	0.7862	0.7397	0.8497	LID1F		0.7806							0.9990		0.9900
Perfluoropentanesulfonic acid	0.9939 0.8649	0.9072 0.8561	0.8603	0.8733	0.9588	LID1F		0.8710							0.9990		0.9900
HFPODA	2.7792 2.6693	2.5333 2.4352	2.5096	2.6150	2.7574	LID1F		2.5451							0.9970		0.9900
Perfluoroheptanoic acid	1.2338 1.0373	1.1258 1.0078	1.1633	1.0382	1.1389	LID1F		1.0341							0.9980		0.9900
Perfluorohexanesulfonic acid	1.2074 0.9900	1.0188 1.0082	1.0049	0.9531	1.0523	LID1F		1.0058							1.0000		0.9900
DONA	1.6466 1.4508	1.4906 1.4500	1.5494	1.4280	1.5257	LID1F		1.4591							1.0000		0.9900
6:2 Fluorotelomer sulfonic acid	6.6855 4.7443	5.0388 4.6222	5.3100	5.2617	5.4551	LID1F		4.7876							0.9960		0.9900
Perfluoroheptanesulfonic acid	0.9369 0.8837	0.9256 0.8958	0.8852	0.8568	0.9197	LID1F		0.8934							1.0000		0.9900
Perfluorooctanoic acid	1.0536 0.8648	0.9729 0.8270	0.8712	0.8417	0.8715	LID1F		0.8442							0.9990		0.9900
Perfluorooctanesulfonic acid	1.2793 1.0102	1.0320 1.0300	1.0444	0.9782	1.0393	LID1F		1.0237							1.0000		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorononanoic acid	0.8892 0.8705	0.8792 0.8092	0.8496	0.8289	0.9025	LID1F		0.8381							0.9980		0.9900
9Cl-PF3ONS	1.9975 1.6248	1.6236 1.6782	1.6437	1.5864	1.6558	LID1F		1.6567							1.0000		0.9900
Perfluorononanesulfonic acid	0.9061 0.8475	0.8255 0.8840	0.8706	0.8706	0.8680	LID1F		0.8713							1.0000		0.9900
Perfluorodecanoic acid	0.9730 0.8401	0.8751 0.8137	0.8279	0.8215	0.8781	LID1F		0.8290							0.9990		0.9900
8:2 Fluorotelomer sulfonic acid	8.4365 8.1833	7.6991 7.7374	8.0675	8.0594	8.2689	LID1F		7.9382							0.9990		0.9900
Perfluorooctanesulfonamide	1.0133 1.0062	1.0267 0.9954	1.0257	0.9757	1.0764	LID1F		1.0069							0.9990		0.9900
NMeFOSAA	1.1160 0.9816	1.0285 0.9696	0.9970	1.0124	1.0465	LID1F		0.9840							0.9990		0.9900
Perfluorodecanesulfonic acid	1.0169 0.8959	0.8885 0.9018	0.9220	0.8571	0.9100	LID1F		0.8994							1.0000		0.9900
Perfluoroundecanoic acid	0.9336 0.7955	0.7989 0.7829	0.8411	0.8026	0.8265	LID1F		0.7929							1.0000		0.9900
NEtFOSAA	0.9487 0.9265	0.9265 0.9159	0.9056	0.8886	0.9749	LID1F		0.9241							1.0000		0.9900
11Cl-PF3OUdS	1.4400 1.2952	1.3561 1.3252	1.3478	1.2951	1.3308	LID1F		1.3166							1.0000		0.9900
Perfluorododecanoic acid	1.0989 0.8587	0.9721 0.8549	0.8907	0.8585	0.9056	LID1F		0.8627							1.0000		0.9900
10:2 FTS	6.6081 6.8134	7.1166 6.4153	6.5108	6.0548	6.7148	LID1F		6.5459							0.9990		0.9900
NMeFOSE	0.9983 1.0135	1.0390 1.0073	1.0342	0.9732	1.0501	LID1F		1.0126							1.0000		0.9900
NMeFOSA	1.0087 1.0530	1.1376 1.0104	1.0987	1.0519	1.1307	LID1F		1.0386							0.9990		0.9900
Perfluorododecanesulfonic acid	0.9702 0.8659	0.8927 0.8523	0.8827	0.8573	0.8939	LID1F		0.8615							1.0000		0.9900
NEtFOSE	1.0741 1.0454	1.1116 0.9948	0.9835	0.9619	1.0466	LID1F		1.0134							0.9990		0.9900
NEtFOSA	1.0565 1.0611	1.0398 1.0164	1.0076	0.9928	1.0478	LID1F		1.0312							1.0000		0.9900
Perfluorotridecanoic acid	0.8905 0.7921	0.8047 0.7507	0.8246	0.8028	0.8534	LID1F		0.7769							0.9980		0.9900
Perfluorotetradecanoic acid	1.0151 0.8539	0.9078 0.8232	0.8826	0.8502	0.9175	LID1F		0.8444							0.9990		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorohexadecanoic acid	0.8846 0.7030	0.7442 0.6624	0.7088	0.6724	0.7243	LID1F		0.6819							0.9990		0.9900
Perfluorooctadecanoic acid	0.3700 0.3475	0.3305 0.3375	0.3448	0.3291	0.3616	LID1F		0.3426							0.9990		0.9900
13C4 PFBA	1.0838 1.0573	1.1326 1.0490	1.1365	1.1133	1.0721	Ave		1.0921				3.3		20.0			
13C5 PFPeA	0.8519 0.9122	0.9249 0.8679	0.9688	0.8844	0.9014	Ave		0.9016				4.3		20.0			
13C3 PFBS	0.6512 0.6943	0.7328 0.6574	0.7709	0.6935	0.7006	Ave		0.7001				5.9		20.0			
M2-4:2 FTS	0.0512 0.0484	0.0502 0.0479	0.0515	0.0482	0.0494	Ave		0.0495				3.0		20.0			
13C5 PFHxA	0.8696 0.8434	0.8811 0.8160	0.8945	0.8932	0.8264	Ave		0.8606				3.7		20.0			
13C3 HFPO-DA	0.1064 0.0997	0.1098 0.1111	0.1106	0.1035	0.1025	Ave		0.1062				4.2		20.0			
13C4 PFHpA	0.9128 0.8972	0.9173 0.8713	0.8915	0.9212	0.9218	Ave		0.9047				2.1		20.0			
13C3 PFHxS	0.5276 0.5374	0.5345 0.5148	0.5502	0.5472	0.5575	Ave		0.5384				2.7		20.0			
M2-6:2 FTS	0.0266 0.0252	0.0267 0.0251	0.0264	0.0243	0.0250	Ave		0.0256				3.7		20.0			
13C8 PFOA	0.9728 0.9500	0.9948 0.9550	1.0104	0.9796	1.0065	Ave		0.9813				2.4		20.0			
13C8 PFOS	1.0208 0.9615	1.0760 0.9884	1.0187	0.9738	1.0186	Ave		1.0083				3.8		20.0			
13C9 PFNA	1.8149 1.6068	1.7685 1.7331	1.7871	1.6658	1.6826	Ave		1.7227				4.3		20.0			
13C6 PFDA	1.1256 1.0371	1.1473 1.0091	1.1970	1.1095	1.1075	Ave		1.1047				5.8		20.0			
M2-8:2 FTS	0.0182 0.0152	0.0168 0.0152	0.0179	0.0173	0.0170	Ave		0.0168				7.1		20.0			
13C8 FOSA	0.9899 0.9024	0.9365 0.8775	0.9614	0.9142	0.8575	Ave		0.9199				5.0		20.0			
d3-NMeFOSAA	0.3204 0.2988	0.3108 0.3028	0.3256	0.2988	0.3115	Ave		0.3098				3.4		20.0			
13C7 PFUnA	1.1054 1.0601	1.1781 1.0311	1.1776	1.1152	1.1201	Ave		1.1125				4.9		20.0			
d5-NEtFOSAA	0.2832 0.2631	0.2784 0.2543	0.2929	0.2718	0.2721	Ave		0.2737				4.7		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
13C2-PFDoDA	0.7960 0.7443	0.8014 0.7189	0.8307	0.7800	0.7754	Ave		0.7781				4.8		20.0			
d7-N-MeFOSE-M	0.1921 0.1709	0.1853 0.1717	0.1862	0.1760	0.1764	Ave		0.1798				4.5		20.0			
d3-NMePFOSA	0.1130 0.1117	0.1105 0.1140	0.1138	0.1065	0.1130	Ave		0.1118				2.4		20.0			
d9-N-EtFOSE-M	0.2127 0.1829	0.2022 0.1879	0.2130	0.1956	0.1970	Ave		0.1988				5.8		20.0			
d5-NEtPFOSA	0.1148 0.1076	0.1109 0.1069	0.1143	0.1106	0.1144	Ave		0.1114				3.0		20.0			
13C2 PFTeDA	0.8390 0.7812	0.8556 0.7735	0.8767	0.8235	0.8092	Ave		0.8227				4.6		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-20482/1	20JUL09MCAL-09.d
Level 2	IC 410-20482/2	20JUL09MCAL-10.d
Level 3	IC 410-20482/3	20JUL09MCAL-11.d
Level 4	IC 410-20482/4	20JUL09MCAL-12.d
Level 5	ICISAV 410-20482/5	20JUL09MCAL-13.d
Level 6	IC 410-20482/6	20JUL09MCAL-14.d
Level 7	IC 410-20482/7	20JUL09MCAL-15.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid		LID1F	90614 15730977	196749 27951206	712820	2757743	6526588	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanoic acid		LID1F	78218 15291062	180504 26475485	665228	2566672	6176945	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorobutanesulfonic acid		LID1F	49673 11490838	119608 18749041	478729	1902023	4487633	0.177 44.3	0.443 88.5	1.77	7.08	17.7
4:2 Fluorotelomer sulfonic acid		LID1F	17281 3570405	37963 6005121	155104	613985	1476659	0.187 46.7	0.467 93.4	1.87	7.47	18.7
Perfluorohexanoic acid		LID1F	77809 14942611	180338 26256458	677810	2632620	6241335	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanesulfonic acid		LID1F	46608 10104783	116759 17315237	447676	1746288	4360151	0.188 46.9	0.469 93.8	1.88	7.50	18.8
HFPODA		LID1F	28653 6157950	68551 11205561	267509	1078290	2511222	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoroheptanoic acid		LID1F	109163 21541677	254446 36368070	999494	3810831	9331814	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexanesulfonic acid		LID1F	56312 11230755	122371 19602934	485962	1895300	4755958	0.182 45.6	0.456 91.2	1.82	7.30	18.2
DONA		LID1F	137669 28473434	318376 49446111	1258079	4953378	11813831	0.189 47.3	0.473 94.5	1.89	7.56	18.9
6:2 Fluorotelomer sulfonic acid		LID1F	16355 2623593	31433 4556693	128060	483413	1149355	0.190 47.4	0.474 94.8	1.90	7.58	19.0
Perfluoroheptanesulfonic acid		LID1F	45611 10464384	116050 18180600	446864	1778432	4338819	0.190 47.6	0.476 95.2	1.90	7.62	19.0
Perfluorooctanoic acid		LID1F	99347 19016036	238492 32709736	848362	3285562	7796789	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctanesulfonic acid		LID1F	57092 11237400	122775 19488259	472304	1831270	4534473	0.185 46.3	0.463 92.6	1.85	7.40	18.5
Perfluorononanoic acid		LID1F	76232 17483033	185776 29010123	728319	2868006	7028466	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
9Cl-PF3ONS		LID1F	89579 18162063	194102 31906884	746933	2984298	7259798	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorononanesulfonic acid		LID1F	41945 9778593	101876 17350348	408382	1690524	3928596	0.192 48.0	0.480 96.0	1.92	7.68	19.2
Perfluorodecanoic acid		LID1F	96046 18899028	222417 31879893	837193	3336496	7941129	0.200 50.0	0.500 100	2.00	8.00	20.0
8:2 Fluorotelomer sulfonic acid		LID1F	12884 2584938	27394 4377434	116975	488851	1098277	0.192 47.9	0.479 95.8	1.92	7.66	19.2
Perfluorooctanesulfonamide		LID1F	87962 19695932	213031 33910671	833035	3265307	7536775	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSAA		LID1F	31354 6361362	70819 11398044	274216	1107301	2661837	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorodecanesulfonic acid		LID1F	47273 10380814	110100 17772495	434278	1671325	4135580	0.193 48.2	0.482 96.4	1.93	7.71	19.3
Perfluoroundecanoic acid		LID1F	90498 18292442	208504 31338825	836690	3276522	7559477	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSAA		LID1F	23556 5287767	57137 9042508	224105	884113	2166217	0.200 50.0	0.500 100	2.00	8.00	20.0
11Cl-PF3OUdS		LID1F	64579 14477274	162122 25195705	612448	2436300	5834663	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorododecanoic acid		LID1F	76704 13863063	172599 23860168	625079	2451131	5733685	0.200 50.0	0.500 100	2.00	8.00	20.0
10:2 FTS		LID1F	10155 2165689	25480 3652198	94995	369562	897440	0.193 48.2	0.482 96.4	1.93	7.71	19.3
NMeFOSE		LID1F	16813 3756025	42641 6713175	162676	626844	1512612	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSA		LID1F	9999 2550852	27846 4472132	105627	410112	1043123	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorododecanesulfonic acid		LID1F	45288 10074704	111090 16865765	417514	1678700	4079512	0.194 48.4	0.484 96.8	1.94	7.74	19.4
NEtFOSE		LID1F	20029 4146300	49786 7259050	176957	688846	1683820	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSA		LID1F	10639 2477214	25539 4217410	97311	401948	978518	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotridecanoic acid		LID1F	62159 12787733	142880 20951910	578709	2292122	5403351	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotetradecanoic acid		LID1F	74679 14470603	172080 24720248	653676	2562864	6062433	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexadecanoic acid		LID1F	65077 11914180	141067 19890203	524932	2026992	4786054	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctadecanoic acid		LID1F	27218 5888746	62653 10133619	255342	992059	2389330	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	13C3 PFBA	Ave	4160579 3793132	4241357 3440808	4089344	4277831	3709387	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C5 PFPeA	13C3 PFBA	Ave	3270257 3272629	3463597 2846744	3485903	3398573	3118854	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFBS	13C3 PFBA	Ave	2339821 2331560	2568583 2018290	2596256	2494248	2268884	9.36 9.36	9.36 9.36	9.36	9.36	9.36
M2-4:2 FTS	13PF OA	Ave	231800 209187	230879 185256	231902	224367	205119	9.34 9.34	9.34 9.34	9.34	9.34	9.34
13C5 PFHxA	13PF OA	Ave	4214274 3904452	4342041 3379223	4310882	4448911	3672670	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 HFPO-DA	13PF OA	Ave	515494 461389	541191 460155	532963	515431	455357	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C4 PFHpA	13PF OA	Ave	4423816 4153603	4520440 3608543	4296078	4588346	4096948	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFHxS	13PF OA	Ave	2418900 2353400	2491756 2016798	2508098	2578239	2343987	9.46 9.46	9.46 9.46	9.46	9.46	9.46
M2-6:2 FTS	13PF OA	Ave	122575 110832	125026 98790	120838	115085	105570	9.50 9.50	9.50 9.50	9.50	9.50	9.50
13C8 PFOA	13PF OA	Ave	4714453 4397937	4902463 3955143	4869145	4879082	4473376	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C8 PFOS	PFOS	Ave	2306178 2299309	2459176 1955458	2336848	2418465	2254651	9.57 9.57	9.57 9.57	9.57	9.57	9.57
13C9 PFNA	PFOS	Ave	4286616 4016990	4225794 3584850	4286015	4325071	3893842	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C6 PFDA	PFDA	Ave	4935317 4499278	5083314 3917859	5055876	5076598	4521756	10.0 10.0	10.0 10.0	10.0	10.0	10.0
M2-8:2 FTS	PFDA	Ave	76359 63176	71162 56575	72498	75820	66410	9.58 9.58	9.58 9.58	9.58	9.58	9.58
13C8 FOSA	PFDA	Ave	4340219 3914998	4149677 3406761	4060834	4183147	3500970	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMeFOSAA	PFDA	Ave	1404734 1296077	1377123 1175505	1375194	1367129	1271828	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C7 PFUnA	PFDA	Ave	4846551 4599035	5219785 4003017	4973959	5102953	4572928	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtFOSAA	PFDA	Ave	1241531 1141425	1233338 987290	1237390	1243642	1111014	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2-PFDoDA	PFDA	Ave	3490074 3228861	3551079 2791101	3508926	3569072	3165619	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d7-N-MeFOSE-M	PFDA	Ave	842120 741220	820818 666425	786455	805119	720218	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMePFOSA	PFDA	Ave	495639 484508	489570 442631	480693	487357	461262	10.0 10.0	10.0 10.0	10.0	10.0	10.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
d9-N-EtFOSE-M	PFDA	Ave	932395 793283	895779 729669	899631	895166	804462	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtPFOSA	PFDA	Ave	503514 466901	491218 414921	482870	506067	466938	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2 PFTeDA	PFDA	Ave	3678501 3389295	3791032 3002912	3703106	3768011	3303906	10.0 10.0	10.0 10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD
LID1F = Linear 1/Conc IsoDil FZ

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-20482/1	20JUL09MCAL-09.d
Level 2	IC 410-20482/2	20JUL09MCAL-10.d
Level 3	IC 410-20482/3	20JUL09MCAL-11.d
Level 4	IC 410-20482/4	20JUL09MCAL-12.d
Level 5	ICISAV 410-20482/5	20JUL09MCAL-13.d
Level 6	IC 410-20482/6	20JUL09MCAL-14.d
Level 7	IC 410-20482/7	20JUL09MCAL-15.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanoic acid	31.9 -1.6	12.4	5.6	-2.4	6.6	0.5	50 30	30	30	30	30	30
Perfluoropentanoic acid	27.3 -1.0	11.0	1.6	0.5	5.4	-0.5	50 30	30	30	30	30	30
Perfluorobutanesulfonic acid	11.4 -2.5	-2.2	-3.2	0.1	3.8	3.5	50 30	30	30	30	30	30
4:2 Fluorotelomer sulfonic acid	11.7 -2.9	-1.5	0.2	2.5	7.8	2.2	50 30	30	30	30	30	30
Perfluorohexanoic acid	18.3 -0.5	6.4	0.7	-5.2	8.9	-1.9	50 30	30	30	30	30	30
Perfluoropentanesulfonic acid	14.1 -1.7	4.2	-1.2	0.3	10.1	-0.7	50 30	30	30	30	30	30
HFPODA	9.2 -4.3	-0.5	-1.4	2.7	8.3	4.9	50 30	30	30	30	30	30
Perfluoroheptanoic acid	19.3 -2.5	8.9	12.5	0.4	10.1	0.3	50 30	30	30	30	30	30
Perfluorohexanesulfonic acid	20.0 0.2	1.3	-0.1	-5.2	4.6	-1.6	50 30	30	30	30	30	30
DONA	12.9 -0.6	2.2	6.2	-2.1	4.6	-0.6	50 30	30	30	30	30	30
6:2 Fluorotelomer sulfonic acid	39.6 -3.5	5.2	10.9	9.9	13.9	-0.9	50 30	30	30	30	30	30
Perfluoroheptanesulfonic acid	4.9 0.3	3.6	-0.9	-4.1	2.9	-1.1	50 30	30	30	30	30	30
Perfluorooctanoic acid	24.8 -2.0	15.3	3.2	-0.3	3.2	2.4	50 30	30	30	30	30	30
Perfluorooctanesulfonic acid	25.0 0.6	0.8	2.0	-4.4	1.5	-1.3	50 30	30	30	30	30	30
Perfluorononanoic acid	6.1 -3.4	4.9	1.4	-1.1	7.7	3.9	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
9Cl-PF3ONS	20.6 1.3	-2.0	-0.8	-4.2	-0.1	-1.9	50 30	30	30	30	30	30
Perfluorononanesulfonic acid	4.0 1.5	-5.3	-0.1	-0.1	-0.4	-2.7	50 30	30	30	30	30	30
Perfluorodecanoic acid	17.4 -1.8	5.6	-0.1	-0.9	5.9	1.3	50 30	30	30	30	30	30
8:2 Fluorotelomer sulfonic acid	6.3 -2.5	-3.0	1.6	1.5	4.2	3.1	50 30	30	30	30	30	30
Perfluorooctanesulfonamide	0.6 -1.1	2.0	1.9	-3.1	6.9	-0.1	50 30	30	30	30	30	30
NMeFOSAA	13.4 -1.5	4.5	1.3	2.9	6.4	-0.2	50 30	30	30	30	30	30
Perfluorodecanesulfonic acid	13.1 0.3	-1.2	2.5	-4.7	1.2	-0.4	50 30	30	30	30	30	30
Perfluoroundecanoic acid	17.7 -1.3	0.8	6.1	1.2	4.2	0.3	50 30	30	30	30	30	30
NEtFOSAA	2.7 -0.9	0.3	-2.0	-3.8	5.5	0.3	50 30	30	30	30	30	30
11Cl-PF3OUdS	9.4 0.7	3.0	2.4	-1.6	1.1	-1.6	50 30	30	30	30	30	30
Perfluorododecanoic acid	27.4 -0.9	12.7	3.2	-0.5	5.0	-0.5	50 30	30	30	30	30	30
10:2 FTS	1.0 -2.0	8.7	-0.5	-7.5	2.6	4.1	50 30	30	30	30	30	30
NMeFOSE	-1.4 -0.5	2.6	2.1	-3.9	3.7	0.1	50 30	30	30	30	30	30
NMeFOSA	-2.9 -2.7	9.5	5.8	1.3	8.9	1.4	50 30	30	30	30	30	30
Perfluorododecanesulfonic acid	12.6 -1.1	3.6	2.5	-0.5	3.8	0.5	50 30	30	30	30	30	30
NEtFOSE	6.0 -1.8	9.7	-2.9	-5.1	3.3	3.2	50 30	30	30	30	30	30
NEtFOSA	2.4 -1.4	0.8	-2.3	-3.7	1.6	2.9	50 30	30	30	30	30	30
Perfluorotridecanoic acid	14.6 -3.4	3.6	6.1	3.3	9.8	2.0	50 30	30	30	30	30	30
Perfluorotetradecanoic acid	20.2 -2.5	7.5	4.5	0.7	8.6	1.1	50 30	30	30	30	30	30
Perfluorohexadecanoic acid	29.7 -2.9	9.1	3.9	-1.4	6.2	3.1	50 30	30	30	30	30	30
Perfluorooctadecanoic acid	8.0 -1.5	-3.5	0.6	-3.9	5.5	1.4	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
13C4 PFBA	-0.8 -3.9	3.7	4.1	1.9	-1.8	-3.2	30 30	30	30	30	30	30
13C5 PFPeA	-5.5 -3.7	2.6	7.4	-1.9	0.0	1.2	30 30	30	30	30	30	30
13C3 PFBS	-7.0 -6.1	4.7	10.1	-0.9	0.1	-0.8	30 30	30	30	30	30	30
M2-4:2 FTS	3.4 -3.3	1.2	4.0	-2.7	-0.3	-2.3	30 30	30	30	30	30	30
13C5 PFHxA	1.0 -5.2	2.4	3.9	3.8	-4.0	-2.0	30 30	30	30	30	30	30
13C3 HFPO-DA	0.1 4.6	3.4	4.1	-2.6	-3.5	-6.2	30 30	30	30	30	30	30
13C4 PFHpA	0.9 -3.7	1.4	-1.5	1.8	1.9	-0.8	30 30	30	30	30	30	30
13C3 PFHxS	-2.0 -4.4	-0.7	2.2	1.6	3.5	-0.2	30 30	30	30	30	30	30
M2-6:2 FTS	3.9 -2.0	4.2	3.0	-5.1	-2.4	-1.6	30 30	30	30	30	30	30
13C8 PFOA	-0.9 -2.7	1.4	3.0	-0.2	2.6	-3.2	30 30	30	30	30	30	30
13C8 PFOS	1.2 -2.0	6.7	1.0	-3.4	1.0	-4.6	30 30	30	30	30	30	30
13C9 PFNA	5.4 0.6	2.7	3.7	-3.3	-2.3	-6.7	30 30	30	30	30	30	30
13C6 PFDA	1.9 -8.7	3.8	8.3	0.4	0.3	-6.1	30 30	30	30	30	30	30
M2-8:2 FTS	8.3 -9.4	-0.2	6.7	3.0	1.1	-9.5	30 30	30	30	30	30	30
13C8 FOSA	7.6 -4.6	1.8	4.5	-0.6	-6.8	-1.9	30 30	30	30	30	30	30
d3-NMeFOSAA	3.4 -2.3	0.3	5.1	-3.6	0.6	-3.6	30 30	30	30	30	30	30
13C7 PFUnA	-0.6 -7.3	5.9	5.8	0.2	0.7	-4.7	30 30	30	30	30	30	30
d5-NEtFOSAA	3.5 -7.1	1.7	7.0	-0.7	-0.6	-3.9	30 30	30	30	30	30	30
13C2-PFDoDA	2.3 -7.6	3.0	6.8	0.2	-0.4	-4.3	30 30	30	30	30	30	30
d7-N-MeFOSE-M	6.8 -4.5	3.0	3.6	-2.1	-1.9	-5.0	30 30	30	30	30	30	30
d3-NMePFOSA	1.1 2.0	-1.2	1.8	-4.7	1.1	-0.1	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
d9-N-EtFOSE-M	7.0 -5.4	1.7	7.2	-1.6	-0.9	-8.0	30 30	30	30	30	30	30
d5-NEtPFOSA	3.1 -4.0	-0.4	2.7	-0.7	2.7	-3.4	30 30	30	30	30	30	30
13C2 PFTeDA	2.0 -6.0	4.0	6.6	0.1	-1.6	-5.0	30 30	30	30	30	30	30

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: CCV 410-22577/89 Calibration Date: 07/15/2020 03:23

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL14-127.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8900		21.9	20.0	9.5	30.0
Perfluoropentanoic acid	LID1F		0.8844		19.7	20.0	-1.3	30.0
Perfluorobutanesulfonic acid	LID1F		1.043		18.3	17.7	3.3	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		1.846		20.6	18.7	10.4	30.0
Perfluorohexanoic acid	LID1F		0.7813		21.3	20.0	6.7	30.0
Perfluoropentanesulfonic acid	LID1F		0.4765		19.3	18.8	2.8	30.0
HFPODA	LID1F		2.097		18.5	20.0	-7.4	30.0
Perfluoroheptanoic acid	LID1F		1.288		22.6	20.0	13.1	30.0
Perfluorohexanesulfonic acid	LID1F		1.029		19.0	18.2	4.4	30.0
DONA	LID1F		1.488		21.5	18.9	13.7	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		1.770		21.1	19.0	11.4	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9216		20.0	19.0	5.1	30.0
Perfluorooctanoic acid	LID1F		0.7806		22.4	20.0	11.8	30.0
Perfluorooctanesulfonic acid	LID1F		1.076		19.4	18.5	4.6	30.0
Perfluorononanoic acid	LID1F		0.8876		21.0	20.0	4.9	30.0
9Cl-PF3ONS	LID1F		2.333		19.3	18.6	3.7	30.0
Perfluorononanesulfonic acid	LID1F		0.7054		20.8	19.2	8.3	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		1.679		20.2	19.2	5.5	30.0
Perfluorodecanoic acid	LID1F		0.5489		19.6	20.0	-1.8	30.0
Perfluorooctanesulfonamide	LID1F		1.028		21.4	20.0	6.9	30.0
NMeFOSAA	LID1F		0.9593		20.1	20.0	0.6	30.0
Perfluorodecanesulfonic acid	LID1F		0.5614		21.0	19.3	9.0	30.0
Perfluoroundecanoic acid	LID1F		0.5472		22.4	20.0	12.1	30.0
NEtFOSAA	LID1F		1.035		21.8	20.0	9.1	30.0
11Cl-PF3OUdS	LID1F		1.864		19.2	18.6	3.5	30.0
Perfluorododecanoic acid	LID1F		0.5827		21.2	20.0	6.1	30.0
10:2 FTS	LID1F		2.006		21.0	19.3	9.0	30.0
NMeFOSE	LID1F		0.9698		20.7	20.0	3.5	30.0
NMeFOSA	LID1F		1.066		20.2	20.0	1.1	30.0
Perfluorododecanesulfonic acid	LID1F		0.2641		20.2	19.4	4.4	30.0
Perfluorotridecanoic acid	LID1F		0.7961		21.8	20.0	9.0	30.0
NEtFOSE	LID1F		0.7612		20.3	20.0	1.6	30.0
NEtFOSA	LID1F		1.031		21.0	20.0	4.8	30.0
Perfluorotetradecanoic acid	LID1F		1.004		22.6	20.0	13.0	30.0
Perfluorohexadecanoic acid	LID1F		0.4882		18.9	20.0	-5.5	30.0
Perfluorooctadecanoic acid	LID1F		0.4337		18.0	20.0	-10.2	30.0
13C4 PFBA	Ave	1.110	1.062		9.57	10.0	-4.3	30.0
13C5 PFPeA	Ave	0.8798	0.8775		9.97	10.0	-0.3	30.0

FORM VII EPA 537 (Mod)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: CCV 410-22577/89 Calibration Date: 07/15/2020 03:23

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL14-127.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.4382	0.4270		9.12	9.36	-2.6	30.0
M2-4:2 FTS	Ave	0.0956	0.0964		9.42	9.34	0.8	30.0
13C5 PFHxA	Ave	1.443	1.515		10.5	10.0	5.0	30.0
13C3 HFPO-DA	Ave	0.2830	0.3308		11.7	10.0	16.9	30.0
13C4 PFHpA	Ave	1.058	1.097		10.4	10.0	3.7	30.0
13C3 PFHxS	Ave	0.4556	0.4753		9.87	9.46	4.3	30.0
M2-6:2 FTS	Ave	0.0785	0.0708		8.57	9.50	-9.8	30.0
13C8 PFOA	Ave	1.373	1.333		9.71	10.0	-2.9	30.0
13C8 PFOS	Ave	1.014	0.9678		9.13	9.57	-4.5	30.0
13C9 PFNA	Ave	2.195	2.067		9.42	10.0	-5.8	30.0
13C6 PFDA	Ave	1.629	1.587		9.74	10.0	-2.6	30.0
M2-8:2 FTS	Ave	0.1121	0.1008		8.61	9.58	-10.1	30.0
13C8 FOSA	Ave	1.193	1.286		10.8	10.0	7.8	30.0
d3-NMeFOSAA	Ave	0.3112	0.3703		11.9	10.0	19.0	30.0
13C7 PFUnA	Ave	1.490	1.466		9.84	10.0	-1.6	30.0
d5-NEtFOSAA	Ave	0.2452	0.2629		10.7	10.0	7.2	30.0
13C2-PFDoDA	Ave	1.816	1.855		10.2	10.0	2.1	30.0
d7-N-MeFOSE-M	Ave	0.2323	0.2367		10.2	10.0	1.9	30.0
d3-NMePFOSA	Ave	0.1221	0.1200		9.83	10.0	-1.7	30.0
d9-N-EtFOSE-M	Ave	0.2364	0.2388		10.1	10.0	1.0	30.0
d5-NEtPFOSA	Ave	0.0999	0.1056		10.6	10.0	5.8	30.0
13C2 PFTeDA	Ave	1.429	1.620		11.3	10.0	13.4	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: CCV 410-22577/92 Calibration Date: 07/15/2020 03:50

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL14-130.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8468		2.08	2.00	4.2	30.0
Perfluoropentanoic acid	LID1F		0.9568		2.14	2.00	6.8	30.0
Perfluorobutanesulfonic acid	LID1F		1.028		1.80	1.77	1.8	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		1.858		2.08	1.87	11.2	30.0
Perfluorohexanoic acid	LID1F		0.8033		2.19	2.00	9.7	30.0
Perfluoropentanesulfonic acid	LID1F		0.4504		1.82	1.88	-2.9	30.0
HFPODA	LID1F		2.314		2.04	2.00	2.2	30.0
Perfluoroheptanoic acid	LID1F		1.302		2.29	2.00	14.3	30.0
Perfluorohexanesulfonic acid	LID1F		0.9915		1.83	1.82	0.6	30.0
DONA	LID1F		1.442		2.08	1.89	10.1	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		1.650		1.97	1.90	3.9	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8744		1.90	1.90	-0.3	30.0
Perfluorooctanoic acid	LID1F		0.7303		2.09	2.00	4.6	30.0
Perfluorooctanesulfonic acid	LID1F		0.9676		1.74	1.85	-6.0	30.0
Perfluorononanoic acid	LID1F		0.8147		1.92	2.00	-3.8	30.0
9Cl-PF3ONS	LID1F		2.149		1.78	1.86	-4.5	30.0
Perfluorononanesulfonic acid	LID1F		0.6594		1.94	1.92	1.2	30.0
Perfluorodecanoic acid	LID1F		0.5357		1.92	2.00	-4.1	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		1.537		1.85	1.92	-3.4	30.0
Perfluorooctanesulfonamide	LID1F		1.022		2.12	2.00	6.2	30.0
NMeFOSAA	LID1F		0.8833		1.85	2.00	-7.4	30.0
Perfluorodecanesulfonic acid	LID1F		0.5627		2.11	1.93	9.3	30.0
Perfluoroundecanoic acid	LID1F		0.5489		2.25	2.00	12.5	30.0
NEtFOSAA	LID1F		1.024		2.16	2.00	7.9	30.0
11Cl-PF3OUdS	LID1F		1.763		1.82	1.86	-2.2	30.0
Perfluorododecanoic acid	LID1F		0.6215		2.26	2.00	13.2	30.0
10:2 FTS	LID1F		2.258		2.37	1.93	22.7	30.0
NMeFOSE	LID1F		0.9726		2.08	2.00	3.8	30.0
NMeFOSA	LID1F		1.078		2.05	2.00	2.3	30.0
Perfluorododecanesulfonic acid	LID1F		0.2247		1.72	1.94	-11.2	30.0
NEtFOSE	LID1F		0.7776		2.08	2.00	3.8	30.0
Perfluorotridecanoic acid	LID1F		0.8635		2.36	2.00	18.2	30.0
NEtFOSA	LID1F		1.031		2.09	2.00	4.7	30.0
Perfluorotetradecanoic acid	LID1F		0.9290		2.09	2.00	4.6	30.0
Perfluorohexadecanoic acid	LID1F		0.4563		1.77	2.00	-11.6	30.0
Perfluorooctadecanoic acid	LID1F		0.3774		1.56	2.00	-21.9	30.0
13C4 PFBA	Ave	1.110	1.154		10.4	10.0	4.0	30.0
13C5 PFPeA	Ave	0.8798	0.8617		9.79	10.0	-2.1	30.0

FORM VII EPA 537 (Mod)

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: CCV 410-22577/92 Calibration Date: 07/15/2020 03:50

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL14-130.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.4382	0.4408		9.42	9.36	0.6	30.0
M2-4:2 FTS	Ave	0.0956	0.0907		8.86	9.34	-5.1	30.0
13C5 PFHxA	Ave	1.443	1.519		10.5	10.0	5.2	30.0
13C3 HFPO-DA	Ave	0.2830	0.2901		10.3	10.0	2.5	30.0
13C4 PFHpA	Ave	1.058	1.094		10.3	10.0	3.4	30.0
13C3 PFHxS	Ave	0.4556	0.4952		10.3	9.46	8.7	30.0
M2-6:2 FTS	Ave	0.0785	0.0800		9.68	9.50	1.9	30.0
13C8 PFOA	Ave	1.373	1.419		10.3	10.0	3.3	30.0
13C8 PFOS	Ave	1.014	0.9934		9.37	9.57	-2.0	30.0
13C9 PFNA	Ave	2.195	2.153		9.81	10.0	-1.9	30.0
13C6 PFDA	Ave	1.629	1.603		9.84	10.0	-1.6	30.0
M2-8:2 FTS	Ave	0.1121	0.1145		9.78	9.58	2.1	30.0
13C8 FOSA	Ave	1.193	1.297		10.9	10.0	8.7	30.0
d3-NMeFOSAA	Ave	0.3112	0.3939		12.7	10.0	26.6	30.0
13C7 PFUnA	Ave	1.490	1.543		10.4	10.0	3.5	30.0
d5-NEtFOSAA	Ave	0.2452	0.2688		11.0	10.0	9.6	30.0
13C2-PFDoDA	Ave	1.816	1.849		10.2	10.0	1.8	30.0
d7-N-MeFOSE-M	Ave	0.2323	0.2299		9.89	10.0	-1.1	30.0
d3-NMePFOSA	Ave	0.1221	0.1176		9.63	10.0	-3.7	30.0
d9-N-EtFOSE-M	Ave	0.2364	0.2445		10.3	10.0	3.4	30.0
d5-NEtPFOSA	Ave	0.0999	0.1022		10.2	10.0	2.3	30.0
13C2 PFTeDA	Ave	1.429	1.799		12.6	10.0	26.0	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: ICV 410-20482/9 Calibration Date: 07/09/2020 11:26

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09MCAL-17.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8868		2.15	2.00	7.4	30.0
Perfluoropentanoic acid	LID1F		1.006		2.14	2.00	7.1	30.0
Perfluorobutanesulfonic acid	LID1F		1.018		1.79	1.77	1.1	30.0
Perfluorohexanoic acid	LID1F		0.8083		2.07	2.00	3.5	30.0
HFPODA	LID1F		2.602		2.04	2.00	2.2	30.0
Perfluoroheptanoic acid	LID1F		1.110		2.15	2.00	7.3	30.0
Perfluorohexanesulfonic acid	LID1F		1.019		1.92	1.89	1.3	30.0
DONA	LID1F		1.450		1.87	1.88	-0.6	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9191		1.96	1.90	2.9	30.0
Perfluorooctanoic acid	LID1F		0.8632		2.05	2.00	2.3	30.0
Perfluorooctanesulfonic acid	LID1F		0.9279		1.73	1.91	-9.4	30.0
Perfluorononanoic acid	LID1F		0.8496		2.03	2.00	1.4	30.0
9Cl-PF3ONS	LID1F		1.689		1.90	1.86	1.9	30.0
Perfluorodecanoic acid	LID1F		0.8204		1.98	2.00	-1.0	30.0
NMeFOSAA	LID1F		1.003		2.04	2.00	1.9	30.0
Perfluorodecanesulfonic acid	LID1F		0.9664		2.07	1.93	7.4	30.0
Perfluoroundecanoic acid	LID1F		0.8224		2.07	2.00	3.7	30.0
NEtFOSAA	LID1F		0.9614		2.08	2.00	4.0	30.0
11Cl-PF3OUdS	LID1F		1.309		1.87	1.88	-0.5	30.0
Perfluorododecanoic acid	LID1F		0.8947		2.07	2.00	3.7	30.0
Perfluorotridecanoic acid	LID1F		0.8186		2.11	2.00	5.4	30.0
Perfluorotetradecanoic acid	LID1F		0.8561		2.03	2.00	1.4	30.0
13C4 PFBA	Ave	1.092	1.000		9.15	10.0	-8.5	30.0
13C5 PFPeA	Ave	0.9016	0.8521		9.45	10.0	-5.5	30.0
13C3 PFBS	Ave	0.7001	0.6518		8.71	9.36	-6.9	30.0
M2-4:2 FTS	Ave	0.0495	0.0470		8.85	9.34	-5.2	30.0
13C5 PFHxA	Ave	0.8606	0.8070		9.38	10.0	-6.2	30.0
13C3 HFPO-DA	Ave	0.1062	0.0949		8.94	10.0	-10.6	30.0
13C4 PFHpA	Ave	0.9047	0.8106		8.96	10.0	-10.4	30.0
13C3 PFHxS	Ave	0.5384	0.4807		8.44	9.46	-10.7	30.0
M2-6:2 FTS	Ave	0.0256	0.0240		8.90	9.50	-6.3	30.0
13C8 PFOA	Ave	0.9813	0.9018		9.19	10.0	-8.1	30.0
13C8 PFOS	Ave	1.008	0.9218		8.75	9.57	-8.6	30.0
13C9 PFNA	Ave	1.723	1.578		9.16	10.0	-8.4	30.0
13C6 PFDA	Ave	1.105	1.040		9.42	10.0	-5.8	30.0
M2-8:2 FTS	Ave	0.0168	0.0163		9.27	9.58	-3.2	30.0
13C8 FOSA	Ave	0.9199	0.8850		9.62	10.0	-3.8	30.0
d3-NMeFOSAA	Ave	0.3098	0.3078		9.94	10.0	-0.6	30.0
13C7 PFUnA	Ave	1.113	1.030		9.26	10.0	-7.4	30.0
d5-NEtFOSAA	Ave	0.2737	0.2636		9.63	10.0	-3.7	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: ICV 410-20482/9 Calibration Date: 07/09/2020 11:26

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09MCAL-17.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C2-PFDoDA	Ave	0.7781	0.7476		9.61	10.0	-3.9	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1708		9.50	10.0	-5.0	30.0
d3-NMePFOSA	Ave	0.1118	0.1054		9.43	10.0	-5.7	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.1962		9.87	10.0	-1.3	30.0
d5-NEtPFOSA	Ave	0.1114	0.1093		9.82	10.0	-1.8	30.0
13C2 PFTeDA	Ave	0.8227	0.7669		9.32	10.0	-6.8	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: CCV 410-20936/23 Calibration Date: 07/09/2020 16:28

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-25.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8077		7.83	8.00	-2.2	30.0
Perfluoropentanoic acid	LID1F		0.9412		8.02	8.00	0.2	30.0
Perfluorobutanesulfonic acid	LID1F		0.9441		6.64	7.08	-6.3	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.238		7.25	7.47	-3.0	30.0
Perfluorohexanoic acid	LID1F		0.7484		7.67	8.00	-4.1	30.0
Perfluoropentanesulfonic acid	LID1F		0.8612		7.42	7.50	-1.1	30.0
HFPODA	LID1F		2.499		7.85	8.00	-1.8	30.0
Perfluoroheptanoic acid	LID1F		1.041		8.05	8.00	0.7	30.0
Perfluorohexanesulfonic acid	LID1F		0.9682		7.02	7.30	-3.7	30.0
DONA	LID1F		1.415		7.33	7.56	-3.0	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.210		8.25	7.58	8.8	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8625		7.35	7.62	-3.5	30.0
Perfluorooctanoic acid	LID1F		0.8401		7.96	8.00	-0.5	30.0
Perfluorooctanesulfonic acid	LID1F		1.000		7.23	7.40	-2.3	30.0
Perfluorononanoic acid	LID1F		0.8299		7.92	8.00	-1.0	30.0
9Cl-PF3ONS	LID1F		1.635		7.34	7.44	-1.3	30.0
Perfluorononanesulfonic acid	LID1F		0.8837		7.79	7.68	1.4	30.0
Perfluorodecanoic acid	LID1F		0.7763		7.49	8.00	-6.4	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		8.150		7.87	7.66	2.7	30.0
Perfluorooctanesulfonamide	LID1F		0.996		7.91	8.00	-1.1	30.0
NMeFOSAA	LID1F		0.9585		7.79	8.00	-2.6	30.0
Perfluorodecanesulfonic acid	LID1F		0.8740		7.49	7.71	-2.8	30.0
Perfluoroundecanoic acid	LID1F		0.7622		7.69	8.00	-3.9	30.0
NEtFOSAA	LID1F		0.8936		7.74	8.00	-3.3	30.0
11Cl-PF3OUdS	LID1F		1.308		7.39	7.44	-0.6	30.0
Perfluorododecanoic acid	LID1F		0.9014		8.36	8.00	4.5	30.0
10:2 FTS	LID1F		6.877		8.10	7.71	5.1	30.0
NMeFOSE	LID1F		0.9737		7.69	8.00	-3.8	30.0
NMeFOSA	LID1F		1.058		8.15	8.00	1.8	30.0
Perfluorododecanesulfonic acid	LID1F		0.8784		7.90	7.74	2.0	30.0
NEtFOSE	LID1F		1.024		8.09	8.00	1.1	30.0
Perfluorotridecanoic acid	LID1F		0.8364		8.61	8.00	7.7	30.0
NEtFOSA	LID1F		0.9825		7.62	8.00	-4.7	30.0
Perfluorotetradecanoic acid	LID1F		0.8546		8.10	8.00	1.2	30.0
Perfluorohexadecanoic acid	LID1F		0.6989		8.20	8.00	2.5	30.0
Perfluorooctadecanoic acid	LID1F		0.3441		8.03	8.00	0.4	30.0
13C4 PFBA	Ave	1.092	1.108		10.2	10.0	1.5	30.0
13C5 PFPeA	Ave	0.9016	0.9581		10.6	10.0	6.3	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: CCV 410-20936/23 Calibration Date: 07/09/2020 16:28

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-25.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.7001	0.7256		9.70	9.36	3.7	30.0
M2-4:2 FTS	Ave	0.0495	0.0490		9.24	9.34	-1.0	30.0
13C5 PFHxA	Ave	0.8606	0.8720		10.1	10.0	1.3	30.0
13C3 HFPO-DA	Ave	0.1062	0.0976		9.19	10.0	-8.1	30.0
13C3 PFHxS	Ave	0.5384	0.5166		9.08	9.46	-4.1	30.0
13C4 PFHpA	Ave	0.9047	0.9041		9.99	10.0	-0.0	30.0
M2-6:2 FTS	Ave	0.0256	0.0246		9.13	9.50	-3.9	30.0
13C8 PFOA	Ave	0.9813	0.9652		9.84	10.0	-1.6	30.0
13C8 PFOS	Ave	1.008	0.9701		9.20	9.57	-3.8	30.0
13C9 PFNA	Ave	1.723	1.745		10.1	10.0	1.3	30.0
13C6 PFDA	Ave	1.105	1.133		10.3	10.0	2.5	30.0
M2-8:2 FTS	Ave	0.0168	0.0162		9.24	9.58	-3.5	30.0
13C8 FOSA	Ave	0.9199	0.9119		9.91	10.0	-0.9	30.0
d3-NMeFOSAA	Ave	0.3098	0.3089		9.97	10.0	-0.3	30.0
13C7 PFUnA	Ave	1.113	1.138		10.2	10.0	2.3	30.0
d5-NEtFOSAA	Ave	0.2737	0.2772		10.1	10.0	1.3	30.0
13C2-PFDoDA	Ave	0.7781	0.7694		9.89	10.0	-1.1	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1770		9.85	10.0	-1.5	30.0
d3-NMePFOSA	Ave	0.1118	0.1052		9.41	10.0	-5.9	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.1958		9.85	10.0	-1.5	30.0
d5-NEtPFOSA	Ave	0.1114	0.1082		9.72	10.0	-2.8	30.0
13C2 PFTeDA	Ave	0.8227	0.8365		10.2	10.0	1.7	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: CCV 410-20936/37 Calibration Date: 07/09/2020 18:35

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-39.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8799		21.3	20.0	6.6	30.0
Perfluoropentanoic acid	LID1F		1.001		21.3	20.0	6.6	30.0
Perfluorobutanesulfonic acid	LID1F		1.046		18.4	17.7	3.9	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.568		20.0	18.7	6.9	30.0
Perfluorohexanoic acid	LID1F		0.7765		19.9	20.0	-0.5	30.0
Perfluoropentanesulfonic acid	LID1F		0.9262		19.9	18.8	6.3	30.0
HFPODA	LID1F		2.616		20.6	20.0	2.8	30.0
Perfluoroheptanoic acid	LID1F		1.082		20.9	20.0	4.7	30.0
Perfluorohexanesulfonic acid	LID1F		1.029		18.7	18.2	2.3	30.0
DONA	LID1F		1.533		19.9	18.9	5.0	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.040		20.0	19.0	5.3	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9392		20.0	19.0	5.1	30.0
Perfluorooctanoic acid	LID1F		0.8984		21.3	20.0	6.4	30.0
Perfluorooctanesulfonic acid	LID1F		1.060		19.2	18.5	3.5	30.0
Perfluorononanoic acid	LID1F		0.8239		19.7	20.0	-1.7	30.0
9Cl-PF3ONS	LID1F		1.807		20.3	18.6	9.1	30.0
Perfluorononanesulfonic acid	LID1F		0.9446		20.8	19.2	8.4	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		8.934		21.6	19.2	12.5	30.0
Perfluorodecanoic acid	LID1F		0.8652		20.9	20.0	4.4	30.0
Perfluorooctanesulfonamide	LID1F		1.079		21.4	20.0	7.2	30.0
NMeFOSAA	LID1F		0.999		20.3	20.0	1.5	30.0
Perfluorodecanesulfonic acid	LID1F		0.9599		20.6	19.3	6.7	30.0
Perfluoroundecanoic acid	LID1F		0.8456		21.3	20.0	6.6	30.0
NEtFOSAA	LID1F		0.9890		21.4	20.0	7.0	30.0
11Cl-PF3OUdS	LID1F		1.466		20.7	18.6	11.4	30.0
Perfluorododecanoic acid	LID1F		0.9047		21.0	20.0	4.9	30.0
10:2 FTS	LID1F		6.998		20.6	19.3	6.9	30.0
NMeFOSA	LID1F		1.088		21.0	20.0	4.8	30.0
NMeFOSE	LID1F		1.014		20.0	20.0	0.1	30.0
Perfluorododecanesulfonic acid	LID1F		0.9483		21.3	19.4	10.1	30.0
NEtFOSE	LID1F		1.054		20.8	20.0	4.0	30.0
Perfluorotridecanoic acid	LID1F		0.8480		21.8	20.0	9.1	30.0
NEtFOSA	LID1F		1.060		20.6	20.0	2.8	30.0
Perfluorotetradecanoic acid	LID1F		0.8920		21.1	20.0	5.6	30.0
Perfluorohexadecanoic acid	LID1F		0.7143		21.0	20.0	4.8	30.0
Perfluorooctadecanoic acid	LID1F		0.3595		21.0	20.0	4.9	30.0
13C4 PFBA	Ave	1.092	1.069		9.79	10.0	-2.1	30.0
13C5 PFPeA	Ave	0.9016	0.9344		10.4	10.0	3.6	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: CCV 410-20936/37 Calibration Date: 07/09/2020 18:35

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-39.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.7001	0.7026		9.39	9.36	0.4	30.0
M2-4:2 FTS	Ave	0.0495	0.0492		9.27	9.34	-0.7	30.0
13C5 PFHxA	Ave	0.8606	0.8669		10.1	10.0	0.7	30.0
13C3 HFPO-DA	Ave	0.1062	0.0989		9.31	10.0	-6.9	30.0
13C3 PFHxS	Ave	0.5384	0.5172		9.09	9.46	-3.9	30.0
13C4 PFHpA	Ave	0.9047	0.8956		9.90	10.0	-1.0	30.0
M2-6:2 FTS	Ave	0.0256	0.0259		9.61	9.50	1.1	30.0
13C8 PFOA	Ave	0.9813	0.9716		9.90	10.0	-1.0	30.0
13C8 PFOS	Ave	1.008	0.9746		9.25	9.57	-3.3	30.0
13C9 PFNA	Ave	1.723	1.773		10.3	10.0	2.9	30.0
13C6 PFDA	Ave	1.105	1.082		9.79	10.0	-2.1	30.0
M2-8:2 FTS	Ave	0.0168	0.0153		8.73	9.58	-8.9	30.0
13C8 FOSA	Ave	0.9199	0.8800		9.57	10.0	-4.3	30.0
d3-NMeFOSAA	Ave	0.3098	0.3158		10.2	10.0	1.9	30.0
13C7 PFUnA	Ave	1.113	1.103		9.92	10.0	-0.8	30.0
d5-NEtFOSAA	Ave	0.2737	0.2715		9.92	10.0	-0.8	30.0
13C2-PFDoDA	Ave	0.7781	0.7683		9.87	10.0	-1.3	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1814		10.1	10.0	0.9	30.0
d3-NMePFOSA	Ave	0.1118	0.1087		9.73	10.0	-2.7	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.1981		9.97	10.0	-0.3	30.0
d5-NEtPFOSA	Ave	0.1114	0.1071		9.62	10.0	-3.8	30.0
13C2 PFTeDA	Ave	0.8227	0.8301		10.1	10.0	0.9	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: CCV 410-20936/45 Calibration Date: 07/09/2020 19:49

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-47.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8323		2.02	2.00	0.8	30.0
Perfluoropentanoic acid	LID1F		0.9615		2.05	2.00	2.4	30.0
Perfluorobutanesulfonic acid	LID1F		0.9807		1.72	1.77	-2.6	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.432		1.92	1.87	2.8	30.0
Perfluorohexanoic acid	LID1F		0.7805		2.00	2.00	-0.0	30.0
Perfluoropentanesulfonic acid	LID1F		0.9245		1.99	1.88	6.1	30.0
HFPODA	LID1F		2.566		2.02	2.00	0.8	30.0
Perfluoroheptanoic acid	LID1F		1.074		2.08	2.00	3.9	30.0
Perfluorohexanesulfonic acid	LID1F		0.9789		1.78	1.82	-2.7	30.0
DONA	LID1F		1.433		1.86	1.89	-1.8	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.325		2.11	1.90	11.2	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8873		1.89	1.90	-0.7	30.0
Perfluorooctanoic acid	LID1F		0.9313		2.21	2.00	10.3	30.0
Perfluorooctanesulfonic acid	LID1F		1.030		1.86	1.85	0.6	30.0
Perfluorononanoic acid	LID1F		0.8635		2.06	2.00	3.0	30.0
9Cl-PF3ONS	LID1F		1.697		1.91	1.86	2.4	30.0
Perfluorononanesulfonic acid	LID1F		0.9021		1.99	1.92	3.5	30.0
Perfluorodecanoic acid	LID1F		0.8442		2.04	2.00	1.8	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		8.376		2.02	1.92	5.5	30.0
Perfluorooctanesulfonamide	LID1F		1.010		2.01	2.00	0.4	30.0
NMeFOSAA	LID1F		0.9664		1.96	2.00	-1.8	30.0
Perfluorodecanesulfonic acid	LID1F		0.9096		1.95	1.93	1.1	30.0
Perfluoroundecanoic acid	LID1F		0.7758		1.96	2.00	-2.2	30.0
NEtFOSAA	LID1F		0.9239		2.00	2.00	-0.0	30.0
11Cl-PF3OUdS	LID1F		1.348		1.90	1.86	2.4	30.0
Perfluorododecanoic acid	LID1F		0.9176		2.13	2.00	6.4	30.0
10:2 FTS	LID1F		6.889		2.03	1.93	5.2	30.0
NMeFOSA	LID1F		1.083		2.09	2.00	4.3	30.0
NMeFOSE	LID1F		1.005		1.98	2.00	-0.8	30.0
Perfluorododecanesulfonic acid	LID1F		0.8912		2.00	1.94	3.4	30.0
NEtFOSE	LID1F		1.010		1.99	2.00	-0.4	30.0
Perfluorotridecanoic acid	LID1F		0.8606		2.22	2.00	10.8	30.0
NEtFOSA	LID1F		1.001		1.94	2.00	-2.9	30.0
Perfluorotetradecanoic acid	LID1F		0.8565		2.03	2.00	1.4	30.0
Perfluorohexadecanoic acid	LID1F		0.6967		2.04	2.00	2.2	30.0
Perfluorooctadecanoic acid	LID1F		0.3381		1.97	2.00	-1.3	30.0
13C4 PFBA	Ave	1.092	1.135		10.4	10.0	3.9	30.0
13C5 PFPeA	Ave	0.9016	0.9217		10.2	10.0	2.2	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: CCV 410-20936/45 Calibration Date: 07/09/2020 19:49

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09-47.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.7001	0.6693		8.95	9.36	-4.4	30.0
M2-4:2 FTS	Ave	0.0495	0.0513		9.66	9.34	3.5	30.0
13C5 PFHxA	Ave	0.8606	0.8746		10.2	10.0	1.6	30.0
13C3 HFPO-DA	Ave	0.1062	0.1007		9.48	10.0	-5.2	30.0
13C3 PFHxS	Ave	0.5384	0.5382		9.46	9.46	-0.0	30.0
13C4 PFHpA	Ave	0.9047	0.9389		10.4	10.0	3.8	30.0
M2-6:2 FTS	Ave	0.0256	0.0266		9.85	9.50	3.6	30.0
13C8 PFOA	Ave	0.9813	0.9744		9.93	10.0	-0.7	30.0
13C8 PFOS	Ave	1.008	1.034		9.81	9.57	2.5	30.0
13C9 PFNA	Ave	1.723	1.806		10.5	10.0	4.9	30.0
13C6 PFDA	Ave	1.105	1.183		10.7	10.0	7.1	30.0
M2-8:2 FTS	Ave	0.0168	0.0170		9.69	9.58	1.1	30.0
13C8 FOSA	Ave	0.9199	0.9595		10.4	10.0	4.3	30.0
d3-NMeFOSAA	Ave	0.3098	0.3254		10.5	10.0	5.0	30.0
13C7 PFUnA	Ave	1.113	1.243		11.2	10.0	11.7	30.0
d5-NEtFOSAA	Ave	0.2737	0.2975		10.9	10.0	8.7	30.0
13C2-PFDoDA	Ave	0.7781	0.7990		10.3	10.0	2.7	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1889		10.5	10.0	5.1	30.0
d3-NMePFOSA	Ave	0.1118	0.1127		10.1	10.0	0.8	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.2122		10.7	10.0	6.8	30.0
d5-NEtPFOSA	Ave	0.1114	0.1139		10.2	10.0	2.3	30.0
13C2 PFTeDA	Ave	0.8227	0.8808		10.7	10.0	7.1	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: CCV 410-21758/40 Calibration Date: 07/13/2020 18:38

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL13-44.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8260		8.00	8.00	0.0	30.0
Perfluoropentanoic acid	LID1F		0.9282		7.90	8.00	-1.2	30.0
Perfluorobutanesulfonic acid	LID1F		0.9414		6.62	7.08	-6.5	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.281		7.34	7.47	-1.7	30.0
Perfluorohexanoic acid	LID1F		0.7454		7.64	8.00	-4.5	30.0
Perfluoropentanesulfonic acid	LID1F		0.8458		7.29	7.50	-2.9	30.0
HFPODA	LID1F		2.577		8.10	8.00	1.3	30.0
Perfluoroheptanoic acid	LID1F		1.102		8.52	8.00	6.5	30.0
Perfluorohexanesulfonic acid	LID1F		0.9397		6.82	7.30	-6.6	30.0
DONA	LID1F		1.417		7.34	7.56	-2.9	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.090		8.06	7.58	6.3	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8244		7.03	7.62	-7.7	30.0
Perfluorooctanoic acid	LID1F		0.9041		8.57	8.00	7.1	30.0
Perfluorooctanesulfonic acid	LID1F		0.9720		7.03	7.40	-5.1	30.0
Perfluorononanoic acid	LID1F		0.7889		7.53	8.00	-5.9	30.0
9Cl-PF3ONS	LID1F		1.636		7.35	7.44	-1.2	30.0
Perfluorononanesulfonic acid	LID1F		0.8827		7.78	7.68	1.3	30.0
Perfluorodecanoic acid	LID1F		0.8007		7.73	8.00	-3.4	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		7.500		7.24	7.66	-5.5	30.0
Perfluorooctanesulfonamide	LID1F		0.9867		7.84	8.00	-2.0	30.0
NMeFOSAA	LID1F		0.9607		7.81	8.00	-2.4	30.0
Perfluorodecanesulfonic acid	LID1F		0.9019		7.73	7.71	0.3	30.0
Perfluoroundecanoic acid	LID1F		0.7644		7.71	8.00	-3.6	30.0
NEtFOSAA	LID1F		0.8485		7.35	8.00	-8.2	30.0
11Cl-PF3OUdS	LID1F		1.365		7.71	7.44	3.7	30.0
Perfluorododecanoic acid	LID1F		0.9304		8.63	8.00	7.8	30.0
10:2 FTS	LID1F		6.623		7.80	7.71	1.2	30.0
NMeFOSA	LID1F		0.9672		7.45	8.00	-6.9	30.0
NMeFOSE	LID1F		0.9873		7.80	8.00	-2.5	30.0
Perfluorododecanesulfonic acid	LID1F		0.8993		8.08	7.74	4.4	30.0
NEtFOSE	LID1F		0.9862		7.79	8.00	-2.7	30.0
Perfluorotridecanoic acid	LID1F		0.8207		8.45	8.00	5.6	30.0
NEtFOSA	LID1F		0.9706		7.53	8.00	-5.9	30.0
Perfluorotetradecanoic acid	LID1F		0.8403		7.96	8.00	-0.5	30.0
Perfluorohexadecanoic acid	LID1F		0.6843		8.03	8.00	0.3	30.0
Perfluorooctadecanoic acid	LID1F		0.3356		7.84	8.00	-2.0	30.0
13C4 PFBA	Ave	1.092	1.107		10.1	10.0	1.3	30.0
13C5 PFPeA	Ave	0.9016	0.9635		10.7	10.0	6.9	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: CCV 410-21758/40 Calibration Date: 07/13/2020 18:38

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL13-44.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.7001	0.7162		9.58	9.36	2.3	30.0
M2-4:2 FTS	Ave	0.0495	0.0483		9.11	9.34	-2.4	30.0
13C5 PFHxA	Ave	0.8606	0.8815		10.2	10.0	2.4	30.0
13C3 HFPO-DA	Ave	0.1062	0.0997		9.39	10.0	-6.1	30.0
13C3 PFHxS	Ave	0.5384	0.5437		9.55	9.46	1.0	30.0
13C4 PFHpA	Ave	0.9047	0.9161		10.1	10.0	1.3	30.0
M2-6:2 FTS	Ave	0.0256	0.0250		9.28	9.50	-2.3	30.0
13C8 PFOA	Ave	0.9813	0.9437		9.62	10.0	-3.8	30.0
13C8 PFOS	Ave	1.008	1.007		9.55	9.57	-0.1	30.0
13C9 PFNA	Ave	1.723	1.807		10.5	10.0	4.9	30.0
13C6 PFDA	Ave	1.105	1.116		10.1	10.0	1.0	30.0
M2-8:2 FTS	Ave	0.0168	0.0164		9.34	9.58	-2.5	30.0
13C8 FOSA	Ave	0.9199	0.9015		9.80	10.0	-2.0	30.0
d3-NMeFOSAA	Ave	0.3098	0.3104		10.0	10.0	0.2	30.0
13C7 PFUnA	Ave	1.113	1.125		10.1	10.0	1.1	30.0
d5-NEtFOSAA	Ave	0.2737	0.2896		10.6	10.0	5.8	30.0
13C2-PFDoDA	Ave	0.7781	0.7939		10.2	10.0	2.0	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1857		10.3	10.0	3.3	30.0
d3-NMePFOSA	Ave	0.1118	0.1137		10.2	10.0	1.7	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.2023		10.2	10.0	1.8	30.0
d5-NEtPFOSA	Ave	0.1114	0.1133		10.2	10.0	1.7	30.0
13C2 PFTeDA	Ave	0.8227	0.8623		10.5	10.0	4.8	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: CCV 410-21758/51 Calibration Date: 07/13/2020 20:18

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL13-55.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8782		21.3	20.0	6.4	30.0
Perfluoropentanoic acid	LID1F		0.9839		20.9	20.0	4.7	30.0
Perfluorobutanesulfonic acid	LID1F		1.024		18.0	17.7	1.7	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.511		19.6	18.7	5.2	30.0
Perfluorohexanoic acid	LID1F		0.7981		20.4	20.0	2.2	30.0
Perfluoropentanesulfonic acid	LID1F		0.9344		20.1	18.8	7.3	30.0
HFPODA	LID1F		2.551		20.0	20.0	0.2	30.0
Perfluoroheptanoic acid	LID1F		1.108		21.4	20.0	7.2	30.0
Perfluorohexanesulfonic acid	LID1F		1.053		19.1	18.2	4.7	30.0
DONA	LID1F		1.556		20.2	18.9	6.6	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.379		21.3	19.0	12.3	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9333		19.9	19.0	4.5	30.0
Perfluorooctanoic acid	LID1F		0.9364		22.2	20.0	10.9	30.0
Perfluorooctanesulfonic acid	LID1F		1.035		18.7	18.5	1.1	30.0
Perfluorononanoic acid	LID1F		0.8444		20.1	20.0	0.7	30.0
9Cl-PF3ONS	LID1F		1.725		19.4	18.6	4.1	30.0
Perfluorononanesulfonic acid	LID1F		0.9613		21.2	19.2	10.3	30.0
Perfluorodecanoic acid	LID1F		0.8417		20.3	20.0	1.5	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		8.692		21.0	19.2	9.5	30.0
Perfluorooctanesulfonamide	LID1F		1.003		19.9	20.0	-0.4	30.0
NMeFOSAA	LID1F		0.9817		20.0	20.0	-0.2	30.0
Perfluorodecanesulfonic acid	LID1F		0.9802		21.0	19.3	9.0	30.0
Perfluoroundecanoic acid	LID1F		0.8814		22.2	20.0	11.2	30.0
NEtFOSAA	LID1F		0.9168		19.8	20.0	-0.8	30.0
11Cl-PF3OUdS	LID1F		1.439		20.3	18.6	9.3	30.0
Perfluorododecanoic acid	LID1F		0.8983		20.8	20.0	4.1	30.0
10:2 FTS	LID1F		6.948		20.5	19.3	6.1	30.0
NMeFOSE	LID1F		1.041		20.6	20.0	2.8	30.0
NMeFOSA	LID1F		1.059		20.4	20.0	2.0	30.0
Perfluorododecanesulfonic acid	LID1F		0.9518		21.4	19.4	10.5	30.0
NEtFOSE	LID1F		1.060		20.9	20.0	4.6	30.0
Perfluorotridecanoic acid	LID1F		0.8208		21.1	20.0	5.6	30.0
NEtFOSA	LID1F		1.036		20.1	20.0	0.5	30.0
Perfluorotetradecanoic acid	LID1F		0.8985		21.3	20.0	6.4	30.0
Perfluorohexadecanoic acid	LID1F		0.7493		22.0	20.0	9.9	30.0
Perfluorooctadecanoic acid	LID1F		0.3630		21.2	20.0	5.9	30.0
13C4 PFBA	Ave	1.092	1.087		9.95	10.0	-0.5	30.0
13C5 PFPeA	Ave	0.9016	0.9036		10.0	10.0	0.2	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Lab Sample ID: CCV 410-21758/51 Calibration Date: 07/13/2020 20:18

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL13-55.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.7001	0.6770		9.05	9.36	-3.3	30.0
M2-4:2 FTS	Ave	0.0495	0.0472		8.90	9.34	-4.7	30.0
13C5 PFHxA	Ave	0.8606	0.8735		10.2	10.0	1.5	30.0
13C3 HFPO-DA	Ave	0.1062	0.1027		9.67	10.0	-3.3	30.0
13C4 PFHpA	Ave	0.9047	0.8905		9.84	10.0	-1.6	30.0
13C3 PFHxS	Ave	0.5384	0.5180		9.10	9.46	-3.8	30.0
M2-6:2 FTS	Ave	0.0256	0.0246		9.12	9.50	-4.0	30.0
13C8 PFOA	Ave	0.9813	0.9219		9.39	10.0	-6.1	30.0
13C8 PFOS	Ave	1.008	1.003		9.52	9.57	-0.5	30.0
13C9 PFNA	Ave	1.723	1.760		10.2	10.0	2.2	30.0
13C6 PFDA	Ave	1.105	1.142		10.3	10.0	3.4	30.0
M2-8:2 FTS	Ave	0.0168	0.0163		9.30	9.58	-2.9	30.0
13C8 FOSA	Ave	0.9199	0.9587		10.4	10.0	4.2	30.0
d3-NMeFOSAA	Ave	0.3098	0.3112		10.0	10.0	0.4	30.0
13C7 PFUnA	Ave	1.113	1.067		9.59	10.0	-4.1	30.0
d5-NEtFOSAA	Ave	0.2737	0.2800		10.2	10.0	2.3	30.0
13C2-PFDoDA	Ave	0.7781	0.8140		10.5	10.0	4.6	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1801		10.0	10.0	0.2	30.0
d3-NMePFOSA	Ave	0.1118	0.1128		10.1	10.0	0.9	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.1974		9.93	10.0	-0.7	30.0
d5-NEtPFOSA	Ave	0.1114	0.1145		10.3	10.0	2.8	30.0
13C2 PFTeDA	Ave	0.8227	0.8219		9.99	10.0	-0.1	30.0

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 10:14

Analysis Batch Number: 20482 End Date: 07/09/2020 11:36

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 410-20482/1		07/09/2020 10:14	1	20JUL09MCAL-09.d	Gemini C18 50mm 3(mm)
IC 410-20482/2		07/09/2020 10:23	1	20JUL09MCAL-10.d	Gemini C18 50mm 3(mm)
IC 410-20482/3		07/09/2020 10:32	1	20JUL09MCAL-11.d	Gemini C18 50mm 3(mm)
IC 410-20482/4		07/09/2020 10:41	1	20JUL09MCAL-12.d	Gemini C18 50mm 3(mm)
ICISAV 410-20482/5		07/09/2020 10:50	1	20JUL09MCAL-13.d	Gemini C18 50mm 3(mm)
IC 410-20482/6		07/09/2020 10:59	1	20JUL09MCAL-14.d	Gemini C18 50mm 3(mm)
IC 410-20482/7		07/09/2020 11:08	1	20JUL09MCAL-15.d	Gemini C18 50mm 3(mm)
ICB 410-20482/8		07/09/2020 11:17	1	20JUL09MCAL-16.d	Gemini C18 50mm 3(mm)
ICV 410-20482/9		07/09/2020 11:26	1	20JUL09MCAL-17.d	Gemini C18 50mm 3(mm)
WDM 410-20482/10		07/09/2020 11:36	1	20JUL09MCAL-18.d	Gemini C18 50mm 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 14:37

Analysis Batch Number: 20936 End Date: 07/10/2020 12:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 410-20936/11		07/09/2020 14:37	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 14:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 14:58	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:07	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:16	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:25	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:34	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:43	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 15:52	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:01	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 16:19	1		Gemini C18 50mm 3(mm)
CCV 410-20936/23		07/09/2020 16:28	1	20JUL09-25.d	Gemini C18 50mm 3(mm)
MB 410-19879/1-A		07/09/2020 16:37	1	20JUL09-26.d	Gemini C18 50mm 3(mm)
LCS 410-19879/2-A		07/09/2020 16:46	1	20JUL09-27.d	Gemini C18 50mm 3(mm)
LCSD 410-19879/3-A		07/09/2020 16:55	1	20JUL09-28.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:04	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:13	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:23	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:32	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:41	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 17:50	1		Gemini C18 50mm 3(mm)
410-6631-1		07/09/2020 17:59	1	20JUL09-35.d	Gemini C18 50mm 3(mm)
410-6631-2		07/09/2020 18:08	1	20JUL09-36.d	Gemini C18 50mm 3(mm)
410-6631-3		07/09/2020 18:17	1	20JUL09-37.d	Gemini C18 50mm 3(mm)
410-6631-4		07/09/2020 18:26	1	20JUL09-38.d	Gemini C18 50mm 3(mm)
CCV 410-20936/37		07/09/2020 18:35	1	20JUL09-39.d	Gemini C18 50mm 3(mm)
410-6631-5		07/09/2020 18:44	1	20JUL09-40.d	Gemini C18 50mm 3(mm)
410-6631-6		07/09/2020 18:53	1	20JUL09-41.d	Gemini C18 50mm 3(mm)
410-6631-7		07/09/2020 19:02	1	20JUL09-42.d	Gemini C18 50mm 3(mm)
410-6631-8		07/09/2020 19:11	1	20JUL09-43.d	Gemini C18 50mm 3(mm)
410-6631-9		07/09/2020 19:20	1	20JUL09-44.d	Gemini C18 50mm 3(mm)
410-6631-10		07/09/2020 19:29	1	20JUL09-45.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 19:39	1		Gemini C18 50mm 3(mm)
CCV 410-20936/45		07/09/2020 19:49	1	20JUL09-47.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 19:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:19	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:28	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:37	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 20:55	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:04	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:13	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:22	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 14:37

Analysis Batch Number: 20936 End Date: 07/10/2020 12:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/09/2020 21:32	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:41	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 21:50	1		Gemini C18 50mm 3(mm)
CCV 410-20936/59		07/09/2020 21:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:29	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 22:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 23:05	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 23:14	1		Gemini C18 50mm 3(mm)
CCV 410-20936/68		07/09/2020 23:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 23:34	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 23:44	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/09/2020 23:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 00:02	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 00:12	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 00:21	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 00:30	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 00:39	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 00:48	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 00:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 01:06	1		Gemini C18 50mm 3(mm)
CCV 410-20936/80		07/10/2020 01:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 01:25	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 01:36	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 01:45	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 01:54	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:03	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:12	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:21	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:30	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:39	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:48	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 02:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 03:07	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 03:16	1		Gemini C18 50mm 3(mm)
CCV 410-20936/94		07/10/2020 03:25	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 03:35	1		Gemini C18 50mm 3(mm)
CCV 410-20936/96		07/10/2020 03:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 03:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:24	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 14:37

Analysis Batch Number: 20936 End Date: 07/10/2020 12:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/10/2020 04:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:43	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 04:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:02	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:11	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:29	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 05:47	1		Gemini C18 50mm 3(mm)
CCV 410-20936/110		07/10/2020 05:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:07	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:17	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:26	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 06:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:05	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:14	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:23	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:32	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:41	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:50	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 07:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:09	1		Gemini C18 50mm 3(mm)
CCV 410-20936/125		07/10/2020 08:18	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:28	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 08:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 09:42	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 10:01	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 10:12	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 10:21	1		Gemini C18 50mm 3(mm)
CCV 410-20936/139		07/10/2020 10:30	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 10:40	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 10:51	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:00	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:09	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:18	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:27	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:36	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 11:45	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 14:37

Analysis Batch Number: 20936 End Date: 07/10/2020 12:12

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/10/2020 11:54	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/10/2020 12:03	1		Gemini C18 50mm 3(mm)
CCV 410-20936/150		07/10/2020 12:12	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Instrument ID: 30733 Start Date: 07/13/2020 12:40

Analysis Batch Number: 21758 End Date: 07/13/2020 23:24

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 410-21758/1		07/13/2020 12:40	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 12:49	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 12:59	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 13:08	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 13:17	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 13:26	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 13:35	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 13:44	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 13:53	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 14:02	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 14:11	100		Gemini C18 50mm 3(mm)
CCV 410-21758/12		07/13/2020 14:21	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 14:31	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 14:41	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 14:50	100		Gemini C18 50mm 3(mm)
CCV 410-21758/16		07/13/2020 15:00	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 15:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 15:19	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 15:28	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 15:37	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 15:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 15:55	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 16:04	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 16:13	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 16:22	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 16:32	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 16:41	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 16:50	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 16:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 17:08	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 17:17	1		Gemini C18 50mm 3(mm)
CCV 410-21758/32		07/13/2020 17:26	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 17:35	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 17:44	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 17:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 18:02	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 18:11	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 18:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 18:29	1		Gemini C18 50mm 3(mm)
CCV 410-21758/40		07/13/2020 18:38	1	20JUL13-44.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 18:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 18:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 19:06	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 19:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 19:24	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Instrument ID: 30733 Start Date: 07/13/2020 12:40

Analysis Batch Number: 21758 End Date: 07/13/2020 23:24

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/13/2020 19:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 19:42	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 19:51	10		Gemini C18 50mm 3(mm)
410-6631-7 DL		07/13/2020 20:00	10	20JUL13-53.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:09	10		Gemini C18 50mm 3(mm)
CCV 410-21758/51		07/13/2020 20:18	1	20JUL13-55.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:27	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:37	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:46	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:56	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 21:05	10		Gemini C18 50mm 3(mm)
CCV 410-21758/57		07/13/2020 21:14	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 21:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 21:34	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 22:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 22:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 22:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 23:05	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 23:15	1		Gemini C18 50mm 3(mm)
CCV 410-21758/71		07/13/2020 23:24	1		Gemini C18 50mm 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Instrument ID: 27632 Start Date: 07/13/2020 13:01

Analysis Batch Number: 21880 End Date: 07/13/2020 14:22

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 410-21880/1		07/13/2020 13:01	1	20JUL13MCAL-09.d	Gemini C18 50mm 3(mm)
IC 410-21880/2		07/13/2020 13:10	1	20JUL13MCAL-10.d	Gemini C18 50mm 3(mm)
IC 410-21880/3		07/13/2020 13:19	1	20JUL13MCAL-11.d	Gemini C18 50mm 3(mm)
IC 410-21880/4		07/13/2020 13:28	1	20JUL13MCAL-12.d	Gemini C18 50mm 3(mm)
ICISAV 410-21880/5		07/13/2020 13:37	1	20JUL13MCAL-13.d	Gemini C18 50mm 3(mm)
IC 410-21880/6		07/13/2020 13:46	1	20JUL13MCAL-14.d	Gemini C18 50mm 3(mm)
IC 410-21880/7		07/13/2020 13:55	1	20JUL13MCAL-15.d	Gemini C18 50mm 3(mm)
ICB 410-21880/8		07/13/2020 14:04	1	20JUL13MCAL-16.d	Gemini C18 50mm 3(mm)
ICV 410-21880/9		07/13/2020 14:13	1	20JUL13MCAL-17.d	Gemini C18 50mm 3(mm)
WDM 410-21880/10		07/13/2020 14:22	1	20JUL13MCAL-18.d	Gemini C18 50mm 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6631-1

SDG No.:

Instrument ID: 27632 Start Date: 07/14/2020 16:12

Analysis Batch Number: 22577 End Date: 07/15/2020 03:50

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 410-22577/15		07/14/2020 16:12	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 16:39	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 16:48	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/14/2020 16:57	100		Gemini C18 50mm 3(mm)
CCV 410-22577/24		07/14/2020 17:33	1		Gemini C18 50mm 3(mm)
CCV 410-22577/89		07/15/2020 03:23	1	20JUL14-127.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/15/2020 03:32	10		Gemini C18 50mm 3(mm)
410-6631-8 DL		07/15/2020 03:41	10	20JUL14-129.d	Gemini C18 50mm 3(mm)
CCV 410-22577/92		07/15/2020 03:50	1	20JUL14-130.d	Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-6631-1

SDG No.:

Batch Number: 19879 Batch Start Date: 07/07/20 08:07 Batch Analyst: Barnhart, Toby B

Batch Method: EPA 537 (mod) Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	PFC_MS_MODWX 00015	PFC_SS_MODX 00020
MB 410-19879/1		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL		25 uL
LCS 410-19879/2		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL	40 uL	25 uL
LCSD 410-19879/3		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL	40 uL	25 uL
410-6631-A-1	EQB-WL-070120	EPA 537 (mod), EPA 537 (Mod)	T	306.16 g	27.45 g	278.7 mL	1 mL		25 uL
410-6631-A-2	MSA-FB-070120	EPA 537 (mod), EPA 537 (Mod)	T	306.14 g	27.09 g	279.1 mL	1 mL		25 uL
410-6631-A-3	MSA-DUP-2-070120	EPA 537 (mod), EPA 537 (Mod)	T	291.81 g	27.06 g	264.8 mL	1 mL		25 uL
410-6631-A-4	GSP-MW-19-070120	EPA 537 (mod), EPA 537 (Mod)	T	295.29 g	27.16 g	268.1 mL	1 mL		25 uL
410-6631-A-5	GSP-MW-9-070120	EPA 537 (mod), EPA 537 (Mod)	T	304.43 g	27.14 g	277.3 mL	1 mL		25 uL
410-6631-A-6	MSA-MW-50S-070120	EPA 537 (mod), EPA 537 (Mod)	T	325.24 g	27.51 g	297.7 mL	1 mL		25 uL
410-6631-A-7	MSA-MW-51S-070120	EPA 537 (mod), EPA 537 (Mod)	T	321.99 g	27.75 g	294.2 mL	1 mL		25 uL
410-6631-A-8	MSA-PMW-6S-070120	EPA 537 (mod), EPA 537 (Mod)	T	45.38 g	19.89 g	25.5 mL	1 mL		25 uL
410-6631-A-9	MSA-Pond 2-070120	EPA 537 (mod), EPA 537 (Mod)	T	306.65 g	27.58 g	279.1 mL	1 mL		25 uL
410-6631-A-10	MSA-Pond 1-070120	EPA 537 (mod), EPA 537 (Mod)	T	288.32 g	27.39 g	260.9 mL	1 mL		25 uL

Lab Sample ID	Client Sample ID	Method Chain	Basis	AnalysisComment					

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-6631-1

SDG No.:

Batch Number: 19879 Batch Start Date: 07/07/20 08:07 Batch Analyst: Barnhart, Toby B

Batch Method: EPA 537 (mod) Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	AnalysisComment					
MB 410-19879/1		EPA 537 (mod), EPA 537 (Mod)							
LCS 410-19879/2		EPA 537 (mod), EPA 537 (Mod)							
LCSD 410-19879/3		EPA 537 (mod), EPA 537 (Mod)							
410-6631-A-1	EQB-WL-070120	EPA 537 (mod), EPA 537 (Mod)	T						
410-6631-A-2	MSA-FB-070120	EPA 537 (mod), EPA 537 (Mod)	T						
410-6631-A-3	MSA-DUP-2-070120	EPA 537 (mod), EPA 537 (Mod)	T						
410-6631-A-4	GSP-MW-19-070120	EPA 537 (mod), EPA 537 (Mod)	T						
410-6631-A-5	GSP-MW-9-070120	EPA 537 (mod), EPA 537 (Mod)	T						
410-6631-A-6	MSA-MW-50S-070120	EPA 537 (mod), EPA 537 (Mod)	T						
410-6631-A-7	MSA-MW-51S-070120	EPA 537 (mod), EPA 537 (Mod)	T						
410-6631-A-8	MSA-PMW-6S-070120	EPA 537 (mod), EPA 537 (Mod)	T	Sediment, foamy; Transferred 25ml of sample into a new bottle and diluted with 225ml of Mili Q H20.					
410-6631-A-9	MSA-Pond 2-070120	EPA 537 (mod), EPA 537 (Mod)	T	Organic material					

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-6631-1

SDG No.:

Batch Number: 19879 Batch Start Date: 07/07/20 08:07 Batch Analyst: Barnhart, Toby B

Batch Method: EPA 537 (mod) Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	AnalysisComment					
410-6631-A-10	MSA-Pond 1-070120	EPA 537 (mod), EPA 537 (Mod)	T	Organic material					

Batch Notes	
Balance ID	B629764122
Collection Tube Witness	NF 33365
H2O ID	House A372
Manifold ID	11, 12
Methanol ID	DX907-IN
Analyst ID - IS Reagent Drop Witness	NF 33365
Solvent Lot #	3090607032033A; 2731907062033A
Solvent Name	1:1 ACN:MeOH; 0.3% NH4OH in MeOH
SPE Cartridge Lot ID	6509790-02

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TETRA TECH **INTERNAL CORRESPONDENCE**

TO: **S. BRENNER** **DATE:** **OCTOBER 14, 2020**

FROM: **GLORIA SCHIFINO** **COPIES:** **DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS)**
MARTIN STATE AIRPORT
SAMPLE DELIVERY GROUP (SDG) 410-6854-1

SAMPLES: 4/Aqueous

GSP-MW-10-070620 GSP-MW-15-070620
GSP-MW-7-070620 MSA-DUP-4-070620

1/Field Blank (FB)

MSA-FB-070620

1/Equipment Blank/PFAS

EQB-WL-070620

Overview

The sample set for Martin State Airport, SDG 410-6854-1, consisted of four (4) aqueous samples, one (1) field blank sample and one (1) equipment blank. All samples were analyzed for perfluorinated alkyl acids. One (1) field duplicate pairs (MSA-DUP-4-070620/ GSP-MW-7-070620) were included in this SDG.

The samples were collected by Tetra Tech on July 6, 2020 and analyzed by Eurofins Lancaster Laboratories. PFAS groundwater analyses were conducted in accordance with EPA method 537 modified analytical and reporting protocols.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, mass calibration, mass spectral acquisition rate, instrument sensitivity check, peak asymmetry factor, initial/continuing calibrations, ion transitions, laboratory method results, extracted internal standard recoveries, laboratory control sample results, chromatographic resolution, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

Major

No major issues were identified.

Minor

The matrix spike percent recovery for PFOS was above the quality control limit for sample GSP-MW-15-070620. The matrix spike duplicate recovery was acceptable. The detected result was qualified as estimated (J).

Detected results reported below the reporting limit (RL) but above the detection limit (DL) were qualified as estimated (J).

Notes

The compound PFOA was detected in the equipment blank at a concentration of 0.61 ng/L. No validation was required because sample results were greater than the RL.

Non-detected results were reported to the reporting limit.

Executive Summary

Laboratory Performance: One contaminant was present in the equipment blank.

Other Factors Affecting Data Quality: Results below the LOQ were estimated.

The data for these analyses were reviewed with reference to the Environmental Protection Agency document EPA 910-R-18-001 “Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537”, (November 2018). The text of this report has been formulated to address only those areas affecting data quality.

for Tetra Tech, Inc.
Gloria Schifino
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

Data Qualifier Definitions

The following definitions provide brief explanations of the validation qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted detection limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value is the estimated concentration in the sample.
R	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
UR	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

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: 09023	NSAMPLE	EQB-WL-070620			GSP-MW-10-070620			GSP-MW-15-070620			GSP-MW-7-070620		
SDG: 410-6854-1	LAB_ID	410-6854-1			410-6854-6			410-6854-5			410-6854-4		
FRACTION: PFAS	SAMP_DATE	7/6/2020			7/6/2020			7/6/2020			7/6/2020		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/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
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		4.7	U		6.1			15			2.7	J	P
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		2.8	U		2.8	U		2.9	U		2.9	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)		0.61	J	P	24			7.1			13		
PERFLUOROBUTANESULFONIC ACID (PFBS)		1.9	U		15			1.2	J	P	14		
PERFLUOROHEPTANOIC ACID (PFHPA)		1.9	U		19			4			8.7		
PERFLUOROHEXANESULFONIC ACID (PFHXS)		1.9	U		120			3.2			73		
PERFLUORONONANOIC ACID (PFNA)		1.9	U		5.9			2.6			2.8		
PERFLUOROOCTANESULFONIC ACID (PFOS)		1.9	U		170			33	J	D	58		

PROJ_NO: 09023	NSAMPLE	MSA-DUP-4-070620			MSA-FB-070620		
SDG: 410-6854-1	LAB_ID	410-6854-3			410-6854-2		
FRACTION: PFAS	SAMP_DATE	7/6/2020			7/6/2020		
MEDIA: WATER	QC_TYPE	NM			NM		
	UNITS	NG/L			NG/L		
	PCT_SOLIDS	0.0			0.0		
	DUP_OF	GSP-MW-7-070620					
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		2.5	J	P	4.5	U	
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		2.8	U		2.7	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)		13			1.8	U	
PERFLUOROBUTANESULFONIC ACID (PFBS)		14			1.8	U	
PERFLUOROHEPTANOIC ACID (PFHPA)		9.1			1.8	U	
PERFLUOROHEXANESULFONIC ACID (PFHXS)		74			1.8	U	
PERFLUORONONANOIC ACID (PFNA)		2.9			1.8	U	
PERFLUOROOCTANESULFONIC ACID (PFOS)		58			1.8	U	

Appendix B

Results as Reported by the Laboratory

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6854-1

SDG No.:

Client Sample ID: EQB-WL-070620 Lab Sample ID: 410-6854-1

Matrix: Water Lab File ID: 20JUL13-29.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/06/2020 08:15

Extraction Method: EPA 537 (mod) Date Extracted: 07/08/2020 16:40

Sample wt/vol: 264.1(mL) Date Analyzed: 07/13/2020 16:22

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 21758 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.7	1.9
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.95
375-73-5	Perfluorobutanesulfonic acid	ND		1.9	0.47
375-85-9	Perfluoroheptanoic acid	ND		1.9	0.47
355-46-4	Perfluorohexanesulfonic acid	ND		1.9	0.47
375-95-1	Perfluorononanoic acid	ND		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	ND		1.9	0.47
335-67-1	Perfluorooctanoic acid	0.61	J	1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	98		29-182
STL02280	M2-8:2 FTS	98		37-169
STL02337	13C3 PFBS	91		23-175
STL01892	13C4 PFHpA	90		33-140
STL01052	13C8 PFOA	89		52-124
STL01054	13C8 PFOS	92		52-121
STL02581	13C3 PFHxS	88		35-143
STL02578	13C9 PFNA	94		48-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6854-1

SDG No.:

Client Sample ID: MSA-FB-070620 Lab Sample ID: 410-6854-2

Matrix: Water Lab File ID: 20JUL13-30.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/06/2020 13:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/08/2020 16:40

Sample wt/vol: 275.4(mL) Date Analyzed: 07/13/2020 16:32

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 21758 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.5	1.8
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.7	0.91
375-73-5	Perfluorobutanesulfonic acid	ND		1.8	0.45
375-85-9	Perfluoroheptanoic acid	ND		1.8	0.45
355-46-4	Perfluorohexanesulfonic acid	ND		1.8	0.45
375-95-1	Perfluorononanoic acid	ND		1.8	0.45
1763-23-1	Perfluorooctanesulfonic acid	ND		1.8	0.45
335-67-1	Perfluorooctanoic acid	ND		1.8	0.45

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	93		29-182
STL02280	M2-8:2 FTS	91		37-169
STL02337	13C3 PFBS	89		23-175
STL01892	13C4 PFHpA	90		33-140
STL01052	13C8 PFOA	88		52-124
STL01054	13C8 PFOS	86		52-121
STL02581	13C3 PFHxS	86		35-143
STL02578	13C9 PFNA	92		48-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6854-1

SDG No.:

Client Sample ID: MSA-DUP-4-070620 Lab Sample ID: 410-6854-3

Matrix: Water Lab File ID: 20JUL13-31.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/06/2020 00:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/08/2020 16:40

Sample wt/vol: 267.5(mL) Date Analyzed: 07/13/2020 16:41

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 21758 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	2.5	J	4.7	1.9
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.93
375-73-5	Perfluorobutanesulfonic acid	14		1.9	0.47
375-85-9	Perfluoroheptanoic acid	9.1		1.9	0.47
355-46-4	Perfluorohexanesulfonic acid	74		1.9	0.47
375-95-1	Perfluorononanoic acid	2.9		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	58		1.9	0.47
335-67-1	Perfluorooctanoic acid	13		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	121		29-182
STL02280	M2-8:2 FTS	97		37-169
STL02337	13C3 PFBS	102		23-175
STL01892	13C4 PFHpA	87		33-140
STL01052	13C8 PFOA	87		52-124
STL01054	13C8 PFOS	88		52-121
STL02581	13C3 PFHxS	84		35-143
STL02578	13C9 PFNA	97		48-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6854-1

SDG No.:

Client Sample ID: GSP-MW-7-070620 Lab Sample ID: 410-6854-4

Matrix: Water Lab File ID: 20JUL13-32.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/06/2020 11:20

Extraction Method: EPA 537 (mod) Date Extracted: 07/08/2020 16:40

Sample wt/vol: 259.4(mL) Date Analyzed: 07/13/2020 16:50

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 21758 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	2.7	J	4.8	1.9
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.9	0.96
375-73-5	Perfluorobutanesulfonic acid	14		1.9	0.48
375-85-9	Perfluoroheptanoic acid	8.7		1.9	0.48
355-46-4	Perfluorohexanesulfonic acid	73		1.9	0.48
375-95-1	Perfluorononanoic acid	2.8		1.9	0.48
1763-23-1	Perfluorooctanesulfonic acid	58		1.9	0.48
335-67-1	Perfluorooctanoic acid	13		1.9	0.48

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	117		29-182
STL02280	M2-8:2 FTS	101		37-169
STL02337	13C3 PFBS	104		23-175
STL01892	13C4 PFHpA	87		33-140
STL01052	13C8 PFOA	86		52-124
STL01054	13C8 PFOS	85		52-121
STL02581	13C3 PFHxS	88		35-143
STL02578	13C9 PFNA	95		48-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6854-1

SDG No.:

Client Sample ID: GSP-MW-15-070620 Lab Sample ID: 410-6854-5

Matrix: Water Lab File ID: 20JUL13-33.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/06/2020 09:35

Extraction Method: EPA 537 (mod) Date Extracted: 07/08/2020 16:40

Sample wt/vol: 261.8(mL) Date Analyzed: 07/13/2020 16:59

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 21758 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	15		4.8	1.9
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.9	0.95
375-73-5	Perfluorobutanesulfonic acid	1.2	J	1.9	0.48
375-85-9	Perfluoroheptanoic acid	4.0		1.9	0.48
355-46-4	Perfluorohexanesulfonic acid	3.2		1.9	0.48
375-95-1	Perfluorononanoic acid	2.6		1.9	0.48
1763-23-1	Perfluorooctanesulfonic acid	33	F1	1.9	0.48
335-67-1	Perfluorooctanoic acid	7.1		1.9	0.48

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	127		29-182
STL02280	M2-8:2 FTS	103		37-169
STL02337	13C3 PFBS	98		23-175
STL01892	13C4 PFHpA	87		33-140
STL01052	13C8 PFOA	89		52-124
STL01054	13C8 PFOS	92		52-121
STL02581	13C3 PFHxS	86		35-143
STL02578	13C9 PFNA	96		48-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6854-1

SDG No.:

Client Sample ID: GSP-MW-10-070620 Lab Sample ID: 410-6854-6

Matrix: Water Lab File ID: 20JUL13-37.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/06/2020 13:40

Extraction Method: EPA 537 (mod) Date Extracted: 07/08/2020 16:40

Sample wt/vol: 266.3(mL) Date Analyzed: 07/13/2020 17:35

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 21758 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	6.1		4.7	1.9
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.94
375-73-5	Perfluorobutanesulfonic acid	15		1.9	0.47
375-85-9	Perfluoroheptanoic acid	19		1.9	0.47
355-46-4	Perfluorohexanesulfonic acid	120		1.9	0.47
375-95-1	Perfluorononanoic acid	5.9		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	170		1.9	0.47
335-67-1	Perfluorooctanoic acid	24		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	132		29-182
STL02280	M2-8:2 FTS	104		37-169
STL02337	13C3 PFBS	95		23-175
STL01892	13C4 PFHpA	78		33-140
STL01052	13C8 PFOA	82		52-124
STL01054	13C8 PFOS	85		52-121
STL02581	13C3 PFHxS	76		35-143
STL02578	13C9 PFNA	94		48-130

Appendix C

Support Documentation

ANALYTE	ORIGINAL GSP-MW-7-070620	DUPLICATE MSA-DUP-4-070620	RL	RPD	RPD > 30% Aqueous	ORIGINAL SAMPLE CONC >2xRL	DUPLICATE SAMPLE CONC >2xRL	DIFFERENCE >2XRL
6:2 FLUOROTELOMER SULFONATE (6:2FTS)	2.7	2.5	4.8	7.69	FALSE	FALSE	FALSE	FALSE
PENTADECAFLUOROOCTANOIC ACID (PFOA)	13	13	1.9	0.00	FALSE	TRUE	TRUE	FALSE
PERFLUOROBUTANESULFONIC ACID (PFBS)	14	14	1.9	0.00	FALSE	TRUE	TRUE	FALSE
PERFLUOROHEPTANOIC ACID (PFHPA)	8.7	9.1	1.9	4.49	FALSE	TRUE	TRUE	FALSE
PERFLUOROHEXANESULFONIC ACID (PFHXS)	73	74	1.9	1.36	FALSE	TRUE	TRUE	FALSE
PERFLUORONONANOIC ACID (PFNA)	2.8	2.9	1.9	3.51	FALSE	FALSE	FALSE	FALSE
PERFLUOROOCTANESULFONIC ACID (PFOS)	58	58	1.9	0.00	FALSE	TRUE	TRUE	FALSE

410-6854 Chain of Custody

Chain of Custody Record

321390

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Samantha Brenner	Site Contact: P. O'Brien	Date: 7/6/20	COC No:
Company Name: Tetra Tech	Tel/Fax: 301-528-3056	Lab Contact: Stephen Gordon	Carrier: Fedex	1 of 1 COCs
Address: 20251 Century Blvd, Suite 200	Analysis Turnaround Time			Sampler:
City/State/Zip: Germantown, MD 20874	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 301-528-5552	TAT if different from Below			Walk-in Client:
Fax: 301-528-5050	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day — Standard			Lab Sampling:
Project Name: MSA PFAS GW Round 2				Job / SDG No.:
Site: MSA				
PO# 1127109023				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFAS (Method 537)	Sample Specific Notes:
EQB-WL-070620	7/6/20	0815	GRAB	GW	2	N	N	X	
MSA-FB-070620		1300						X	Trizma preserved FRB
MSA-DUP-4-070620		0000						X	
BSP-MW-7-070620		1120						X	
BSP-MW-15-070620		0935			6		Y	X	MS/MSD
BSP-MW-10-070620		1340			2		N	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: 1.4 Corr'd: 1.4 | Therm ID No.:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Tetra Tech	7/6/20 1530			7/6/20 17:15
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	ELE	7/7/20 1745		ELE	7/7/20 13:45
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
	ELE	7/7/20 17:45	W Martins	ELE	7/7/20 1745

Definitions/Glossary

Client: Tetra Tech, Inc. Job ID: 410-6854-1
Project/Site: MSA PFAS GW Round 2

Qualifiers

LCMS

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job Narrative
410-6854-1

Comments
No additional comments.

Receipt
The samples were received on 7/7/2020 5:45 PM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.4° C.

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

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

Method Summary

Client: Tetra Tech, Inc. Job ID: 410-6854-1
Project/Site: MSA PFAS GW Round 2

Method	Method Description	Protocol	Laboratory
EPA 537 (Mod)	EPA 537 Isotope Dilution	EPA	ELLE
EPA 537 (mod)	EPA 537 Isotope Dilution	EPA	ELLE

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: Tetra Tech, Inc.
Job ID: 410-6854-1
Project/Site: MSA PFAS GW Round 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
410-6854-1	EQB-WL-070620	Water	07/06/20 08:15	07/07/20 17:45	
410-6854-2	MSA-FB-070620	Water	07/06/20 13:00	07/07/20 17:45	
410-6854-3	MSA-DUP-4-070620	Water	07/06/20 00:00	07/07/20 17:45	
410-6854-4	GSP-MW-7-070620	Water	07/06/20 11:20	07/07/20 17:45	
410-6854-5	GSP-MW-15-070620	Water	07/06/20 09:35	07/07/20 17:45	
410-6854-6	GSP-MW-10-070620	Water	07/06/20 13:40	07/07/20 17:45	

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6854-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C3PFBS #	C4PFHA #	C3PFHS #	M262FTS #	C8PFOA #	C8PFOS #	C9PFNA #	M282FTS #
EQB-WL-070620	410-6854-1	91	90	88	98	89	92	94	98
MSA-FB-070620	410-6854-2	89	90	86	93	88	86	92	91
MSA-DUP-4-070620	410-6854-3	102	87	84	121	87	88	97	97
GSP-MW-7-070620	410-6854-4	104	87	88	117	86	85	95	101
GSP-MW-15-070620	410-6854-5	98	87	86	127	89	92	96	103
GSP-MW-10-070620	410-6854-6	95	78	76	132	82	85	94	104
	MB 410-20524/1-A	95	100	94	102	93	87	92	99
	LCS 410-20524/2-A	88	84	82	90	85	85	91	92
GSP-MW-15-070620 MS	410-6854-5 MS	93	77	78	116	80	84	92	90
GSP-MW-15-070620 MSD	410-6854-5 MSD	104	91	89	130	89	89	100	115

	QC LIMITS
C3PFBS = 13C3 PFBS	23-175
C4PFHA = 13C4 PFHpA	33-140
C3PFHS = 13C3 PFHxS	35-143
M262FTS = M2-6:2 FTS	29-182
C8PFOA = 13C8 PFOA	52-124
C8PFOS = 13C8 PFOS	52-121
C9PFNA = 13C9 PFNA	48-130
M282FTS = M2-8:2 FTS	37-169

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6854-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL13-26.d

Lab ID: LCS 410-20524/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
6:2 Fluorotelomer sulfonic acid	24.3	26.5	109	56-140	
8:2 Fluorotelomer sulfonic acid	24.5	25.2	103	58-143	
Perfluorobutanesulfonic acid	22.6	22.0	97	67-135	
Perfluoroheptanoic acid	25.6	27.9	109	69-144	
Perfluorohexanesulfonic acid	24.2	23.6	97	63-132	
Perfluorononanoic acid	25.6	25.9	101	66-144	
Perfluorooctanesulfonic acid	24.5	22.6	92	53-129	
Perfluorooctanoic acid	25.6	27.8	109	67-139	
M2-6:2 FTS	38.0	34.3	90	29-182	
M2-8:2 FTS	38.3	35.1	92	37-169	
13C3 PFBS	37.4	33.1	88	23-175	
13C4 PFHpA	40.0	33.8	84	33-140	
13C8 PFOA	40.0	34.1	85	52-124	
13C8 PFOS	38.3	32.6	85	52-121	
13C3 PFHxS	37.8	31.1	82	35-143	
13C9 PFNA	40.0	36.5	91	48-130	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM III
LCMS MATRIX SPIKE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6854-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL13-34.d

Lab ID: 410-6854-5 MS Client ID: GSP-MW-15-070620 MS

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC	QC LIMITS REC	#
6:2 Fluorotelomer sulfonic acid	22.2	15	42.3	125	56-140	
8:2 Fluorotelomer sulfonic acid	22.4	ND	29.7	133	58-143	
Perfluorobutanesulfonic acid	20.7	1.2 J	23.3	107	67-135	
Perfluoroheptanoic acid	23.4	4.0	31.9	119	69-144	
Perfluorohexanesulfonic acid	22.1	3.2	28.7	115	63-132	
Perfluorononanoic acid	23.4	2.6	30.4	119	66-144	
Perfluorooctanesulfonic acid	22.3	33	62.5	130	53-129	F1
Perfluorooctanoic acid	23.4	7.1	36.6	126	67-139	
M2-6:2 FTS	34.7	46	40.3	116	29-182	
M2-8:2 FTS	35.0	38	31.3	90	37-169	
13C3 PFBS	34.2	35	31.7	93	23-175	
13C4 PFHpA	36.5	33	28.2	77	33-140	
13C8 PFOA	36.5	34	29.3	80	52-124	
13C8 PFOS	34.9	34	29.4	84	52-121	
13C3 PFHxS	34.6	31	26.9	78	35-143	
13C9 PFNA	36.5	37	33.6	92	48-130	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM III
LCMS MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6854-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL13-35.d

Lab ID: 410-6854-5 MSD Client ID: GSP-MW-15-070620 MSD

COMPOUND	SPIKE ADDED (ng/L)	MSD CONCENTRATION (ng/L)	MSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
6:2 Fluorotelomer sulfonic acid	22.7	35.3	92	18	30	56-140	
8:2 Fluorotelomer sulfonic acid	22.9	23.7	103	23	30	58-143	
Perfluorobutanesulfonic acid	21.2	21.2	95	9	30	67-135	
Perfluoroheptanoic acid	23.9	26.8	95	17	30	69-144	
Perfluorohexanesulfonic acid	22.6	26.2	102	9	30	63-132	
Perfluorononanoic acid	23.9	27.1	102	11	30	66-144	
Perfluorooctanesulfonic acid	22.9	58.0	107	7	30	53-129	
Perfluorooctanoic acid	23.9	32.8	107	11	30	67-139	
M2-6:2 FTS	35.5	46.3	130			29-182	
M2-8:2 FTS	35.8	41.0	115			37-169	
13C3 PFBS	35.0	36.4	104			23-175	
13C4 PFHpA	37.4	33.9	91			33-140	
13C8 PFOA	37.4	33.2	89			52-124	
13C8 PFOS	35.8	31.9	89			52-121	
13C3 PFHxS	35.4	31.5	89			35-143	
13C9 PFNA	37.4	37.5	100			48-130	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-6854-1

SDG No.:

Lab File ID: 20JUL13-25.d Lab Sample ID: MB 410-20524/1-A

Matrix: Water Date Extracted: 07/08/2020 16:40

Instrument ID: 30733 Date Analyzed: 07/13/2020 15:46

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 410-20524/2-A	20JUL13-26.d	07/13/2020 15:55
EQB-WL-070620	410-6854-1	20JUL13-29.d	07/13/2020 16:22
MSA-FB-070620	410-6854-2	20JUL13-30.d	07/13/2020 16:32
MSA-DUP-4-070620	410-6854-3	20JUL13-31.d	07/13/2020 16:41
GSP-MW-7-070620	410-6854-4	20JUL13-32.d	07/13/2020 16:50
GSP-MW-15-070620	410-6854-5	20JUL13-33.d	07/13/2020 16:59
GSP-MW-15-070620 MS	410-6854-5 MS	20JUL13-34.d	07/13/2020 17:08
GSP-MW-15-070620 MSD	410-6854-5 MSD	20JUL13-35.d	07/13/2020 17:17
GSP-MW-10-070620	410-6854-6	20JUL13-37.d	07/13/2020 17:35

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6854-1

SDG No.:

Client Sample ID: Lab Sample ID: MB 410-20524/1-A

Matrix: Water Lab File ID: 20JUL13-25.d

Analysis Method: EPA 537 (Mod) Date Collected:

Extraction Method: EPA 537 (mod) Date Extracted: 07/08/2020 16:40

Sample wt/vol: 250(mL) Date Analyzed: 07/13/2020 15:46

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 3(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 21758 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		5.0	2.0
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		3.0	1.0
375-73-5	Perfluorobutanesulfonic acid	ND		2.0	0.50
375-85-9	Perfluoroheptanoic acid	ND		2.0	0.50
355-46-4	Perfluorohexanesulfonic acid	ND		2.0	0.50
375-95-1	Perfluorononanoic acid	ND		2.0	0.50
1763-23-1	Perfluorooctanesulfonic acid	ND		2.0	0.50
335-67-1	Perfluorooctanoic acid	ND		2.0	0.50

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	102		29-182
STL02280	M2-8:2 FTS	99		37-169
STL02337	13C3 PFBS	95		23-175
STL01892	13C4 PFHpA	100		33-140
STL01052	13C8 PFOA	93		52-124
STL01054	13C8 PFOS	87		52-121
STL02581	13C3 PFHxS	94		35-143
STL02578	13C9 PFNA	92		48-130

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6854-1

SDG No.:

Instrument ID: 30733 Calibration Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/09/2020 11:08

Calibration ID: 6664

		13C3PFBA		13PFOA		PFOS	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1810897	3.54	2342094	5.26	1136098	5.58
UPPER LIMIT		2716346	3.74	3513141	5.46	1704147	5.78
LOWER LIMIT		905449	3.34	1171047	5.06	568049	5.38
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-20482/8		1707938	3.53	2312321	5.26	1072027	5.58
ICV 410-20482/9		1899600	3.53	2526066	5.25	1207497	5.58
CCV 410-21758/16		2160381	3.62	2798265	5.29	1304039	5.60
MB 410-20524/1-A		1827771	3.53	2422984	5.26	1187827	5.59
LCS 410-20524/2-A		1819532	3.52	2480146	5.25	1125134	5.57
410-6854-1	EQB-WL-070620	1829804	3.54	2469388	5.24	1132408	5.57
410-6854-2	MSA-FB-070620	1831336	3.54	2453650	5.24	1104199	5.56
410-6854-3	MSA-DUP-4-070620	1567833	3.53	2596332	5.25	1154575	5.58
410-6854-4	GSP-MW-7-070620	1527518	3.54	2491068	5.25	1159188	5.58
410-6854-5	GSP-MW-15-070620	1687449	3.53	2570057	5.25	1163787	5.57
410-6854-5 MS	GSP-MW-15-070620 MS	1639066	3.52	2555830	5.26	1106883	5.58
410-6854-5 MSD	GSP-MW-15-070620 MSD	1637336	3.52	2537145	5.24	1135660	5.56
CCV 410-21758/32		2052532	3.53	2750627	5.25	1229489	5.57
410-6854-6	GSP-MW-10-070620	1529360	3.52	2546192	5.25	1087986	5.57
CCV 410-21758/40		2290645	3.53	3078418	5.25	1420586	5.58

13C3PFBA = 13C3-PFBA
13PFOA = 13C2 PFOA
PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-6854-1

SDG No.:

Instrument ID: 30733 Calibration Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/09/2020 11:08

Calibration ID: 6664

		PFDA					
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		2137017	5.91				
UPPER LIMIT		3205526	6.11				
LOWER LIMIT		1068509	5.71				
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-20482/8		2052405	5.91				
ICV 410-20482/9		2272200	5.91				
CCV 410-21758/16		2403557	5.92				
MB 410-20524/1-A		2207087	5.92				
LCS 410-20524/2-A		2100847	5.90				
410-6854-1	EQB-WL-070620	2142479	5.90				
410-6854-2	MSA-FB-070620	2081646	5.89				
410-6854-3	MSA-DUP-4-070620	2263982	5.91				
410-6854-4	GSP-MW-7-070620	2120192	5.91				
410-6854-5	GSP-MW-15-070620	2223628	5.89				
410-6854-5 MS	GSP-MW-15-070620 MS	2238928	5.91				
410-6854-5 MSD	GSP-MW-15-070620 MSD	2087397	5.89				
CCV 410-21758/32		2411239	5.89				
410-6854-6	GSP-MW-10-070620	2231518	5.90				
CCV 410-21758/40		2651771	5.91				

PFDA = 13C2 PFDA

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-20482/1	20JUL09MCAL-09.d
Level 2	IC 410-20482/2	20JUL09MCAL-10.d
Level 3	IC 410-20482/3	20JUL09MCAL-11.d
Level 4	IC 410-20482/4	20JUL09MCAL-12.d
Level 5	ICISAV 410-20482/5	20JUL09MCAL-13.d
Level 6	IC 410-20482/6	20JUL09MCAL-14.d
Level 7	IC 410-20482/7	20JUL09MCAL-15.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid	1.0890 0.8294	0.9278 0.8123	0.8716	0.8058	0.8797	LID1F		0.8255							0.9990		0.9900
Perfluoropentanoic acid	1.1959 0.9345	1.0423 0.9300	0.9542	0.9440	0.9903	LID1F		0.9394							0.9990		0.9900
Perfluorobutanesulfonic acid	1.1226 1.0425	0.9850 0.9825	0.9751	1.0081	1.0459	LID1F		1.0073							0.9990		0.9900
4:2 Fluorotelomer sulfonic acid	3.7276 3.4136	3.2886 3.2415	3.3442	3.4207	3.5995	LID1F		3.3385							0.9990		0.9900
Perfluorohexanoic acid	0.9232 0.7654	0.8307 0.7770	0.7862	0.7397	0.8497	LID1F		0.7806							0.9990		0.9900
Perfluoropentanesulfonic acid	0.9939 0.8649	0.9072 0.8561	0.8603	0.8733	0.9588	LID1F		0.8710							0.9990		0.9900
HFPODA	2.7792 2.6693	2.5333 2.4352	2.5096	2.6150	2.7574	LID1F		2.5451							0.9970		0.9900
Perfluoroheptanoic acid	1.2338 1.0373	1.1258 1.0078	1.1633	1.0382	1.1389	LID1F		1.0341							0.9980		0.9900
Perfluorohexanesulfonic acid	1.2074 0.9900	1.0188 1.0082	1.0049	0.9531	1.0523	LID1F		1.0058							1.0000		0.9900
DONA	1.6466 1.4508	1.4906 1.4500	1.5494	1.4280	1.5257	LID1F		1.4591							1.0000		0.9900
6:2 Fluorotelomer sulfonic acid	6.6855 4.7443	5.0388 4.6222	5.3100	5.2617	5.4551	LID1F		4.7876							0.9960		0.9900
Perfluoroheptanesulfonic acid	0.9369 0.8837	0.9256 0.8958	0.8852	0.8568	0.9197	LID1F		0.8934							1.0000		0.9900
Perfluorooctanoic acid	1.0536 0.8648	0.9729 0.8270	0.8712	0.8417	0.8715	LID1F		0.8442							0.9990		0.9900
Perfluorooctanesulfonic acid	1.2793 1.0102	1.0320 1.0300	1.0444	0.9782	1.0393	LID1F		1.0237							1.0000		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorononanoic acid	0.8892 0.8705	0.8792 0.8092	0.8496	0.8289	0.9025	LID1F		0.8381							0.9980		0.9900
9Cl-PF3ONS	1.9975 1.6248	1.6236 1.6782	1.6437	1.5864	1.6558	LID1F		1.6567							1.0000		0.9900
Perfluorononanesulfonic acid	0.9061 0.8475	0.8255 0.8840	0.8706	0.8706	0.8680	LID1F		0.8713							1.0000		0.9900
Perfluorodecanoic acid	0.9730 0.8401	0.8751 0.8137	0.8279	0.8215	0.8781	LID1F		0.8290							0.9990		0.9900
8:2 Fluorotelomer sulfonic acid	8.4365 8.1833	7.6991 7.7374	8.0675	8.0594	8.2689	LID1F		7.9382							0.9990		0.9900
Perfluorooctanesulfonamide	1.0133 1.0062	1.0267 0.9954	1.0257	0.9757	1.0764	LID1F		1.0069							0.9990		0.9900
NMeFOSAA	1.1160 0.9816	1.0285 0.9696	0.9970	1.0124	1.0465	LID1F		0.9840							0.9990		0.9900
Perfluorodecanesulfonic acid	1.0169 0.8959	0.8885 0.9018	0.9220	0.8571	0.9100	LID1F		0.8994							1.0000		0.9900
Perfluoroundecanoic acid	0.9336 0.7955	0.7989 0.7829	0.8411	0.8026	0.8265	LID1F		0.7929							1.0000		0.9900
NEtFOSAA	0.9487 0.9265	0.9265 0.9159	0.9056	0.8886	0.9749	LID1F		0.9241							1.0000		0.9900
11Cl-PF3OUdS	1.4400 1.2952	1.3561 1.3252	1.3478	1.2951	1.3308	LID1F		1.3166							1.0000		0.9900
Perfluorododecanoic acid	1.0989 0.8587	0.9721 0.8549	0.8907	0.8585	0.9056	LID1F		0.8627							1.0000		0.9900
10:2 FTS	6.6081 6.8134	7.1166 6.4153	6.5108	6.0548	6.7148	LID1F		6.5459							0.9990		0.9900
NMeFOSE	0.9983 1.0135	1.0390 1.0073	1.0342	0.9732	1.0501	LID1F		1.0126							1.0000		0.9900
NMeFOSA	1.0087 1.0530	1.1376 1.0104	1.0987	1.0519	1.1307	LID1F		1.0386							0.9990		0.9900
Perfluorododecanesulfonic acid	0.9702 0.8659	0.8927 0.8523	0.8827	0.8573	0.8939	LID1F		0.8615							1.0000		0.9900
NEtFOSE	1.0741 1.0454	1.1116 0.9948	0.9835	0.9619	1.0466	LID1F		1.0134							0.9990		0.9900
NEtFOSA	1.0565 1.0611	1.0398 1.0164	1.0076	0.9928	1.0478	LID1F		1.0312							1.0000		0.9900
Perfluorotridecanoic acid	0.8905 0.7921	0.8047 0.7507	0.8246	0.8028	0.8534	LID1F		0.7769							0.9980		0.9900
Perfluorotetradecanoic acid	1.0151 0.8539	0.9078 0.8232	0.8826	0.8502	0.9175	LID1F		0.8444							0.9990		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorohexadecanoic acid	0.8846 0.7030	0.7442 0.6624	0.7088	0.6724	0.7243	LID1F		0.6819							0.9990		0.9900
Perfluorooctadecanoic acid	0.3700 0.3475	0.3305 0.3375	0.3448	0.3291	0.3616	LID1F		0.3426							0.9990		0.9900
13C4 PFBA	1.0838 1.0573	1.1326 1.0490	1.1365	1.1133	1.0721	Ave		1.0921				3.3		20.0			
13C5 PFPeA	0.8519 0.9122	0.9249 0.8679	0.9688	0.8844	0.9014	Ave		0.9016				4.3		20.0			
13C3 PFBS	0.6512 0.6943	0.7328 0.6574	0.7709	0.6935	0.7006	Ave		0.7001				5.9		20.0			
M2-4:2 FTS	0.0512 0.0484	0.0502 0.0479	0.0515	0.0482	0.0494	Ave		0.0495				3.0		20.0			
13C5 PFHxA	0.8696 0.8434	0.8811 0.8160	0.8945	0.8932	0.8264	Ave		0.8606				3.7		20.0			
13C3 HFPO-DA	0.1064 0.0997	0.1098 0.1111	0.1106	0.1035	0.1025	Ave		0.1062				4.2		20.0			
13C4 PFHpA	0.9128 0.8972	0.9173 0.8713	0.8915	0.9212	0.9218	Ave		0.9047				2.1		20.0			
13C3 PFHxS	0.5276 0.5374	0.5345 0.5148	0.5502	0.5472	0.5575	Ave		0.5384				2.7		20.0			
M2-6:2 FTS	0.0266 0.0252	0.0267 0.0251	0.0264	0.0243	0.0250	Ave		0.0256				3.7		20.0			
13C8 PFOA	0.9728 0.9500	0.9948 0.9550	1.0104	0.9796	1.0065	Ave		0.9813				2.4		20.0			
13C8 PFOS	1.0208 0.9615	1.0760 0.9884	1.0187	0.9738	1.0186	Ave		1.0083				3.8		20.0			
13C9 PFNA	1.8149 1.6068	1.7685 1.7331	1.7871	1.6658	1.6826	Ave		1.7227				4.3		20.0			
13C6 PFDA	1.1256 1.0371	1.1473 1.0091	1.1970	1.1095	1.1075	Ave		1.1047				5.8		20.0			
M2-8:2 FTS	0.0182 0.0152	0.0168 0.0152	0.0179	0.0173	0.0170	Ave		0.0168				7.1		20.0			
13C8 FOSA	0.9899 0.9024	0.9365 0.8775	0.9614	0.9142	0.8575	Ave		0.9199				5.0		20.0			
d3-NMeFOSAA	0.3204 0.2988	0.3108 0.3028	0.3256	0.2988	0.3115	Ave		0.3098				3.4		20.0			
13C7 PFUnA	1.1054 1.0601	1.1781 1.0311	1.1776	1.1152	1.1201	Ave		1.1125				4.9		20.0			
d5-NEtFOSAA	0.2832 0.2631	0.2784 0.2543	0.2929	0.2718	0.2721	Ave		0.2737				4.7		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
13C2-PFDoDA	0.7960 0.7443	0.8014 0.7189	0.8307	0.7800	0.7754	Ave		0.7781				4.8		20.0			
d7-N-MeFOSE-M	0.1921 0.1709	0.1853 0.1717	0.1862	0.1760	0.1764	Ave		0.1798				4.5		20.0			
d3-NMePFOSA	0.1130 0.1117	0.1105 0.1140	0.1138	0.1065	0.1130	Ave		0.1118				2.4		20.0			
d9-N-EtFOSE-M	0.2127 0.1829	0.2022 0.1879	0.2130	0.1956	0.1970	Ave		0.1988				5.8		20.0			
d5-NEtPFOSA	0.1148 0.1076	0.1109 0.1069	0.1143	0.1106	0.1144	Ave		0.1114				3.0		20.0			
13C2 PFTeDA	0.8390 0.7812	0.8556 0.7735	0.8767	0.8235	0.8092	Ave		0.8227				4.6		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-20482/1	20JUL09MCAL-09.d
Level 2	IC 410-20482/2	20JUL09MCAL-10.d
Level 3	IC 410-20482/3	20JUL09MCAL-11.d
Level 4	IC 410-20482/4	20JUL09MCAL-12.d
Level 5	ICISAV 410-20482/5	20JUL09MCAL-13.d
Level 6	IC 410-20482/6	20JUL09MCAL-14.d
Level 7	IC 410-20482/7	20JUL09MCAL-15.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid		LID1F	90614 15730977	196749 27951206	712820	2757743	6526588	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanoic acid		LID1F	78218 15291062	180504 26475485	665228	2566672	6176945	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorobutanesulfonic acid		LID1F	49673 11490838	119608 18749041	478729	1902023	4487633	0.177 44.3	0.443 88.5	1.77	7.08	17.7
4:2 Fluorotelomer sulfonic acid		LID1F	17281 3570405	37963 6005121	155104	613985	1476659	0.187 46.7	0.467 93.4	1.87	7.47	18.7
Perfluorohexanoic acid		LID1F	77809 14942611	180338 26256458	677810	2632620	6241335	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanesulfonic acid		LID1F	46608 10104783	116759 17315237	447676	1746288	4360151	0.188 46.9	0.469 93.8	1.88	7.50	18.8
HFPODA		LID1F	28653 6157950	68551 11205561	267509	1078290	2511222	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoroheptanoic acid		LID1F	109163 21541677	254446 36368070	999494	3810831	9331814	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexanesulfonic acid		LID1F	56312 11230755	122371 19602934	485962	1895300	4755958	0.182 45.6	0.456 91.2	1.82	7.30	18.2
DONA		LID1F	137669 28473434	318376 49446111	1258079	4953378	11813831	0.189 47.3	0.473 94.5	1.89	7.56	18.9
6:2 Fluorotelomer sulfonic acid		LID1F	16355 2623593	31433 4556693	128060	483413	1149355	0.190 47.4	0.474 94.8	1.90	7.58	19.0
Perfluoroheptanesulfonic acid		LID1F	45611 10464384	116050 18180600	446864	1778432	4338819	0.190 47.6	0.476 95.2	1.90	7.62	19.0
Perfluorooctanoic acid		LID1F	99347 19016036	238492 32709736	848362	3285562	7796789	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctanesulfonic acid		LID1F	57092 11237400	122775 19488259	472304	1831270	4534473	0.185 46.3	0.463 92.6	1.85	7.40	18.5
Perfluorononanoic acid		LID1F	76232 17483033	185776 29010123	728319	2868006	7028466	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
9Cl-PF3ONS		LID1F	89579 18162063	194102 31906884	746933	2984298	7259798	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorononanesulfonic acid		LID1F	41945 9778593	101876 17350348	408382	1690524	3928596	0.192 48.0	0.480 96.0	1.92	7.68	19.2
Perfluorodecanoic acid		LID1F	96046 18899028	222417 31879893	837193	3336496	7941129	0.200 50.0	0.500 100	2.00	8.00	20.0
8:2 Fluorotelomer sulfonic acid		LID1F	12884 2584938	27394 4377434	116975	488851	1098277	0.192 47.9	0.479 95.8	1.92	7.66	19.2
Perfluorooctanesulfonamide		LID1F	87962 19695932	213031 33910671	833035	3265307	7536775	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSAA		LID1F	31354 6361362	70819 11398044	274216	1107301	2661837	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorodecanesulfonic acid		LID1F	47273 10380814	110100 17772495	434278	1671325	4135580	0.193 48.2	0.482 96.4	1.93	7.71	19.3
Perfluoroundecanoic acid		LID1F	90498 18292442	208504 31338825	836690	3276522	7559477	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSAA		LID1F	23556 5287767	57137 9042508	224105	884113	2166217	0.200 50.0	0.500 100	2.00	8.00	20.0
11Cl-PF3OUdS		LID1F	64579 14477274	162122 25195705	612448	2436300	5834663	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorododecanoic acid		LID1F	76704 13863063	172599 23860168	625079	2451131	5733685	0.200 50.0	0.500 100	2.00	8.00	20.0
10:2 FTS		LID1F	10155 2165689	25480 3652198	94995	369562	897440	0.193 48.2	0.482 96.4	1.93	7.71	19.3
NMeFOSE		LID1F	16813 3756025	42641 6713175	162676	626844	1512612	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSA		LID1F	9999 2550852	27846 4472132	105627	410112	1043123	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorododecanesulfonic acid		LID1F	45288 10074704	111090 16865765	417514	1678700	4079512	0.194 48.4	0.484 96.8	1.94	7.74	19.4
NEtFOSE		LID1F	20029 4146300	49786 7259050	176957	688846	1683820	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSA		LID1F	10639 2477214	25539 4217410	97311	401948	978518	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotridecanoic acid		LID1F	62159 12787733	142880 20951910	578709	2292122	5403351	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotetradecanoic acid		LID1F	74679 14470603	172080 24720248	653676	2562864	6062433	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexadecanoic acid		LID1F	65077 11914180	141067 19890203	524932	2026992	4786054	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctadecanoic acid		LID1F	27218 5888746	62653 10133619	255342	992059	2389330	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	13C3 PFBA	Ave	4160579 3793132	4241357 3440808	4089344	4277831	3709387	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C5 PFPeA	13C3 PFBA	Ave	3270257 3272629	3463597 2846744	3485903	3398573	3118854	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFBS	13C3 PFBA	Ave	2339821 2331560	2568583 2018290	2596256	2494248	2268884	9.36 9.36	9.36 9.36	9.36	9.36	9.36
M2-4:2 FTS	13PF OA	Ave	231800 209187	230879 185256	231902	224367	205119	9.34 9.34	9.34 9.34	9.34	9.34	9.34
13C5 PFHxA	13PF OA	Ave	4214274 3904452	4342041 3379223	4310882	4448911	3672670	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 HFPO-DA	13PF OA	Ave	515494 461389	541191 460155	532963	515431	455357	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C4 PFHpA	13PF OA	Ave	4423816 4153603	4520440 3608543	4296078	4588346	4096948	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFHxS	13PF OA	Ave	2418900 2353400	2491756 2016798	2508098	2578239	2343987	9.46 9.46	9.46 9.46	9.46	9.46	9.46
M2-6:2 FTS	13PF OA	Ave	122575 110832	125026 98790	120838	115085	105570	9.50 9.50	9.50 9.50	9.50	9.50	9.50
13C8 PFOA	13PF OA	Ave	4714453 4397937	4902463 3955143	4869145	4879082	4473376	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C8 PFOS	PFOS	Ave	2306178 2299309	2459176 1955458	2336848	2418465	2254651	9.57 9.57	9.57 9.57	9.57	9.57	9.57
13C9 PFNA	PFOS	Ave	4286616 4016990	4225794 3584850	4286015	4325071	3893842	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C6 PFDA	PFDA	Ave	4935317 4499278	5083314 3917859	5055876	5076598	4521756	10.0 10.0	10.0 10.0	10.0	10.0	10.0
M2-8:2 FTS	PFDA	Ave	76359 63176	71162 56575	72498	75820	66410	9.58 9.58	9.58 9.58	9.58	9.58	9.58
13C8 FOSA	PFDA	Ave	4340219 3914998	4149677 3406761	4060834	4183147	3500970	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMeFOSAA	PFDA	Ave	1404734 1296077	1377123 1175505	1375194	1367129	1271828	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C7 PFUnA	PFDA	Ave	4846551 4599035	5219785 4003017	4973959	5102953	4572928	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtFOSAA	PFDA	Ave	1241531 1141425	1233338 987290	1237390	1243642	1111014	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2-PFDoDA	PFDA	Ave	3490074 3228861	3551079 2791101	3508926	3569072	3165619	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d7-N-MeFOSE-M	PFDA	Ave	842120 741220	820818 666425	786455	805119	720218	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMePFOSA	PFDA	Ave	495639 484508	489570 442631	480693	487357	461262	10.0 10.0	10.0 10.0	10.0	10.0	10.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
d9-N-EtFOSE-M	PFDA	Ave	932395 793283	895779 729669	899631	895166	804462	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtPFOSA	PFDA	Ave	503514 466901	491218 414921	482870	506067	466938	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2 PFTeDA	PFDA	Ave	3678501 3389295	3791032 3002912	3703106	3768011	3303906	10.0 10.0	10.0 10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD
LID1F = Linear 1/Conc IsoDil FZ

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-20482/1	20JUL09MCAL-09.d
Level 2	IC 410-20482/2	20JUL09MCAL-10.d
Level 3	IC 410-20482/3	20JUL09MCAL-11.d
Level 4	IC 410-20482/4	20JUL09MCAL-12.d
Level 5	ICISAV 410-20482/5	20JUL09MCAL-13.d
Level 6	IC 410-20482/6	20JUL09MCAL-14.d
Level 7	IC 410-20482/7	20JUL09MCAL-15.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanoic acid	31.9 -1.6	12.4	5.6	-2.4	6.6	0.5	50 30	30	30	30	30	30
Perfluoropentanoic acid	27.3 -1.0	11.0	1.6	0.5	5.4	-0.5	50 30	30	30	30	30	30
Perfluorobutanesulfonic acid	11.4 -2.5	-2.2	-3.2	0.1	3.8	3.5	50 30	30	30	30	30	30
4:2 Fluorotelomer sulfonic acid	11.7 -2.9	-1.5	0.2	2.5	7.8	2.2	50 30	30	30	30	30	30
Perfluorohexanoic acid	18.3 -0.5	6.4	0.7	-5.2	8.9	-1.9	50 30	30	30	30	30	30
Perfluoropentanesulfonic acid	14.1 -1.7	4.2	-1.2	0.3	10.1	-0.7	50 30	30	30	30	30	30
HFPODA	9.2 -4.3	-0.5	-1.4	2.7	8.3	4.9	50 30	30	30	30	30	30
Perfluoroheptanoic acid	19.3 -2.5	8.9	12.5	0.4	10.1	0.3	50 30	30	30	30	30	30
Perfluorohexanesulfonic acid	20.0 0.2	1.3	-0.1	-5.2	4.6	-1.6	50 30	30	30	30	30	30
DONA	12.9 -0.6	2.2	6.2	-2.1	4.6	-0.6	50 30	30	30	30	30	30
6:2 Fluorotelomer sulfonic acid	39.6 -3.5	5.2	10.9	9.9	13.9	-0.9	50 30	30	30	30	30	30
Perfluoroheptanesulfonic acid	4.9 0.3	3.6	-0.9	-4.1	2.9	-1.1	50 30	30	30	30	30	30
Perfluorooctanoic acid	24.8 -2.0	15.3	3.2	-0.3	3.2	2.4	50 30	30	30	30	30	30
Perfluorooctanesulfonic acid	25.0 0.6	0.8	2.0	-4.4	1.5	-1.3	50 30	30	30	30	30	30
Perfluorononanoic acid	6.1 -3.4	4.9	1.4	-1.1	7.7	3.9	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
9Cl-PF3ONS	20.6 1.3	-2.0	-0.8	-4.2	-0.1	-1.9	50 30	30	30	30	30	30
Perfluorononanesulfonic acid	4.0 1.5	-5.3	-0.1	-0.1	-0.4	-2.7	50 30	30	30	30	30	30
Perfluorodecanoic acid	17.4 -1.8	5.6	-0.1	-0.9	5.9	1.3	50 30	30	30	30	30	30
8:2 Fluorotelomer sulfonic acid	6.3 -2.5	-3.0	1.6	1.5	4.2	3.1	50 30	30	30	30	30	30
Perfluorooctanesulfonamide	0.6 -1.1	2.0	1.9	-3.1	6.9	-0.1	50 30	30	30	30	30	30
NMeFOSAA	13.4 -1.5	4.5	1.3	2.9	6.4	-0.2	50 30	30	30	30	30	30
Perfluorodecanesulfonic acid	13.1 0.3	-1.2	2.5	-4.7	1.2	-0.4	50 30	30	30	30	30	30
Perfluoroundecanoic acid	17.7 -1.3	0.8	6.1	1.2	4.2	0.3	50 30	30	30	30	30	30
NEtFOSAA	2.7 -0.9	0.3	-2.0	-3.8	5.5	0.3	50 30	30	30	30	30	30
11Cl-PF3OUdS	9.4 0.7	3.0	2.4	-1.6	1.1	-1.6	50 30	30	30	30	30	30
Perfluorododecanoic acid	27.4 -0.9	12.7	3.2	-0.5	5.0	-0.5	50 30	30	30	30	30	30
10:2 FTS	1.0 -2.0	8.7	-0.5	-7.5	2.6	4.1	50 30	30	30	30	30	30
NMeFOSE	-1.4 -0.5	2.6	2.1	-3.9	3.7	0.1	50 30	30	30	30	30	30
NMeFOSA	-2.9 -2.7	9.5	5.8	1.3	8.9	1.4	50 30	30	30	30	30	30
Perfluorododecanesulfonic acid	12.6 -1.1	3.6	2.5	-0.5	3.8	0.5	50 30	30	30	30	30	30
NEtFOSE	6.0 -1.8	9.7	-2.9	-5.1	3.3	3.2	50 30	30	30	30	30	30
NEtFOSA	2.4 -1.4	0.8	-2.3	-3.7	1.6	2.9	50 30	30	30	30	30	30
Perfluorotridecanoic acid	14.6 -3.4	3.6	6.1	3.3	9.8	2.0	50 30	30	30	30	30	30
Perfluorotetradecanoic acid	20.2 -2.5	7.5	4.5	0.7	8.6	1.1	50 30	30	30	30	30	30
Perfluorohexadecanoic acid	29.7 -2.9	9.1	3.9	-1.4	6.2	3.1	50 30	30	30	30	30	30
Perfluorooctadecanoic acid	8.0 -1.5	-3.5	0.6	-3.9	5.5	1.4	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
13C4 PFBA	-0.8 -3.9	3.7	4.1	1.9	-1.8	-3.2	30 30	30	30	30	30	30
13C5 PFPeA	-5.5 -3.7	2.6	7.4	-1.9	0.0	1.2	30 30	30	30	30	30	30
13C3 PFBS	-7.0 -6.1	4.7	10.1	-0.9	0.1	-0.8	30 30	30	30	30	30	30
M2-4:2 FTS	3.4 -3.3	1.2	4.0	-2.7	-0.3	-2.3	30 30	30	30	30	30	30
13C5 PFHxA	1.0 -5.2	2.4	3.9	3.8	-4.0	-2.0	30 30	30	30	30	30	30
13C3 HFPO-DA	0.1 4.6	3.4	4.1	-2.6	-3.5	-6.2	30 30	30	30	30	30	30
13C4 PFHpA	0.9 -3.7	1.4	-1.5	1.8	1.9	-0.8	30 30	30	30	30	30	30
13C3 PFHxS	-2.0 -4.4	-0.7	2.2	1.6	3.5	-0.2	30 30	30	30	30	30	30
M2-6:2 FTS	3.9 -2.0	4.2	3.0	-5.1	-2.4	-1.6	30 30	30	30	30	30	30
13C8 PFOA	-0.9 -2.7	1.4	3.0	-0.2	2.6	-3.2	30 30	30	30	30	30	30
13C8 PFOS	1.2 -2.0	6.7	1.0	-3.4	1.0	-4.6	30 30	30	30	30	30	30
13C9 PFNA	5.4 0.6	2.7	3.7	-3.3	-2.3	-6.7	30 30	30	30	30	30	30
13C6 PFDA	1.9 -8.7	3.8	8.3	0.4	0.3	-6.1	30 30	30	30	30	30	30
M2-8:2 FTS	8.3 -9.4	-0.2	6.7	3.0	1.1	-9.5	30 30	30	30	30	30	30
13C8 FOSA	7.6 -4.6	1.8	4.5	-0.6	-6.8	-1.9	30 30	30	30	30	30	30
d3-NMeFOSAA	3.4 -2.3	0.3	5.1	-3.6	0.6	-3.6	30 30	30	30	30	30	30
13C7 PFUnA	-0.6 -7.3	5.9	5.8	0.2	0.7	-4.7	30 30	30	30	30	30	30
d5-NEtFOSAA	3.5 -7.1	1.7	7.0	-0.7	-0.6	-3.9	30 30	30	30	30	30	30
13C2-PFDoDA	2.3 -7.6	3.0	6.8	0.2	-0.4	-4.3	30 30	30	30	30	30	30
d7-N-MeFOSE-M	6.8 -4.5	3.0	3.6	-2.1	-1.9	-5.0	30 30	30	30	30	30	30
d3-NMePFOSA	1.1 2.0	-1.2	1.8	-4.7	1.1	-0.1	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1 Analy Batch No.: 20482

SDG No.:

Instrument ID: 30733 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/09/2020 10:14 Calibration End Date: 07/09/2020 11:08 Calibration ID: 6664

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
d9-N-EtFOSE-M	7.0 -5.4	1.7	7.2	-1.6	-0.9	-8.0	30 30	30	30	30	30	30
d5-NEtPFOSA	3.1 -4.0	-0.4	2.7	-0.7	2.7	-3.4	30 30	30	30	30	30	30
13C2 PFTeDA	2.0 -6.0	4.0	6.6	0.1	-1.6	-5.0	30 30	30	30	30	30	30

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1

SDG No.:

Lab Sample ID: ICV 410-20482/9 Calibration Date: 07/09/2020 11:26

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09MCAL-17.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8868		2.15	2.00	7.4	30.0
Perfluoropentanoic acid	LID1F		1.006		2.14	2.00	7.1	30.0
Perfluorobutanesulfonic acid	LID1F		1.018		1.79	1.77	1.1	30.0
Perfluorohexanoic acid	LID1F		0.8083		2.07	2.00	3.5	30.0
HFPODA	LID1F		2.602		2.04	2.00	2.2	30.0
Perfluoroheptanoic acid	LID1F		1.110		2.15	2.00	7.3	30.0
Perfluorohexanesulfonic acid	LID1F		1.019		1.92	1.89	1.3	30.0
DONA	LID1F		1.450		1.87	1.88	-0.6	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9191		1.96	1.90	2.9	30.0
Perfluorooctanoic acid	LID1F		0.8632		2.05	2.00	2.3	30.0
Perfluorooctanesulfonic acid	LID1F		0.9279		1.73	1.91	-9.4	30.0
Perfluorononanoic acid	LID1F		0.8496		2.03	2.00	1.4	30.0
9Cl-PF3ONS	LID1F		1.689		1.90	1.86	1.9	30.0
Perfluorodecanoic acid	LID1F		0.8204		1.98	2.00	-1.0	30.0
NMeFOSAA	LID1F		1.003		2.04	2.00	1.9	30.0
Perfluorodecanesulfonic acid	LID1F		0.9664		2.07	1.93	7.4	30.0
Perfluoroundecanoic acid	LID1F		0.8224		2.07	2.00	3.7	30.0
NEtFOSAA	LID1F		0.9614		2.08	2.00	4.0	30.0
11Cl-PF3OUdS	LID1F		1.309		1.87	1.88	-0.5	30.0
Perfluorododecanoic acid	LID1F		0.8947		2.07	2.00	3.7	30.0
Perfluorotridecanoic acid	LID1F		0.8186		2.11	2.00	5.4	30.0
Perfluorotetradecanoic acid	LID1F		0.8561		2.03	2.00	1.4	30.0
13C4 PFBA	Ave	1.092	1.000		9.15	10.0	-8.5	30.0
13C5 PFPeA	Ave	0.9016	0.8521		9.45	10.0	-5.5	30.0
13C3 PFBS	Ave	0.7001	0.6518		8.71	9.36	-6.9	30.0
M2-4:2 FTS	Ave	0.0495	0.0470		8.85	9.34	-5.2	30.0
13C5 PFHxA	Ave	0.8606	0.8070		9.38	10.0	-6.2	30.0
13C3 HFPO-DA	Ave	0.1062	0.0949		8.94	10.0	-10.6	30.0
13C4 PFHpA	Ave	0.9047	0.8106		8.96	10.0	-10.4	30.0
13C3 PFHxS	Ave	0.5384	0.4807		8.44	9.46	-10.7	30.0
M2-6:2 FTS	Ave	0.0256	0.0240		8.90	9.50	-6.3	30.0
13C8 PFOA	Ave	0.9813	0.9018		9.19	10.0	-8.1	30.0
13C8 PFOS	Ave	1.008	0.9218		8.75	9.57	-8.6	30.0
13C9 PFNA	Ave	1.723	1.578		9.16	10.0	-8.4	30.0
13C6 PFDA	Ave	1.105	1.040		9.42	10.0	-5.8	30.0
M2-8:2 FTS	Ave	0.0168	0.0163		9.27	9.58	-3.2	30.0
13C8 FOSA	Ave	0.9199	0.8850		9.62	10.0	-3.8	30.0
d3-NMeFOSAA	Ave	0.3098	0.3078		9.94	10.0	-0.6	30.0
13C7 PFUnA	Ave	1.113	1.030		9.26	10.0	-7.4	30.0
d5-NEtFOSAA	Ave	0.2737	0.2636		9.63	10.0	-3.7	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1

SDG No.:

Lab Sample ID: ICV 410-20482/9 Calibration Date: 07/09/2020 11:26

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL09MCAL-17.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C2-PFDoDA	Ave	0.7781	0.7476		9.61	10.0	-3.9	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1708		9.50	10.0	-5.0	30.0
d3-NMePFOSA	Ave	0.1118	0.1054		9.43	10.0	-5.7	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.1962		9.87	10.0	-1.3	30.0
d5-NEtPFOSA	Ave	0.1114	0.1093		9.82	10.0	-1.8	30.0
13C2 PFTeDA	Ave	0.8227	0.7669		9.32	10.0	-6.8	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1

SDG No.:

Lab Sample ID: CCV 410-21758/16 Calibration Date: 07/13/2020 15:00

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL13-20.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8601		20.8	20.0	4.2	30.0
Perfluoropentanoic acid	LID1F		0.9779		20.8	20.0	4.1	30.0
Perfluorobutanesulfonic acid	LID1F		1.015		17.8	17.7	0.7	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.545		19.8	18.7	6.2	30.0
Perfluorohexanoic acid	LID1F		0.8319		21.3	20.0	6.6	30.0
Perfluoropentanesulfonic acid	LID1F		0.9366		20.2	18.8	7.5	30.0
HFPODA	LID1F		2.791		21.9	20.0	9.6	30.0
Perfluoroheptanoic acid	LID1F		1.129		21.8	20.0	9.2	30.0
Perfluorohexanesulfonic acid	LID1F		0.9831		17.8	18.2	-2.3	30.0
DONA	LID1F		1.547		20.0	18.9	6.0	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.442		21.6	19.0	13.7	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9210		19.6	19.0	3.1	30.0
Perfluorooctanoic acid	LID1F		0.9299		22.0	20.0	10.2	30.0
Perfluorooctanesulfonic acid	LID1F		1.029		18.6	18.5	0.5	30.0
Perfluorononanoic acid	LID1F		0.8649		20.6	20.0	3.2	30.0
9Cl-PF3ONS	LID1F		1.809		20.3	18.6	9.2	30.0
Perfluorononanesulfonic acid	LID1F		0.9349		20.6	19.2	7.3	30.0
Perfluorodecanoic acid	LID1F		0.8613		20.8	20.0	3.9	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		8.282		20.0	19.2	4.3	30.0
Perfluorooctanesulfonamide	LID1F		0.9935		19.7	20.0	-1.3	30.0
NMeFOSAA	LID1F		1.007		20.5	20.0	2.4	30.0
Perfluorodecanesulfonic acid	LID1F		0.9776		21.0	19.3	8.7	30.0
Perfluoroundecanoic acid	LID1F		0.8213		20.7	20.0	3.6	30.0
NEtFOSAA	LID1F		0.9242		20.0	20.0	0.0	30.0
11Cl-PF3OUdS	LID1F		1.477		20.9	18.6	12.2	30.0
Perfluorododecanoic acid	LID1F		0.9235		21.4	20.0	7.0	30.0
10:2 FTS	LID1F		7.023		20.7	19.3	7.3	30.0
NMeFOSE	LID1F		1.044		20.6	20.0	3.1	30.0
NMeFOSA	LID1F		1.098		21.1	20.0	5.7	30.0
Perfluorododecanesulfonic acid	LID1F		0.9214		20.7	19.4	7.0	30.0
NEtFOSE	LID1F		1.038		20.5	20.0	2.4	30.0
Perfluorotridecanoic acid	LID1F		0.7807		20.1	20.0	0.5	30.0
NEtFOSA	LID1F		1.023		19.8	20.0	-0.8	30.0
Perfluorotetradecanoic acid	LID1F		0.8885		21.0	20.0	5.2	30.0
Perfluorohexadecanoic acid	LID1F		0.7155		21.0	20.0	4.9	30.0
Perfluorooctadecanoic acid	LID1F		0.3531		20.6	20.0	3.1	30.0
13C4 PFBA	Ave	1.092	1.075		9.84	10.0	-1.6	30.0
13C5 PFPeA	Ave	0.9016	0.9123		10.1	10.0	1.2	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1

SDG No.:

Lab Sample ID: CCV 410-21758/16 Calibration Date: 07/13/2020 15:00

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL13-20.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.7001	0.6684		8.94	9.36	-4.5	30.0
M2-4:2 FTS	Ave	0.0495	0.0457		8.62	9.34	-7.8	30.0
13C5 PFHxA	Ave	0.8606	0.8297		9.64	10.0	-3.6	30.0
13C3 HFPO-DA	Ave	0.1062	0.0949		8.94	10.0	-10.6	30.0
13C3 PFHxS	Ave	0.5384	0.5200		9.14	9.46	-3.4	30.0
13C4 PFHpA	Ave	0.9047	0.8771		9.69	10.0	-3.1	30.0
M2-6:2 FTS	Ave	0.0256	0.0246		9.12	9.50	-4.0	30.0
13C8 PFOA	Ave	0.9813	0.9670		9.85	10.0	-1.5	30.0
13C8 PFOS	Ave	1.008	0.9661		9.16	9.57	-4.2	30.0
13C9 PFNA	Ave	1.723	1.697		9.85	10.0	-1.5	30.0
13C6 PFDA	Ave	1.105	1.093		9.89	10.0	-1.1	30.0
M2-8:2 FTS	Ave	0.0168	0.0163		9.31	9.58	-2.8	30.0
13C8 FOSA	Ave	0.9199	0.9342		10.2	10.0	1.6	30.0
d3-NMeFOSAA	Ave	0.3098	0.3016		9.74	10.0	-2.6	30.0
13C7 PFUnA	Ave	1.113	1.161		10.4	10.0	4.3	30.0
d5-NEtFOSAA	Ave	0.2737	0.2801		10.2	10.0	2.3	30.0
13C2-PFDoDA	Ave	0.7781	0.8084		10.4	10.0	3.9	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1774		9.87	10.0	-1.3	30.0
d3-NMePFOSA	Ave	0.1118	0.1071		9.58	10.0	-4.2	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.1967		9.90	10.0	-1.0	30.0
d5-NEtPFOSA	Ave	0.1114	0.1102		9.89	10.0	-1.1	30.0
13C2 PFTeDA	Ave	0.8227	0.8246		10.0	10.0	0.2	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1

SDG No.:

Lab Sample ID: CCV 410-21758/32 Calibration Date: 07/13/2020 17:26

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL13-36.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8819		2.14	2.00	6.8	30.0
Perfluoropentanoic acid	LID1F		0.9602		2.04	2.00	2.2	30.0
Perfluorobutanesulfonic acid	LID1F		0.9295		1.63	1.77	-7.7	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.253		1.82	1.87	-2.6	30.0
Perfluorohexanoic acid	LID1F		0.8168		2.09	2.00	4.6	30.0
Perfluoropentanesulfonic acid	LID1F		0.8727		1.88	1.88	0.2	30.0
HFPODA	LID1F		2.556		2.01	2.00	0.4	30.0
Perfluoroheptanoic acid	LID1F		1.086		2.10	2.00	5.0	30.0
Perfluorohexanesulfonic acid	LID1F		0.9912		1.80	1.82	-1.5	30.0
DONA	LID1F		1.528		1.98	1.89	4.7	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.111		2.02	1.90	6.7	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8577		1.83	1.90	-4.0	30.0
Perfluorooctanoic acid	LID1F		0.9272		2.20	2.00	9.8	30.0
Perfluorooctanesulfonic acid	LID1F		1.020		1.85	1.85	-0.3	30.0
Perfluorononanoic acid	LID1F		0.8490		2.03	2.00	1.3	30.0
9Cl-PF3ONS	LID1F		1.759		1.97	1.86	6.2	30.0
Perfluorononanesulfonic acid	LID1F		0.9217		2.03	1.92	5.8	30.0
Perfluorodecanoic acid	LID1F		0.8495		2.05	2.00	2.5	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		8.725		2.11	1.92	9.9	30.0
Perfluorooctanesulfonamide	LID1F		1.022		2.03	2.00	1.5	30.0
NMeFOSAA	LID1F		0.9574		1.95	2.00	-2.7	30.0
Perfluorodecanesulfonic acid	LID1F		0.9096		1.95	1.93	1.1	30.0
Perfluoroundecanoic acid	LID1F		0.8410		2.12	2.00	6.1	30.0
NEtFOSAA	LID1F		0.8887		1.92	2.00	-3.8	30.0
11Cl-PF3OUdS	LID1F		1.392		1.97	1.86	5.7	30.0
Perfluorododecanoic acid	LID1F		0.8966		2.08	2.00	3.9	30.0
10:2 FTS	LID1F		7.055		2.08	1.93	7.8	30.0
NMeFOSA	LID1F		0.9831		1.89	2.00	-5.3	30.0
NMeFOSE	LID1F		1.020		2.01	2.00	0.7	30.0
Perfluorododecanesulfonic acid	LID1F		0.8972		2.02	1.94	4.1	30.0
Perfluorotridecanoic acid	LID1F		0.7891		2.03	2.00	1.6	30.0
NEtFOSE	LID1F		1.016		2.01	2.00	0.3	30.0
NEtFOSA	LID1F		1.035		2.01	2.00	0.3	30.0
Perfluorotetradecanoic acid	LID1F		0.8909		2.11	2.00	5.5	30.0
Perfluorohexadecanoic acid	LID1F		0.7132		2.09	2.00	4.6	30.0
Perfluorooctadecanoic acid	LID1F		0.3403		1.99	2.00	-0.7	30.0
13C4 PFBA	Ave	1.092	1.138		10.4	10.0	4.2	30.0
13C5 PFPeA	Ave	0.9016	0.9766		10.8	10.0	8.3	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1

SDG No.:

Lab Sample ID: CCV 410-21758/32 Calibration Date: 07/13/2020 17:26

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL13-36.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.7001	0.7437		9.94	9.36	6.2	30.0
M2-4:2 FTS	Ave	0.0495	0.0523		9.86	9.34	5.6	30.0
13C5 PFHxA	Ave	0.8606	0.8887		10.3	10.0	3.3	30.0
13C3 HFPO-DA	Ave	0.1062	0.1036		9.75	10.0	-2.5	30.0
13C4 PFHpA	Ave	0.9047	0.9373		10.4	10.0	3.6	30.0
13C3 PFHxS	Ave	0.5384	0.5507		9.67	9.46	2.3	30.0
M2-6:2 FTS	Ave	0.0256	0.0255		9.47	9.50	-0.3	30.0
13C8 PFOA	Ave	0.9813	1.007		10.3	10.0	2.7	30.0
13C8 PFOS	Ave	1.008	1.061		10.1	9.57	5.2	30.0
13C9 PFNA	Ave	1.723	1.889		11.0	10.0	9.7	30.0
13C6 PFDA	Ave	1.105	1.103		9.99	10.0	-0.1	30.0
M2-8:2 FTS	Ave	0.0168	0.0162		9.24	9.58	-3.5	30.0
13C8 FOSA	Ave	0.9199	0.9377		10.2	10.0	1.9	30.0
d3-NMeFOSAA	Ave	0.3098	0.3156		10.2	10.0	1.9	30.0
13C7 PFUnA	Ave	1.113	1.161		10.4	10.0	4.4	30.0
d5-NEtFOSAA	Ave	0.2737	0.2936		10.7	10.0	7.3	30.0
13C2-PFDoDA	Ave	0.7781	0.8379		10.8	10.0	7.7	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1851		10.3	10.0	3.0	30.0
d3-NMePFOSA	Ave	0.1118	0.1124		10.1	10.0	0.5	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.2079		10.5	10.0	4.6	30.0
d5-NEtPFOSA	Ave	0.1114	0.1103		9.90	10.0	-1.0	30.0
13C2 PFTeDA	Ave	0.8227	0.8512		10.3	10.0	3.5	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1

SDG No.:

Lab Sample ID: CCV 410-21758/40 Calibration Date: 07/13/2020 18:38

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL13-44.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8260		8.00	8.00	0.0	30.0
Perfluoropentanoic acid	LID1F		0.9282		7.90	8.00	-1.2	30.0
Perfluorobutanesulfonic acid	LID1F		0.9414		6.62	7.08	-6.5	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		3.281		7.34	7.47	-1.7	30.0
Perfluorohexanoic acid	LID1F		0.7454		7.64	8.00	-4.5	30.0
Perfluoropentanesulfonic acid	LID1F		0.8458		7.29	7.50	-2.9	30.0
HFPODA	LID1F		2.577		8.10	8.00	1.3	30.0
Perfluoroheptanoic acid	LID1F		1.102		8.52	8.00	6.5	30.0
Perfluorohexanesulfonic acid	LID1F		0.9397		6.82	7.30	-6.6	30.0
DONA	LID1F		1.417		7.34	7.56	-2.9	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		5.090		8.06	7.58	6.3	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8244		7.03	7.62	-7.7	30.0
Perfluorooctanoic acid	LID1F		0.9041		8.57	8.00	7.1	30.0
Perfluorooctanesulfonic acid	LID1F		0.9720		7.03	7.40	-5.1	30.0
Perfluorononanoic acid	LID1F		0.7889		7.53	8.00	-5.9	30.0
9Cl-PF3ONS	LID1F		1.636		7.35	7.44	-1.2	30.0
Perfluorononanesulfonic acid	LID1F		0.8827		7.78	7.68	1.3	30.0
Perfluorodecanoic acid	LID1F		0.8007		7.73	8.00	-3.4	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		7.500		7.24	7.66	-5.5	30.0
Perfluorooctanesulfonamide	LID1F		0.9867		7.84	8.00	-2.0	30.0
NMeFOSAA	LID1F		0.9607		7.81	8.00	-2.4	30.0
Perfluorodecanesulfonic acid	LID1F		0.9019		7.73	7.71	0.3	30.0
Perfluoroundecanoic acid	LID1F		0.7644		7.71	8.00	-3.6	30.0
NEtFOSAA	LID1F		0.8485		7.35	8.00	-8.2	30.0
11Cl-PF3OUdS	LID1F		1.365		7.71	7.44	3.7	30.0
Perfluorododecanoic acid	LID1F		0.9304		8.63	8.00	7.8	30.0
10:2 FTS	LID1F		6.623		7.80	7.71	1.2	30.0
NMeFOSA	LID1F		0.9672		7.45	8.00	-6.9	30.0
NMeFOSE	LID1F		0.9873		7.80	8.00	-2.5	30.0
Perfluorododecanesulfonic acid	LID1F		0.8993		8.08	7.74	4.4	30.0
NEtFOSE	LID1F		0.9862		7.79	8.00	-2.7	30.0
Perfluorotridecanoic acid	LID1F		0.8207		8.45	8.00	5.6	30.0
NEtFOSA	LID1F		0.9706		7.53	8.00	-5.9	30.0
Perfluorotetradecanoic acid	LID1F		0.8403		7.96	8.00	-0.5	30.0
Perfluorohexadecanoic acid	LID1F		0.6843		8.03	8.00	0.3	30.0
Perfluorooctadecanoic acid	LID1F		0.3356		7.84	8.00	-2.0	30.0
13C4 PFBA	Ave	1.092	1.107		10.1	10.0	1.3	30.0
13C5 PFPeA	Ave	0.9016	0.9635		10.7	10.0	6.9	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1

SDG No.:

Lab Sample ID: CCV 410-21758/40 Calibration Date: 07/13/2020 18:38

Instrument ID: 30733 Calib Start Date: 07/09/2020 10:14

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/09/2020 11:08

Lab File ID: 20JUL13-44.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.7001	0.7162		9.58	9.36	2.3	30.0
M2-4:2 FTS	Ave	0.0495	0.0483		9.11	9.34	-2.4	30.0
13C5 PFHxA	Ave	0.8606	0.8815		10.2	10.0	2.4	30.0
13C3 HFPO-DA	Ave	0.1062	0.0997		9.39	10.0	-6.1	30.0
13C3 PFHxS	Ave	0.5384	0.5437		9.55	9.46	1.0	30.0
13C4 PFHpA	Ave	0.9047	0.9161		10.1	10.0	1.3	30.0
M2-6:2 FTS	Ave	0.0256	0.0250		9.28	9.50	-2.3	30.0
13C8 PFOA	Ave	0.9813	0.9437		9.62	10.0	-3.8	30.0
13C8 PFOS	Ave	1.008	1.007		9.55	9.57	-0.1	30.0
13C9 PFNA	Ave	1.723	1.807		10.5	10.0	4.9	30.0
13C6 PFDA	Ave	1.105	1.116		10.1	10.0	1.0	30.0
M2-8:2 FTS	Ave	0.0168	0.0164		9.34	9.58	-2.5	30.0
13C8 FOSA	Ave	0.9199	0.9015		9.80	10.0	-2.0	30.0
d3-NMeFOSAA	Ave	0.3098	0.3104		10.0	10.0	0.2	30.0
13C7 PFUnA	Ave	1.113	1.125		10.1	10.0	1.1	30.0
d5-NEtFOSAA	Ave	0.2737	0.2896		10.6	10.0	5.8	30.0
13C2-PFDoDA	Ave	0.7781	0.7939		10.2	10.0	2.0	30.0
d7-N-MeFOSE-M	Ave	0.1798	0.1857		10.3	10.0	3.3	30.0
d3-NMePFOSA	Ave	0.1118	0.1137		10.2	10.0	1.7	30.0
d9-N-EtFOSE-M	Ave	0.1988	0.2023		10.2	10.0	1.8	30.0
d5-NEtPFOSA	Ave	0.1114	0.1133		10.2	10.0	1.7	30.0
13C2 PFTeDA	Ave	0.8227	0.8623		10.5	10.0	4.8	30.0

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1

SDG No.:

Instrument ID: 30733 Start Date: 07/09/2020 10:14

Analysis Batch Number: 20482 End Date: 07/09/2020 11:36

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 410-20482/1		07/09/2020 10:14	1	20JUL09MCAL-09.d	Gemini C18 50mm 3(mm)
IC 410-20482/2		07/09/2020 10:23	1	20JUL09MCAL-10.d	Gemini C18 50mm 3(mm)
IC 410-20482/3		07/09/2020 10:32	1	20JUL09MCAL-11.d	Gemini C18 50mm 3(mm)
IC 410-20482/4		07/09/2020 10:41	1	20JUL09MCAL-12.d	Gemini C18 50mm 3(mm)
ICISAV 410-20482/5		07/09/2020 10:50	1	20JUL09MCAL-13.d	Gemini C18 50mm 3(mm)
IC 410-20482/6		07/09/2020 10:59	1	20JUL09MCAL-14.d	Gemini C18 50mm 3(mm)
IC 410-20482/7		07/09/2020 11:08	1	20JUL09MCAL-15.d	Gemini C18 50mm 3(mm)
ICB 410-20482/8		07/09/2020 11:17	1	20JUL09MCAL-16.d	Gemini C18 50mm 3(mm)
ICV 410-20482/9		07/09/2020 11:26	1	20JUL09MCAL-17.d	Gemini C18 50mm 3(mm)
WDM 410-20482/10		07/09/2020 11:36	1	20JUL09MCAL-18.d	Gemini C18 50mm 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1

SDG No.:

Instrument ID: 30733 Start Date: 07/13/2020 12:40

Analysis Batch Number: 21758 End Date: 07/13/2020 23:24

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 410-21758/1		07/13/2020 12:40	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 12:49	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 12:59	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 13:08	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 13:17	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 13:26	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 13:35	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 13:44	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 13:53	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 14:02	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 14:11	100		Gemini C18 50mm 3(mm)
CCV 410-21758/12		07/13/2020 14:21	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 14:31	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 14:41	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 14:50	100		Gemini C18 50mm 3(mm)
CCV 410-21758/16		07/13/2020 15:00	1	20JUL13-20.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 15:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 15:19	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 15:28	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 15:37	1		Gemini C18 50mm 3(mm)
MB 410-20524/1-A		07/13/2020 15:46	1	20JUL13-25.d	Gemini C18 50mm 3(mm)
LCS 410-20524/2-A		07/13/2020 15:55	1	20JUL13-26.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 16:04	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 16:13	1		Gemini C18 50mm 3(mm)
410-6854-1		07/13/2020 16:22	1	20JUL13-29.d	Gemini C18 50mm 3(mm)
410-6854-2		07/13/2020 16:32	1	20JUL13-30.d	Gemini C18 50mm 3(mm)
410-6854-3		07/13/2020 16:41	1	20JUL13-31.d	Gemini C18 50mm 3(mm)
410-6854-4		07/13/2020 16:50	1	20JUL13-32.d	Gemini C18 50mm 3(mm)
410-6854-5		07/13/2020 16:59	1	20JUL13-33.d	Gemini C18 50mm 3(mm)
410-6854-5 MS		07/13/2020 17:08	1	20JUL13-34.d	Gemini C18 50mm 3(mm)
410-6854-5 MSD		07/13/2020 17:17	1	20JUL13-35.d	Gemini C18 50mm 3(mm)
CCV 410-21758/32		07/13/2020 17:26	1	20JUL13-36.d	Gemini C18 50mm 3(mm)
410-6854-6		07/13/2020 17:35	1	20JUL13-37.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 17:44	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 17:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 18:02	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 18:11	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 18:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 18:29	1		Gemini C18 50mm 3(mm)
CCV 410-21758/40		07/13/2020 18:38	1	20JUL13-44.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 18:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 18:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 19:06	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 19:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 19:24	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-6854-1

SDG No.:

Instrument ID: 30733 Start Date: 07/13/2020 12:40

Analysis Batch Number: 21758 End Date: 07/13/2020 23:24

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/13/2020 19:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 19:42	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 19:51	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:00	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:09	10		Gemini C18 50mm 3(mm)
CCV 410-21758/51		07/13/2020 20:18	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:27	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:37	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:46	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 20:56	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 21:05	10		Gemini C18 50mm 3(mm)
CCV 410-21758/57		07/13/2020 21:14	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 21:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 21:34	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 22:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 22:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 22:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 23:05	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/13/2020 23:15	1		Gemini C18 50mm 3(mm)
CCV 410-21758/71		07/13/2020 23:24	1		Gemini C18 50mm 3(mm)

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-6854-1

SDG No.:

Batch Number: 20524 Batch Start Date: 07/08/20 16:40 Batch Analyst: Hockley, Eric

Batch Method: EPA 537 (mod) Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	PFC_MS_MODWX 00016	PFC_SS_MODX 00021
MB 410-20524/1		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL		25 uL
LCS 410-20524/2		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL	40 uL	25 uL
410-6854-A-1	EQB-WL-070620	EPA 537 (mod), EPA 537 (Mod)	T	291.81 g	27.73 g	264.1 mL	1 mL		25 uL
410-6854-A-2	MSA-FB-070620	EPA 537 (mod), EPA 537 (Mod)	T	303.38 g	27.95 g	275.4 mL	1 mL		25 uL
410-6854-A-3	MSA-DUP-4-070620	EPA 537 (mod), EPA 537 (Mod)	T	295.14 g	27.61 g	267.5 mL	1 mL		25 uL
410-6854-A-4	GSP-MW-7-070620	EPA 537 (mod), EPA 537 (Mod)	T	287.50 g	28.09 g	259.4 mL	1 mL		25 uL
410-6854-A-5	GSP-MW-15-070620	EPA 537 (mod), EPA 537 (Mod)	T	289.60 g	27.82 g	261.8 mL	1 mL		25 uL
410-6854-A-5 MS	GSP-MW-15-070620	EPA 537 (mod), EPA 537 (Mod)	T	301.69 g	27.94 g	273.8 mL	1 mL	40 uL	25 uL
410-6854-A-5 MSD	GSP-MW-15-070620	EPA 537 (mod), EPA 537 (Mod)	T	295.03 g	27.63 g	267.4 mL	1 mL	40 uL	25 uL
410-6854-A-6	GSP-MW-10-070620	EPA 537 (mod), EPA 537 (Mod)	T	293.65 g	27.32 g	266.3 mL	1 mL		25 uL

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-6854-1

SDG No.:

Batch Number: 20524 Batch Start Date: 07/08/20 16:40 Batch Analyst: Hockley, Eric

Batch Method: EPA 537 (mod) Batch End Date:

Batch Notes	
Balance ID	B629764122
Collection Tube Witness	IMPC27319
H2O ID	HOUSEA372
Manifold ID	6
Methanol ID	DX610-US
Analyst ID - IS Reagent Drop Witness	IMPC27319
Solvent Lot #	3336507072033A , 3189007082033A
Solvent Name	1:1 ACN:MeOH , 0.3% NH4OH:MeOH
SPE Cartridge Lot ID	6509790-02
First Start time	07/08/2020 15:00

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TETRA TECH **INTERNAL CORRESPONDENCE**

TO: **S. BRENNER** **DATE:** **OCTOBER 13, 2020**

FROM: **GLORIA SCHIFINO** **COPIES:** **DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS)**
MARTIN STATE AIRPORT
SAMPLE DELIVERY GROUP (SDG) 410-7056-1

SAMPLES: 6/Aqueous

GSP-MW-13-070720	GSP-MW-16-070720
GSP-SWSD-C1-070720	GSP-SWSD-C2-070720
GSP-SWSD-C3-070720	MSA-DUP-5-070720

1/Field Blank (FB)
MSA-FB-070720

2/Equipment Blank/PFAS
EQB-Peri-070720
EQB-WL-070720

Overview

The sample set for Martin State Airport, SDG 410-7056-1, consisted of six (6) aqueous samples, one (1) field blank sample and two (2) equipment blank. All samples were analyzed for perfluorinated alkyl acids. One (1) field duplicate pairs GSP-MW-13-070720/ MSA-DUP-5-070720) were included in this SDG.

The samples were collected by Tetra Tech on July 7, 2020 and analyzed by Eurofins Lancaster Laboratories. PFAS groundwater analyses were conducted in accordance with EPA method 537 modified analytical and reporting protocols.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, mass calibration, mass spectral acquisition rate, instrument sensitivity check, peak asymmetry factor, initial/continuing calibrations, ion transitions, laboratory method results, extracted internal standard recoveries, laboratory control sample results, chromatographic resolution, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

Major

No major issues were identified.

Minor

The following extracted internal standard percent recoveries were above quality control limits:

Sample	Labeled Standard	Compounds Affected	Data Qualification
GSP-SWSD-C1-070720	13C3-PFBS	PFBS	J
GSP-SWSD-C2-070720	13C3-PFBS	PFBS	J
	13C5-PFPeA	PFPeA	J
GSP-SWSD-C3-070720	13C3-PFBS	PFBS	J

The detected results associated with the aforementioned internal stadardS were qualified as estimated (J).

Detected results reported below the reporting limit (RL) but above the detection limit (DL) were qualified as estimated (J).

In three samples, GSP-SWSD-C1-070720, GSP-SWSD-C2-070720, and GSP-SWSD-C3-070720 the laboratory reported 12 analytes. In the other remaining samples, the laboratory reported 8 analytes.

Notes

Non-detected results were reported to the RL.

Executive Summary

Laboratory Performance: Three samples contained one and/or two extracted internal standard recoveries above quality control limits.

Other Factors Affecting Data Quality: Results below the RL were estimated.

The data for these analyses were reviewed with reference to the Environmental Protection Agency document EPA 910-R-18-001 “Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537”, (November 2018). The text of this report has been formulated to address only those areas affecting data quality.

Tetra Tech, Inc.
for Gloria Schifino
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

Data Qualifier Definitions

The following definitions provide brief explanations of the validation qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted detection limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value is the estimated concentration in the sample.
R	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
UR	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

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: 09023	NSAMPLE	EQB-Peri-070720			EQB-WL-070720			GSP-MW-13-070720			GSP-MW-16-070720		
SDG: 410-7056-1	LAB_ID	410-7056-9			410-7056-1			410-7056-3			410-7056-5		
FRACTION: PFAS	SAMP_DATE	7/7/2020			7/7/2020			7/7/2020			7/7/2020		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/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
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		4.6	U		4.6	U		4.1	J	P	4.7	U	
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		2.8	U		2.7	U		2.8	U		2.8	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)		1.8	U		1.8	U		3.4			11		
PERFLUOROBUTANESULFONIC ACID (PFBS)		1.8	U		1.8	U		1.6	J	P	1.6	J	P
PERFLUOROBUTANOIC ACID (PFBA)													
PERFLUORODECANOIC ACID (PFDA)													
PERFLUOROHEPTANOIC ACID (PFHPA)		1.8	U		1.8	U		2.9			3.4		
PERFLUOROHEXANESULFONIC ACID (PFHXS)		1.8	U		1.8	U		7			6.8		
PERFLUOROHEXANOIC ACID (PFHXA)													
PERFLUORONONANOIC ACID (PFNA)		1.8	U		1.8	U		1.6	J	P	3.3		
PERFLUOROOCTANESULFONIC ACID (PFOS)		1.8	U		1.8	U		24			38		
PERFLUOROPENTANOIC ACID (PFPEA)													

PROJ_NO: 09023	NSAMPLE	GSP-SWSD-C1-070720			GSP-SWSD-C2-070720			GSP-SWSD-C3-070720			MSA-DUP-5-070720		
SDG: 410-7056-1	LAB_ID	410-7056-8			410-7056-7			410-7056-6			410-7056-4		
FRACTION: PFAS	SAMP_DATE	7/7/2020			7/7/2020			7/7/2020			7/7/2020		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF										GSP-MW-13-070720		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		8.9			9.3			9.7			4.2	J	P
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		8.2			9.2			11			2.8	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)		19			18			21			3.9		
PERFLUOROBUTANESULFONIC ACID (PFBS)		0.81	J	NP	1	J	NP	1.1	J	NP	1.5	J	P
PERFLUOROBUTANOIC ACID (PFBA)		15			15			14					
PERFLUORODECANOIC ACID (PFDA)		3.2			3.3			3.3					
PERFLUOROHEPTANOIC ACID (PFHPA)		17			17			20			2.9		
PERFLUOROHEXANESULFONIC ACID (PFHXS)		1.6	J	P	1.5	J	P	2.2			6.6		
PERFLUOROHEXANOIC ACID (PFHXA)		18			17			18					
PERFLUORONONANOIC ACID (PFNA)		7.5			8.3			9.3			1.6	J	P
PERFLUOROOCTANESULFONIC ACID (PFOS)		3.4			3.4			4.7			25		
PERFLUOROPENTANOIC ACID (PFPEA)		26			27	J	N	27					

PROJ_NO: 09023	NSAMPLE	MSA-FB-070720		
SDG: 410-7056-1	LAB_ID	410-7056-2		
FRACTION: PFAS	SAMP_DATE	7/7/2020		
MEDIA: WATER	QC_TYPE	NM		
	UNITS	NG/L		
	PCT_SOLIDS	0.0		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
6:2 FLUOROTELOMER SULFONATE (6:2FTS)		4.5	U	
8:2 FLUOROTELOMER SULFONATE (8:2FTS)		2.7	U	
PENTADECAFLUOROOCTANOIC ACID (PFOA)		1.8	U	
PERFLUOROBUTANESULFONIC ACID (PFBS)		1.8	U	
PERFLUOROBUTANOIC ACID (PFBA)				
PERFLUORODECANOIC ACID (PFDA)				
PERFLUOROHEPTANOIC ACID (PFHPA)		1.8	U	
PERFLUOROHEXANESULFONIC ACID (PFHXS)		1.8	U	
PERFLUOROHEXANOIC ACID (PFHXA)				
PERFLUORONONANOIC ACID (PFNA)		1.8	U	
PERFLUOROOCTANESULFONIC ACID (PFOS)		1.8	U	
PERFLUOROPENTANOIC ACID (PFPEA)				

Appendix B

Results as Reported by the Laboratory

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Client Sample ID: EQB-WL-070720 Lab Sample ID: 410-7056-1

Matrix: Water Lab File ID: 20JUL16-10.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/07/2020 10:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/11/2020 10:47

Sample wt/vol: 273.7(mL) Date Analyzed: 07/16/2020 10:08

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22981 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	ND		1.8	0.46
335-67-1	Perfluorooctanoic acid	ND		1.8	0.46
375-95-1	Perfluorononanoic acid	ND		1.8	0.46
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.6	1.8
375-73-5	Perfluorobutanesulfonic acid	ND		1.8	0.46
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.7	0.91
355-46-4	Perfluorohexanesulfonic acid	ND		1.8	0.46
1763-23-1	Perfluorooctanesulfonic acid	ND		1.8	0.46

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	99		33-140
STL01052	13C8 PFOA	95		52-124
STL02578	13C9 PFNA	89		48-130
STL02337	13C3 PFBS	86		23-175
STL02581	13C3 PFHxS	101		35-143
STL01054	13C8 PFOS	91		52-121
STL02279	M2-6:2 FTS	90		29-182
STL02280	M2-8:2 FTS	95		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Client Sample ID: MSA-FB-070720 Lab Sample ID: 410-7056-2

Matrix: Water Lab File ID: 20JUL16-11.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/07/2020 13:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/11/2020 10:47

Sample wt/vol: 280.1(mL) Date Analyzed: 07/16/2020 10:17

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22981 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	ND		1.8	0.45
335-67-1	Perfluorooctanoic acid	ND		1.8	0.45
375-95-1	Perfluorononanoic acid	ND		1.8	0.45
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.5	1.8
375-73-5	Perfluorobutanesulfonic acid	ND		1.8	0.45
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.7	0.89
355-46-4	Perfluorohexanesulfonic acid	ND		1.8	0.45
1763-23-1	Perfluorooctanesulfonic acid	ND		1.8	0.45

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	98		33-140
STL01052	13C8 PFOA	95		52-124
STL02578	13C9 PFNA	94		48-130
STL02337	13C3 PFBS	87		23-175
STL02581	13C3 PFHxS	97		35-143
STL01054	13C8 PFOS	95		52-121
STL02279	M2-6:2 FTS	95		29-182
STL02280	M2-8:2 FTS	93		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Client Sample ID: GSP-MW-13-070720 Lab Sample ID: 410-7056-3

Matrix: Water Lab File ID: 20JUL16-12.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/07/2020 11:35

Extraction Method: EPA 537 (mod) Date Extracted: 07/11/2020 10:47

Sample wt/vol: 268.7(mL) Date Analyzed: 07/16/2020 10:26

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22981 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	2.9		1.9	0.47
335-67-1	Perfluorooctanoic acid	3.4		1.9	0.47
375-95-1	Perfluorononanoic acid	1.6	J	1.9	0.47
27619-97-2	6:2 Fluorotelomer sulfonic acid	4.1	J	4.7	1.9
375-73-5	Perfluorobutanesulfonic acid	1.6	J	1.9	0.47
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.93
355-46-4	Perfluorohexanesulfonic acid	7.0		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	24		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	92		33-140
STL01052	13C8 PFOA	94		52-124
STL02578	13C9 PFNA	115		48-130
STL02337	13C3 PFBS	152		23-175
STL02581	13C3 PFHxS	83		35-143
STL01054	13C8 PFOS	101		52-121
STL02279	M2-6:2 FTS	154		29-182
STL02280	M2-8:2 FTS	117		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Client Sample ID: MSA-DUP-5-070720 Lab Sample ID: 410-7056-4

Matrix: Water Lab File ID: 20JUL16-13.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/07/2020 00:00

Extraction Method: EPA 537 (mod) Date Extracted: 07/11/2020 10:47

Sample wt/vol: 267.7(mL) Date Analyzed: 07/16/2020 10:35

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22981 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	2.9		1.9	0.47
335-67-1	Perfluorooctanoic acid	3.9		1.9	0.47
375-95-1	Perfluorononanoic acid	1.6	J	1.9	0.47
27619-97-2	6:2 Fluorotelomer sulfonic acid	4.2	J	4.7	1.9
375-73-5	Perfluorobutanesulfonic acid	1.5	J	1.9	0.47
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.93
355-46-4	Perfluorohexanesulfonic acid	6.6		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	25		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	102		33-140
STL01052	13C8 PFOA	96		52-124
STL02578	13C9 PFNA	111		48-130
STL02337	13C3 PFBS	158		23-175
STL02581	13C3 PFHxS	96		35-143
STL01054	13C8 PFOS	98		52-121
STL02279	M2-6:2 FTS	153		29-182
STL02280	M2-8:2 FTS	121		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Client Sample ID: GSP-MW-16-070720 Lab Sample ID: 410-7056-5

Matrix: Water Lab File ID: 20JUL16-14.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/07/2020 13:45

Extraction Method: EPA 537 (mod) Date Extracted: 07/11/2020 10:47

Sample wt/vol: 268.4(mL) Date Analyzed: 07/16/2020 10:44

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22981 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	3.4		1.9	0.47
335-67-1	Perfluorooctanoic acid	11		1.9	0.47
375-95-1	Perfluorononanoic acid	3.3		1.9	0.47
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.7	1.9
375-73-5	Perfluorobutanesulfonic acid	1.6	J	1.9	0.47
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.93
355-46-4	Perfluorohexanesulfonic acid	6.8		1.9	0.47
1763-23-1	Perfluorooctanesulfonic acid	38		1.9	0.47

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	97		33-140
STL01052	13C8 PFOA	87		52-124
STL02578	13C9 PFNA	104		48-130
STL02337	13C3 PFBS	138		23-175
STL02581	13C3 PFHxS	94		35-143
STL01054	13C8 PFOS	94		52-121
STL02279	M2-6:2 FTS	126		29-182
STL02280	M2-8:2 FTS	98		37-169

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Client Sample ID: GSP-SWSD-C3-070720 Lab Sample ID: 410-7056-6

Matrix: Water Lab File ID: 20JUL16-15.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/07/2020 14:15

Extraction Method: EPA 537 (mod) Date Extracted: 07/11/2020 10:47

Sample wt/vol: 300.4(mL) Date Analyzed: 07/16/2020 10:54

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22981 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	9.7		4.2	1.7
39108-34-4	8:2 Fluorotelomer sulfonic acid	11		2.5	0.83
375-73-5	Perfluorobutanesulfonic acid	1.1	J	1.7	0.42
375-22-4	Perfluorobutanoic acid	14		4.2	1.7
335-76-2	Perfluorodecanoic acid	3.3		1.7	0.42
375-85-9	Perfluoroheptanoic acid	20		1.7	0.42
355-46-4	Perfluorohexanesulfonic acid	2.2		1.7	0.42
307-24-4	Perfluorohexanoic acid	18		1.7	0.42
375-95-1	Perfluorononanoic acid	9.3		1.7	0.42
1763-23-1	Perfluorooctanesulfonic acid	4.7		1.7	0.42
335-67-1	Perfluorooctanoic acid	21		1.7	0.42
2706-90-3	Perfluoropentanoic acid	27		1.7	0.42

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	141		29-182
STL02280	M2-8:2 FTS	108		37-169
STL02337	13C3 PFBS	182	*5	23-175
STL01892	13C4 PFHpA	75		33-140
STL01893	13C5 PFPeA	146		38-150
STL01052	13C8 PFOA	75		52-124
STL01054	13C8 PFOS	82		52-121
STL02581	13C3 PFHxS	73		35-143
STL02577	13C5 PFHxA	62		36-137
STL02579	13C6 PFDA	80		50-124
STL02578	13C9 PFNA	98		48-130
STL00992	13C4 PFBA	82		43-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Client Sample ID: GSP-SWSD-C3-070720 RA Lab Sample ID: 410-7056-6 RA

Matrix: Water Lab File ID: 20JUL20-34.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/07/2020 14:15

Extraction Method: EPA 537 (mod) Date Extracted: 07/11/2020 10:47

Sample wt/vol: 300.4(mL) Date Analyzed: 07/20/2020 15:10

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 24107 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	*6:2 Fluorotelomer sulfonic acid*	*9.7*		*4.2*	*1.7*
39108-34-4	*8:2 Fluorotelomer sulfonic acid*	*10*		*2.5*	*0.83*
375-73-5	*Perfluorobutanesulfonic acid*	*0.98*	*J*	*1.7*	*0.42*
375-22-4	*Perfluorobutanoic acid*	*19*		*4.2*	*1.7*
335-76-2	*Perfluorodecanoic acid*	*ND*		*1.7*	*0.42*
375-85-9	*Perfluoroheptanoic acid*	*19*		*1.7*	*0.42*
355-46-4	*Perfluorohexanesulfonic acid*	*2.5*		*1.7*	*0.42*
307-24-4	*Perfluorohexanoic acid*	*19*		*1.7*	*0.42*
375-95-1	*Perfluorononanoic acid*	*8.4*		*1.7*	*0.42*
1763-23-1	*Perfluorooctanesulfonic acid*	*3.7*		*1.7*	*0.42*
335-67-1	*Perfluorooctanoic acid*	*21*		*1.7*	*0.42*
2706-90-3	*Perfluoropentanoic acid*	*30*		*1.7*	*0.42*

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	172		29-182
STL02280	M2-8:2 FTS	144		37-169
STL02337	13C3 PFBS	195	*5	23-175
STL01892	13C4 PFHpA	97		33-140
STL01893	13C5 PFPeA	154	*5	38-150
STL01052	13C8 PFOA	94		52-124
STL01054	13C8 PFOS	105		52-121
STL02581	13C3 PFHxS	86		35-143
STL02577	13C5 PFHxA	74		36-137
STL02579	13C6 PFDA	98		50-124
STL02578	13C9 PFNA	126		48-130
STL00992	13C4 PFBA	96		43-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Client Sample ID: GSP-SWSD-C2-070720 Lab Sample ID: 410-7056-7

Matrix: Water Lab File ID: 20JUL16-16.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/07/2020 14:25

Extraction Method: EPA 537 (mod) Date Extracted: 07/11/2020 10:47

Sample wt/vol: 276.2(mL) Date Analyzed: 07/16/2020 11:03

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22981 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	9.3		4.5	1.8
39108-34-4	8:2 Fluorotelomer sulfonic acid	9.2		2.7	0.91
375-73-5	Perfluorobutanesulfonic acid	1.0	J	1.8	0.45
375-22-4	Perfluorobutanoic acid	15		4.5	1.8
335-76-2	Perfluorodecanoic acid	3.3		1.8	0.45
375-85-9	Perfluoroheptanoic acid	17		1.8	0.45
355-46-4	Perfluorohexanesulfonic acid	1.5	J	1.8	0.45
307-24-4	Perfluorohexanoic acid	17		1.8	0.45
375-95-1	Perfluorononanoic acid	8.3		1.8	0.45
1763-23-1	Perfluorooctanesulfonic acid	3.4		1.8	0.45
335-67-1	Perfluorooctanoic acid	18		1.8	0.45
2706-90-3	Perfluoropentanoic acid	27		1.8	0.45

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	169		29-182
STL02280	M2-8:2 FTS	138		37-169
STL02337	13C3 PFBS	188	*5	23-175
STL01892	13C4 PFHpA	91		33-140
STL01893	13C5 PFPeA	156	*5	38-150
STL01052	13C8 PFOA	88		52-124
STL01054	13C8 PFOS	96		52-121
STL02581	13C3 PFHxS	85		35-143
STL02577	13C5 PFHxA	75		36-137
STL02579	13C6 PFDA	86		50-124
STL02578	13C9 PFNA	106		48-130
STL00992	13C4 PFBA	93		43-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Client Sample ID: GSP-SWSD-C2-070720 RA Lab Sample ID: 410-7056-7 RA

Matrix: Water Lab File ID: 20JUL20-35.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/07/2020 14:25

Extraction Method: EPA 537 (mod) Date Extracted: 07/11/2020 10:47

Sample wt/vol: 276.2(mL) Date Analyzed: 07/20/2020 15:19

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 24107 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	*6:2 Fluorotelomer sulfonic acid*	*9.2*		*4.5*	*1.8*
39108-34-4	*8:2 Fluorotelomer sulfonic acid*	*10*		*2.7*	*0.91*
375-73-5	*Perfluorobutanesulfonic acid*	*0.82*	*J*	*1.8*	*0.45*
375-22-4	*Perfluorobutanoic acid*	*15*		*4.5*	*1.8*
335-76-2	*Perfluorodecanoic acid*	*ND*		*1.8*	*0.45*
375-85-9	*Perfluoroheptanoic acid*	*17*		*1.8*	*0.45*
355-46-4	*Perfluorohexanesulfonic acid*	*1.4*	*J*	*1.8*	*0.45*
307-24-4	*Perfluorohexanoic acid*	*18*		*1.8*	*0.45*
375-95-1	*Perfluorononanoic acid*	*8.3*		*1.8*	*0.45*
1763-23-1	*Perfluorooctanesulfonic acid*	*ND*		*1.8*	*0.45*
335-67-1	*Perfluorooctanoic acid*	*19*		*1.8*	*0.45*
2706-90-3	*Perfluoropentanoic acid*	*27*		*1.8*	*0.45*

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	194	*5	29-182
STL02280	M2-8:2 FTS	150		37-169
STL02337	13C3 PFBS	209	*5	23-175
STL01892	13C4 PFHpA	106		33-140
STL01893	13C5 PFPeA	172	*5	38-150
STL01052	13C8 PFOA	104		52-124
STL01054	13C8 PFOS	115		52-121
STL02581	13C3 PFHxS	94		35-143
STL02577	13C5 PFHxA	83		36-137
STL02579	13C6 PFDA	110		50-124
STL02578	13C9 PFNA	136	*5	48-130
STL00992	13C4 PFBA	114		43-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Client Sample ID: GSP-SWSD-C1-070720 Lab Sample ID: 410-7056-8

Matrix: Water Lab File ID: 20JUL16-17.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/07/2020 14:30

Extraction Method: EPA 537 (mod) Date Extracted: 07/11/2020 10:47

Sample wt/vol: 289.6(mL) Date Analyzed: 07/16/2020 11:12

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22981 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	8.9		4.3	1.7
39108-34-4	8:2 Fluorotelomer sulfonic acid	8.2		2.6	0.86
375-73-5	Perfluorobutanesulfonic acid	0.81	J	1.7	0.43
375-22-4	Perfluorobutanoic acid	15		4.3	1.7
335-76-2	Perfluorodecanoic acid	3.2		1.7	0.43
375-85-9	Perfluoroheptanoic acid	17		1.7	0.43
355-46-4	Perfluorohexanesulfonic acid	1.6	J	1.7	0.43
307-24-4	Perfluorohexanoic acid	18		1.7	0.43
375-95-1	Perfluorononanoic acid	7.5		1.7	0.43
1763-23-1	Perfluorooctanesulfonic acid	3.4		1.7	0.43
335-67-1	Perfluorooctanoic acid	19		1.7	0.43
2706-90-3	Perfluoropentanoic acid	26		1.7	0.43

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	147		29-182
STL02280	M2-8:2 FTS	115		37-169
STL02337	13C3 PFBS	181	*5	23-175
STL01892	13C4 PFHpA	87		33-140
STL01893	13C5 PFPeA	142		38-150
STL01052	13C8 PFOA	79		52-124
STL01054	13C8 PFOS	87		52-121
STL02581	13C3 PFHxS	82		35-143
STL02577	13C5 PFHxA	65		36-137
STL02579	13C6 PFDA	74		50-124
STL02578	13C9 PFNA	98		48-130
STL00992	13C4 PFBA	86		43-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Client Sample ID: GSP-SWSD-C1-070720 RA Lab Sample ID: 410-7056-8 RA

Matrix: Water Lab File ID: 20JUL20-36.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/07/2020 14:30

Extraction Method: EPA 537 (mod) Date Extracted: 07/11/2020 10:47

Sample wt/vol: 289.6(mL) Date Analyzed: 07/20/2020 15:28

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 24107 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	*6:2 Fluorotelomer sulfonic acid*	*9.0*		*4.3*	*1.7*
39108-34-4	*8:2 Fluorotelomer sulfonic acid*	*8.8*		*2.6*	*0.86*
375-73-5	*Perfluorobutanesulfonic acid*	*0.99*	*J*	*1.7*	*0.43*
375-22-4	*Perfluorobutanoic acid*	*16*		*4.3*	*1.7*
335-76-2	*Perfluorodecanoic acid*	*ND*		*1.7*	*0.43*
375-85-9	*Perfluoroheptanoic acid*	*18*		*1.7*	*0.43*
355-46-4	*Perfluorohexanesulfonic acid*	*ND*		*1.7*	*0.43*
307-24-4	*Perfluorohexanoic acid*	*18*		*1.7*	*0.43*
375-95-1	*Perfluorononanoic acid*	*8.5*		*1.7*	*0.43*
1763-23-1	*Perfluorooctanesulfonic acid*	*3.7*		*1.7*	*0.43*
335-67-1	*Perfluorooctanoic acid*	*19*		*1.7*	*0.43*
2706-90-3	*Perfluoropentanoic acid*	*26*		*1.7*	*0.43*

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02279	M2-6:2 FTS	177		29-182
STL02280	M2-8:2 FTS	122		37-169
STL02337	13C3 PFBS	184	*5	23-175
STL01892	13C4 PFHpA	96		33-140
STL01893	13C5 PFPeA	152	*5	38-150
STL01052	13C8 PFOA	92		52-124
STL01054	13C8 PFOS	102		52-121
STL02581	13C3 PFHxS	89		35-143
STL02577	13C5 PFHxA	73		36-137
STL02579	13C6 PFDA	94		50-124
STL02578	13C9 PFNA	128		48-130
STL00992	13C4 PFBA	99		43-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Client Sample ID: EQB-Peri-070720 Lab Sample ID: 410-7056-9

Matrix: Water Lab File ID: 20JUL16-18.d

Analysis Method: EPA 537 (Mod) Date Collected: 07/07/2020 14:50

Extraction Method: EPA 537 (mod) Date Extracted: 07/11/2020 10:47

Sample wt/vol: 270.8(mL) Date Analyzed: 07/16/2020 11:21

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22981 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
375-85-9	Perfluoroheptanoic acid	ND		1.8	0.46
335-67-1	Perfluorooctanoic acid	ND		1.8	0.46
375-95-1	Perfluorononanoic acid	ND		1.8	0.46
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		4.6	1.8
375-73-5	Perfluorobutanesulfonic acid	ND		1.8	0.46
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		2.8	0.92
355-46-4	Perfluorohexanesulfonic acid	ND		1.8	0.46
1763-23-1	Perfluorooctanesulfonic acid	ND		1.8	0.46

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL01892	13C4 PFHpA	99		33-140
STL01052	13C8 PFOA	102		52-124
STL02578	13C9 PFNA	95		48-130
STL02337	13C3 PFBS	92		23-175
STL02581	13C3 PFHxS	102		35-143
STL01054	13C8 PFOS	96		52-121
STL02279	M2-6:2 FTS	101		29-182
STL02280	M2-8:2 FTS	95		37-169

Appendix C

Support Documentation

ANALYTE	ORIGINAL GSP-MW-13-070720	DUPLICATE MSA-DUP-05-070720	RL	RPD	RPD > 30% Aqueous	ORIGINAL SAMPLE CONC >2xRL	DUPLICATE SAMPLE CONC >2xRL	DIFFERENCE >2XRL
6:2 FLUOROTELOMER SULFONATE (6:2FTS)	4.1	4.2	4.7	2.41	FALSE	FALSE	FALSE	FALSE
PENTADECAFLUOROOCTANOIC ACID (PFOA)	3.4	3.9	1.9	13.70	FALSE	FALSE	TRUE	FALSE
PERFLUOROBUTANESULFONIC ACID (PFBS)	1.6	1.5	1.9	6.45	FALSE	FALSE	FALSE	FALSE
PERFLUOROHEPTANOIC ACID (PFHPA)	2.9	2.9	1.9	0.00	FALSE	FALSE	FALSE	FALSE
PERFLUOROHEXANESULFONIC ACID (PFHXS)	7	6.6	1.9	5.88	FALSE	TRUE	TRUE	FALSE
PERFLUORONONANOIC ACID (PFNA)	1.6	1.6	1.9	0.00	FALSE	FALSE	FALSE	FALSE
PERFLUOROOCTANESULFONIC ACID (PFOS)	24	25	1.9	4.08	FALSE	TRUE	TRUE	FALSE

410-7056 Chain of Custody

Chain of Custody Record 321389

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Shannon Brenner	Site Contact: P. O'Brien	Date: 7/7/20	COC No:
Company Name: Tetra Tech	Tel/Fax: 301-528-3056	Lab Contact: Stephen Coreless	Carrier: Fedex	1 of 1 COCs
Address: 20251 Century Blvd. Suite 200	Analysis Turnaround Time			Sampler:
City/State/Zip: Germantown, MD 20874	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 301-528-5552	TAT if different from Below _____			Walk-in Client:
Fax: 301-528-5082	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day — Standard			Lab Sampling:
Project Name: MSA PFAS GW Round 2				Job / SDG No.:
Site: MSA				
PO # 112G09023				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFAS (Method 537)	Sample Specific Notes:
EQB-WL-070720	7/7/20	1000	Grab	GW	2	N	N	X	
MSA-FB-070720	7/7/20	1300	Grab	GW	2	N	N	X	Trizma preserved FTCB
GSP-MW-13-070720	7/7/20	1135	Grab	GW	2	N	N	X	
MSA-DUP-5-070720	7/7/20	0000	Grab	GW	2	N	N	X	
GSP-MW-16-070720	7/7/20	1345	Grab	GW	2	N	N	X	
GSP-SWSD-03-070720	7/7/20	1415	Grab	SW	2	N	N	X	Extended list
GSP-SWSD-02-070720	7/7/20	1425	Grab	SW	2	N	N	X	Extended list
GSP-SWSD-01-070720	7/7/20	1430	Grab	SW	2	N	N	X	Extended list
EQB-Pec1-070720	7/7/20	1450	Grab	GW	2	N	N	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: 0.0 Corr'd: 0.7 | Therm ID No: 167300600WS

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Tetra Tech	7/7/20 1530			7/7/20 15:30
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	STA	7/8/20 1150		GLC	7/8/20 11:50
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
	GLC	7/8/20 7:00		GLC	7-8-20 1715

ICAM

Qualifiers

LCMS

Qualifier	Qualifier Description
*5	Isotope dilution analyte is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job Narrative
410-7056-1

Receipt
The samples were received on 7/8/2020 5:15 PM; the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.7°C

Receipt Exceptions
The Field Sampler was not listed on the Chain of Custody.

LCMS
Method PFC_IDA: The sample injection standard peak areas are outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.GSP-SWSD-C3-070720 (410-7056-6), GSP-SWSD-C2-070720 (410-7056-7) and GSP-SWSD-C1-070720 (410-7056-8)

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

Method Summary

Client: Tetra Tech, Inc. Job ID: 410-7056-1
Project/Site: MSA PFAS GW Round 2

Method	Method Description	Protocol	Laboratory
EPA 537 (Mod)	EPA 537 Isotope Dilution	EPA	ELLE
EPA 537 (mod)	EPA 537 Isotope Dilution	EPA	ELLE

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Env, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: Tetra Tech, Inc.
Job ID: 410-7056-1
Project/Site: MSA PFAS GW Round 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
410-7056-1	EQB-WL-070720	Water	07/07/20 10:00	07/08/20 17:15	
410-7056-2	MSA-FB-070720	Water	07/07/20 13:00	07/08/20 17:15	
410-7056-3	GSP-MW-13-070720	Water	07/07/20 11:35	07/08/20 17:15	
410-7056-4	MSA-DUP-5-070720	Water	07/07/20 00:00	07/08/20 17:15	
410-7056-5	GSP-MW-16-070720	Water	07/07/20 13:45	07/08/20 17:15	
410-7056-6	GSP-SWSD-C3-070720	Water	07/07/20 14:15	07/08/20 17:15	
410-7056-7	GSP-SWSD-C2-070720	Water	07/07/20 14:25	07/08/20 17:15	
410-7056-8	GSP-SWSD-C1-070720	Water	07/07/20 14:30	07/08/20 17:15	
410-7056-9	EQB-Peri-070720	Water	07/07/20 14:50	07/08/20 17:15	

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-7056-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C3PFBS #	C4PFHA #	C3PFHS #	M262FTS #	C8PFOA #	C8PFOS #	C9PFNA #	M282FTS #
EQB-WL-070720	410-7056-1	86	99	101	90	95	91	89	95
MSA-FB-070720	410-7056-2	87	98	97	95	95	95	94	93
GSP-MW-13-070720	410-7056-3	152	92	83	154	94	101	115	117
MSA-DUP-5-070720	410-7056-4	158	102	96	153	96	98	111	121
GSP-MW-16-070720	410-7056-5	138	97	94	126	87	94	104	98
EQB-Peri-070720	410-7056-9	92	99	102	101	102	96	95	95

	QC LIMITS
C3PFBS = 13C3 PFBS	23-175
C4PFHA = 13C4 PFHpA	33-140
C3PFHS = 13C3 PFHxS	35-143
M262FTS = M2-6:2 FTS	29-182
C8PFOA = 13C8 PFOA	52-124
C8PFOS = 13C8 PFOS	52-121
C9PFNA = 13C9 PFNA	48-130
M282FTS = M2-8:2 FTS	37-169

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-7056-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	PFBA #	PFPeA #	C3PFBS #	13C5PHA #	C4PFHA #	C3PFHS #	M262FTS #	C8PFOA #
GSP-SWSD-C3-070720	410-7056-6	82	146	182 *5	62	75	73	141	75
GSP-SWSD-C3-070720 RA	410-7056-6 RA	96	154 *5	195 *5	74	97	86	172	94
GSP-SWSD-C2-070720	410-7056-7	93	156 *5	188 *5	75	91	85	169	88
GSP-SWSD-C2-070720 RA	410-7056-7 RA	114	172 *5	209 *5	83	106	94	194 *5	104
GSP-SWSD-C1-070720	410-7056-8	86	142	181 *5	65	87	82	147	79
GSP-SWSD-C1-070720 RA	410-7056-8 RA	99	152 *5	184 *5	73	96	89	177	92
	MB 410-21514/1-A	93	93	83	94	85	93	89	89
	LCS 410-21514/2-A	95	99	89	105	102	101	103	99
	LCSD 410-21514/3-A	92	94	84	98	92	93	95	94

	QC LIMITS
PFBA = 13C4 PFBA	43-130
PFPeA = 13C5 PFPeA	38-150
C3PFBS = 13C3 PFBS	23-175
13C5PHA = 13C5 PFHxA	36-137
C4PFHA = 13C4 PFHpA	33-140
C3PFHS = 13C3 PFHxS	35-143
M262FTS = M2-6:2 FTS	29-182
C8PFOA = 13C8 PFOA	52-124

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM II
LCMS SURROGATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-7056-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): Gemini C18 ID: 3 (mm)

Client Sample ID	Lab Sample ID	C8PFOS #	C9PFNA #	C6PFDA #	M282FTS #
GSP-SWSD-C3-070720	410-7056-6	82	98	80	108
GSP-SWSD-C3-070720 RA	410-7056-6 RA	105	126	98	144
GSP-SWSD-C2-070720	410-7056-7	96	106	86	138
GSP-SWSD-C2-070720 RA	410-7056-7 RA	115	136 *5	110	150
GSP-SWSD-C1-070720	410-7056-8	87	98	74	115
GSP-SWSD-C1-070720 RA	410-7056-8 RA	102	128	94	122
	MB 410-21514/1-A	93	93	93	95
	LCS 410-21514/2-A	95	93	92	97
	LCSD 410-21514/3-A	93	92	95	95

	QC LIMITS
C8PFOS = 13C8 PFOS	52-121
C9PFNA = 13C9 PFNA	48-130
C6PFDA = 13C6 PFDA	50-124
M282FTS = M2-8:2 FTS	37-169

Column to be used to flag recovery values

FORM II EPA 537 (Mod)

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-7056-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL16-08.d

Lab ID: LCS 410-21514/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
6:2 Fluorotelomer sulfonic acid	24.3	26.1	107	56-140	
Perfluorobutanoic acid	25.6	27.1	106	63-160	
Perfluorobutanesulfonic acid	22.6	22.7	100	67-135	
Perfluorodecanoic acid	25.6	27.1	106	66-141	
8:2 Fluorotelomer sulfonic acid	24.5	26.4	108	58-143	
Perfluoroheptanoic acid	25.6	27.9	109	69-144	
Perfluorohexanesulfonic acid	24.2	23.9	99	63-132	
Perfluorohexanoic acid	25.6	28.6	112	69-139	
Perfluorononanoic acid	25.6	26.0	102	66-144	
Perfluorooctanesulfonic acid	24.5	21.7	89	53-129	
Perfluorooctanoic acid	25.6	26.9	105	67-139	
Perfluoropentanoic acid	25.6	26.4	103	73-135	
13C3 PFBS	37.4	33.3	89	23-175	
M2-6:2 FTS	38.0	39.0	103	29-182	
13C4 PFHpA	40.0	40.8	102	33-140	
M2-8:2 FTS	38.3	37.2	97	37-169	
13C5 PFPeA	40.0	39.6	99	38-150	
13C8 PFOA	40.0	39.8	99	52-124	
13C8 PFOS	38.3	36.3	95	52-121	
13C3 PFHxS	37.8	38.1	101	35-143	
13C5 PFHxA	40.0	41.9	105	36-137	
13C6 PFDA	40.0	36.6	92	50-124	
13C9 PFNA	40.0	37.3	93	48-130	
13C4 PFBA	40.0	38.1	95	43-130	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-7056-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 20JUL16-09.d

Lab ID: LCSD 410-21514/3-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCSD CONCENTRATION (ng/L)	LCSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
6:2 Fluorotelomer sulfonic acid	24.3	25.1	103	4	30	56-140	
Perfluorobutanoic acid	25.6	27.7	108	2	30	63-160	
Perfluorobutanesulfonic acid	22.6	22.4	99	1	30	67-135	
Perfluorodecanoic acid	25.6	24.3	95	11	30	66-141	
8:2 Fluorotelomer sulfonic acid	24.5	25.6	105	3	30	58-143	
Perfluoroheptanoic acid	25.6	28.9	113	3	30	69-144	
Perfluorohexanesulfonic acid	24.2	25.1	104	5	30	63-132	
Perfluorohexanoic acid	25.6	27.6	108	4	30	69-139	
Perfluorononanoic acid	25.6	27.1	106	4	30	66-144	
Perfluorooctanesulfonic acid	24.5	23.1	94	6	30	53-129	
Perfluorooctanoic acid	25.6	25.8	101	4	30	67-139	
Perfluoropentanoic acid	25.6	26.0	101	2	30	73-135	
13C3 PFBS	37.4	31.6	84			23-175	
M2-6:2 FTS	38.0	36.0	95			29-182	
13C4 PFHpA	40.0	36.8	92			33-140	
M2-8:2 FTS	38.3	36.6	95			37-169	
13C5 PFPeA	40.0	37.6	94			38-150	
13C8 PFOA	40.0	37.4	94			52-124	
13C8 PFOS	38.3	35.6	93			52-121	
13C3 PFHxS	37.8	35.3	93			35-143	
13C5 PFHxA	40.0	39.2	98			36-137	
13C6 PFDA	40.0	37.9	95			50-124	
13C9 PFNA	40.0	36.8	92			48-130	
13C4 PFBA	40.0	36.8	92			43-130	

Column to be used to flag recovery and RPD values

FORM III EPA 537 (Mod)

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: Eurofins Lancaster Laboratories Job No.: 410-7056-1

SDG No.:

Lab File ID: 20JUL16-07.d Lab Sample ID: MB 410-21514/1-A

Matrix: Water Date Extracted: 07/11/2020 10:47

Instrument ID: 27632 Date Analyzed: 07/16/2020 09:41

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 410-21514/2-A	20JUL16-08.d	07/16/2020 09:50
	LCSD 410-21514/3-A	20JUL16-09.d	07/16/2020 09:59
EQB-WL-070720	410-7056-1	20JUL16-10.d	07/16/2020 10:08
MSA-FB-070720	410-7056-2	20JUL16-11.d	07/16/2020 10:17
GSP-MW-13-070720	410-7056-3	20JUL16-12.d	07/16/2020 10:26
MSA-DUP-5-070720	410-7056-4	20JUL16-13.d	07/16/2020 10:35
GSP-MW-16-070720	410-7056-5	20JUL16-14.d	07/16/2020 10:44
GSP-SWSD-C3-070720	410-7056-6	20JUL16-15.d	07/16/2020 10:54
GSP-SWSD-C2-070720	410-7056-7	20JUL16-16.d	07/16/2020 11:03
GSP-SWSD-C1-070720	410-7056-8	20JUL16-17.d	07/16/2020 11:12
EQB-Peri-070720	410-7056-9	20JUL16-18.d	07/16/2020 11:21
GSP-SWSD-C3-070720 RA	410-7056-6 RA	20JUL20-34.d	07/20/2020 15:10
GSP-SWSD-C2-070720 RA	410-7056-7 RA	20JUL20-35.d	07/20/2020 15:19
GSP-SWSD-C1-070720 RA	410-7056-8 RA	20JUL20-36.d	07/20/2020 15:28

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Client Sample ID: Lab Sample ID: MB 410-21514/1-A

Matrix: Water Lab File ID: 20JUL16-07.d

Analysis Method: EPA 537 (Mod) Date Collected:

Extraction Method: EPA 537 (mod) Date Extracted: 07/11/2020 10:47

Sample wt/vol: 250(mL) Date Analyzed: 07/16/2020 09:41

Con. Extract Vol.: 1(mL) Dilution Factor: 1

Injection Volume: 4(uL) GC Column: Gemini C18 50mm ID: 3(mm)

% Moisture: GPC Cleanup:(Y/N) N

Analysis Batch No.: 22981 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
27619-97-2	6:2 Fluorotelomer sulfonic acid	ND		5.0	2.0
375-22-4	Perfluorobutanoic acid	ND		5.0	2.0
375-73-5	Perfluorobutanesulfonic acid	ND		2.0	0.50
335-76-2	Perfluorodecanoic acid	ND		2.0	0.50
39108-34-4	8:2 Fluorotelomer sulfonic acid	ND		3.0	1.0
375-85-9	Perfluoroheptanoic acid	ND		2.0	0.50
355-46-4	Perfluorohexanesulfonic acid	ND		2.0	0.50
307-24-4	Perfluorohexanoic acid	ND		2.0	0.50
375-95-1	Perfluorononanoic acid	ND		2.0	0.50
1763-23-1	Perfluorooctanesulfonic acid	ND		2.0	0.50
335-67-1	Perfluorooctanoic acid	ND		2.0	0.50
2706-90-3	Perfluoropentanoic acid	ND		2.0	0.50

CAS NO.	ISOTOPE DILUTION	%REC	Q	LIMITS
STL02337	13C3 PFBS	83		23-175
STL02279	M2-6:2 FTS	89		29-182
STL01892	13C4 PFHpA	85		33-140
STL02280	M2-8:2 FTS	95		37-169
STL01893	13C5 PFPeA	93		38-150
STL01052	13C8 PFOA	89		52-124
STL01054	13C8 PFOS	93		52-121
STL02581	13C3 PFHxS	93		35-143
STL02577	13C5 PFHxA	94		36-137
STL02579	13C6 PFDA	93		50-124
STL02578	13C9 PFNA	93		48-130
STL00992	13C4 PFBA	93		43-130

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Instrument ID: 27632 Calibration Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/13/2020 13:55

Calibration ID: 6740

		13C3PFBA		13PFOA		PFOS	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1443380	3.35	1134281	5.05	475947	5.38
UPPER LIMIT		2165070	3.55	1701422	5.25	713921	5.58
LOWER LIMIT		721690	3.15	567141	4.85	237974	5.18
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-21880/8		1259622	3.35	1019246	5.05	427114	5.37
ICV 410-21880/9		1729800	3.34	1337683	5.04	557572	5.37
CCV 410-22981/1		1566804	3.33	988482	5.01	465491	5.34
MB 410-21514/1-A		1790649	3.33	1252540	5.01	512282	5.35
LCS 410-21514/2-A		1694061	3.33	1139526	5.01	537291	5.34
LCSD 410-21514/3-A		1695336	3.33	1186401	5.01	503461	5.33
410-7056-1	EQB-WL-070720	1754593	3.33	1151216	5.00	532477	5.34
410-7056-2	MSA-FB-070720	1758798	3.32	1220084	5.00	527102	5.33
410-7056-3	GSP-MW-13-070720	901792	3.32	1410282	5.01	479928	5.33
410-7056-4	MSA-DUP-5-070720	867955	3.33	1336603	5.01	504598	5.34
410-7056-5	GSP-MW-16-070720	1067974	3.33	1398908	5.01	523629	5.33
410-7056-6	GSP-SWSD-C3-070720	561534*3	3.32	1345341	5.00	496770	5.33
410-7056-7	GSP-SWSD-C2-070720	641655*3	3.33	1344358	5.01	504291	5.33
410-7056-8	GSP-SWSD-C1-070720	623786*3	3.34	1312765	5.02	503965	5.34
410-7056-9	EQB-Peri-070720	1733402	3.32	1198766	5.00	522909	5.33
CCV 410-22981/14		1863628	3.33	1175094	5.01	550460	5.34

13C3PFBA = 13C3-PFBA
13PFOA = 13C2 PFOA
PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Instrument ID: 27632 Calibration Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/13/2020 13:55

Calibration ID: 6740

		PFDA					
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		862620	5.71				
UPPER LIMIT		1293930	5.91				
LOWER LIMIT		431310	5.51				
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-21880/8		734089	5.71				
ICV 410-21880/9		1045892	5.71				
CCV 410-22981/1		802117	5.67				
MB 410-21514/1-A		908492	5.68				
LCS 410-21514/2-A		889322	5.66				
LCSD 410-21514/3-A		911690	5.66				
410-7056-1	EQB-WL-070720	906351	5.66				
410-7056-2	MSA-FB-070720	930978	5.66				
410-7056-3	GSP-MW-13-070720	971823	5.66				
410-7056-4	MSA-DUP-5-070720	995846	5.67				
410-7056-5	GSP-MW-16-070720	1052139	5.66				
410-7056-6	GSP-SWSD-C3-070720	1005527	5.66				
410-7056-7	GSP-SWSD-C2-070720	1029612	5.66				
410-7056-8	GSP-SWSD-C1-070720	1041006	5.67				
410-7056-9	EQB-Peri-070720	908442	5.66				
CCV 410-22981/14		916245	5.67				

PFDA = 13C2 PFDA

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Instrument ID: 27632 Calibration Start Date: 07/18/2020 12:45

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/18/2020 14:30

Calibration ID: 7113

		13C3PFBA		13PFOA		PFOS	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1216646	3.34	890900	5.03	443244	5.36
UPPER LIMIT		1824969	3.54	1336350	5.23	664866	5.56
LOWER LIMIT		608323	3.14	445450	4.83	221622	5.16
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-23948/8		1005509	3.35	711311	5.03	361030	5.36
ICV 410-23948/9		1362971	3.35	984743	5.03	549483	5.36
CCV 410-24107/12		1364760	3.35	871445	5.03	441068	5.36
410-7056-6 RA	GSP-SWSD-C3-070720 RA	471876*3	3.34	929285	5.02	382097	5.35
410-7056-7 RA	GSP-SWSD-C2-070720 RA	511652	3.35	967002	5.03	391921	5.36
410-7056-8 RA	GSP-SWSD-C1-070720 RA	511455*3	3.34	957330	5.03	389782	5.35
CCV 410-24107/23		1370384	3.34	934956	5.02	432323	5.35

13C3PFBA = 13C3-PFBA
13PFOA = 13C2 PFOA
PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: Eurofins Lancaster Laboratories E Job No.: 410-7056-1

SDG No.:

Instrument ID: 27632 Calibration Start Date: 07/18/2020 12:45

GC Column: Gemini C18 50mm ID: 3(mm) Calibration End Date: 07/18/2020 14:30

Calibration ID: 7113

		PFDA					
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		670180	5.68				
UPPER LIMIT		1005270	5.88				
LOWER LIMIT		335090	5.48				
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICB 410-23948/8		571838	5.69				
ICV 410-23948/9		759662	5.69				
CCV 410-24107/12		641555	5.68				
410-7056-6 RA	GSP-SWSD-C3-070720 RA	701748	5.68				
410-7056-7 RA	GSP-SWSD-C2-070720 RA	679446	5.68				
410-7056-8 RA	GSP-SWSD-C1-070720 RA	763278	5.68				
CCV 410-24107/23		717880	5.68				

PFDA = 13C2 PFDA

Area Limit = 50%-150% of internal standard area
RT Limit = ± 0.2 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII EPA 537 (MOD)

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-21880/1	20JUL13MCAL-09.d
Level 2	IC 410-21880/2	20JUL13MCAL-10.d
Level 3	IC 410-21880/3	20JUL13MCAL-11.d
Level 4	IC 410-21880/4	20JUL13MCAL-12.d
Level 5	ICISAV 410-21880/5	20JUL13MCAL-13.d
Level 6	IC 410-21880/6	20JUL13MCAL-14.d
Level 7	IC 410-21880/7	20JUL13MCAL-15.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid	1.0942 0.8086	0.9410 0.8004	0.8708	0.8075	0.8744	LID1F		0.8127							0.9990		0.9900
Perfluoropentanoic acid	1.1649 0.8961	1.0268 0.8773	0.9175	0.9240	0.9672	LID1F		0.8957							0.9990		0.9900
Perfluorobutanesulfonic acid	1.0096 1.0254	1.0012 0.9953	0.9754	0.9483	1.0668	LID1F		1.0093							0.9990		0.9900
4:2 Fluorotelomer sulfonic acid	1.8279 1.5584	1.8753 1.6923	1.9107	1.6686	1.8203	LID1F		1.6714							0.9970		0.9900
Perfluorohexanoic acid	0.8889 0.7545	0.7911 0.7041	0.8037	0.7438	0.8042	LID1F		0.7324							0.9980		0.9900
Perfluoropentanesulfonic acid	0.5329 0.4398	0.5039 0.4706	0.4603	0.4526	0.4917	LID1F		0.4637							0.9990		0.9900
HFPODA	2.7281 2.5663	2.4548 2.1385	2.2600	2.0309	2.2211	LID1F		2.2642							0.9930		0.9900
Perfluoroheptanoic acid	1.5656 1.1961	1.2701 1.0636	1.3663	1.2508	1.2949	LID1F		1.1387							0.9930		0.9900
Perfluorohexanesulfonic acid	1.1053 1.0089	1.0370 0.9666	0.9551	0.9676	1.0336	LID1F		0.9860							0.9990		0.9900
DONA	1.6160 1.3488	1.3873 1.2472	1.4714	1.4018	1.4601	LID1F		1.3090							0.9960		0.9900
6:2 Fluorotelomer sulfonic acid	1.7276 1.6135	1.6006 1.5337	1.7825	1.6137	1.7642	LID1F		1.5880							0.9980		0.9900
Perfluoroheptanesulfonic acid	1.0152 0.8964	0.8660 0.8646	0.8487	0.8449	0.9029	LID1F		0.8768							1.0000		0.9900
Perfluorooctanoic acid	0.9610 0.7108	0.7432 0.6854	0.6736	0.6824	0.7345	LID1F		0.6981							0.9990		0.9900
Perfluorooctanesulfonic acid	1.2449 1.0644	1.0934 1.0228	0.9650	0.9841	0.9906	LID1F		1.0288							0.9990		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorononanoic acid	0.8664 0.8632	0.9145 0.8285	0.8785	0.8188	0.9009	LID1F		0.8465							0.9990		0.9900
9Cl-PF3ONS	2.4470 2.2699	2.2827 2.2448	2.1367	2.1817	2.2572	LID1F		2.2495							1.0000		0.9900
Perfluorononanesulfonic acid	0.6995 0.6591	0.7009 0.6428	0.6819	0.6563	0.6691	LID1F		0.6514							1.0000		0.9900
Perfluorodecanoic acid	0.5861 0.5574	0.5839 0.5535	0.5190	0.5681	0.5867	LID1F		0.5587							1.0000		0.9900
8:2 Fluorotelomer sulfonic acid	1.8646 1.6757	1.6514 1.5120	1.5427	1.7516	1.7115	LID1F		1.5911							0.9970		0.9900
Perfluorooctanesulfonamide	1.0466 1.0098	0.9586 0.9253	1.0024	0.9229	1.0336	LID1F		0.9616							0.9980		0.9900
NMeFOSAA	1.0122 1.0226	0.9525 0.8888	1.0305	1.0055	1.0748	LID1F		0.9535							0.9940		0.9900
Perfluorodecanesulfonic acid	0.5992 0.5095	0.5835 0.5191	0.5180	0.5180	0.5042	LID1F		0.5150							1.0000		0.9900
Perfluoroundecanoic acid	0.6005 0.5240	0.5215 0.4585	0.5741	0.4920	0.5329	LID1F		0.4880							0.9950		0.9900
NEtFOSAA	1.1603 0.9177	0.8977 0.9441	0.9754	0.9723	1.0408	LID1F		0.9492							0.9980		0.9900
11Cl-PF3OUdS	1.8842 1.8393	1.7714 1.7959	1.6464	1.6938	1.7958	LID1F		1.8018							1.0000		0.9900
Perfluorododecanoic acid	0.7466 0.5554	0.5982 0.5400	0.5811	0.5705	0.5645	LID1F		0.5492							0.9990		0.9900
10:2 FTS	1.9781 1.9103	2.0679 1.7724	2.0445	2.0078	1.9085	LID1F		1.8401							0.9980		0.9900
NMeFOSE	0.9082 0.8761	0.8789 0.9636	0.9286	0.8802	0.9842	LID1F		0.9373							0.9980		0.9900
NMeFOSA	0.9339 1.0768	1.0185 1.0475	0.9778	0.9837	1.0664	LID1F		1.0539							1.0000		0.9900
Perfluorododecanesulfonic acid	0.2663 0.2527	0.2610 0.2536	0.2361	0.2428	0.2570	LID1F		0.2531							1.0000		0.9900
NEtFOSE	0.8375 0.7751	0.7792 0.7396	0.7322	0.7041	0.7469	LID1F		0.7488							0.9990		0.9900
Perfluorotridecanoic acid	0.9053 0.7834	0.8165 0.6822	0.7856	0.7636	0.8175	LID1F		0.7306							0.9940		0.9900
NEtFOSA	0.7918 1.0387	1.0161 0.9533	1.0036	0.9936	0.9965	LID1F		0.9840							0.9980		0.9900
Perfluorotetradecanoic acid	1.0586 0.8914	1.0133 0.8565	0.9986	1.0139	0.9759	LID1F		0.8885							0.9970		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorohexadecanoic acid	0.6883 0.5328	0.5889 0.4952	0.5457	0.5251	0.5715	LID1F		0.5164							0.9970		0.9900
Perfluorooctadecanoic acid	0.5186 0.4927	0.4878 0.4709	0.4817	0.4846	0.5194	LID1F		0.4832							0.9990		0.9900
13C4 PFBA	1.1180 1.0818	1.1605 1.0533	1.1496	1.1105	1.0970	Ave		1.1101				3.4		20.0			
13C5 PFPeA	0.9128 0.8720	0.9027 0.8313	0.8989	0.8702	0.8705	Ave		0.8798				3.1		20.0			
13C3 PFBS	0.4469 0.4313	0.4631 0.4275	0.4428	0.4324	0.4232	Ave		0.4382				3.1		20.0			
M2-4:2 FTS	0.0944 0.0973	0.0956 0.0949	0.0949	0.0984	0.0937	Ave		0.0956				1.8		20.0			
13C5 PFHxA	1.4386 1.4162	1.5172 1.3806	1.4431	1.4812	1.4240	Ave		1.4430				3.1		20.0			
13C3 HFPO-DA	0.2784 0.2523	0.2613 0.2903	0.2830	0.3103	0.3053	Ave		0.2830				7.5		20.0			
13C4 PFHpA	1.0365 1.0276	1.1256 1.0300	1.0560	1.0530	1.0755	Ave		1.0578				3.2		20.0			
13C3 PFHxS	0.4525 0.4256	0.4937 0.4135	0.4850	0.4656	0.4533	Ave		0.4556				6.4		20.0			
M2-6:2 FTS	0.0891 0.0702	0.0928 0.0664	0.0788	0.0786	0.0737	Ave		0.0785				12.3		20.0			
13C8 PFOA	1.3802 1.3197	1.4718 1.2327	1.4351	1.3955	1.3766	Ave		1.3731				5.7		20.0			
13C8 PFOS	0.9861 0.9752	1.0422 0.9686	1.0907	0.9969	1.0376	Ave		1.0139				4.4		20.0			
13C9 PFNA	2.1439 2.1234	2.3636 2.0840	2.3091	2.1904	2.1483	Ave		2.1947				4.7		20.0			
13C6 PFDA	1.7215 1.5056	1.7237 1.5282	1.6448	1.5967	1.6846	Ave		1.6293				5.4		20.0			
M2-8:2 FTS	0.1368 0.0944	0.1254 0.1001	0.1066	0.1092	0.1125	Ave		0.1121				13.0		20.0			
13C8 FOSA	1.3231 1.1050	1.2385 1.1655	1.1311	1.1740	1.2143	Ave		1.1931				6.1		20.0			
d3-NMeFOSAA	0.3102 0.2923	0.3187 0.3408	0.2887	0.3098	0.3180	Ave		0.3112				5.6		20.0			
13C7 PFUnA	1.5358 1.3860	1.5616 1.4895	1.4551	1.4894	1.5154	Ave		1.4904				3.9		20.0			
d5-NEtFOSAA	0.2716 0.2333	0.2463 0.2384	0.2286	0.2450	0.2534	Ave		0.2452				5.8		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
13C2-PFDoDA	1.7377 1.7264	1.9360 1.7453	1.7571	1.9271	1.8852	Ave		1.8164				5.2		20.0			
d7-N-MeFOSE-M	0.2508 0.2258	0.2266 0.2363	0.2223	0.2304	0.2341	Ave		0.2323				4.1		20.0			
d3-NMePFOSA	0.1394 0.1102	0.1190 0.1282	0.1146	0.1180	0.1252	Ave		0.1221				8.0		20.0			
d9-N-EtFOSE-M	0.2627 0.2193	0.2344 0.2421	0.2198	0.2328	0.2436	Ave		0.2364				6.4		20.0			
d5-NEtPFOSA	0.1088 0.0928	0.0967 0.1062	0.0958	0.0961	0.1026	Ave		0.0999				6.0		20.0			
13C2 PFTeDA	1.4494 1.3780	1.4423 1.4675	1.3890	1.4314	1.4421	Ave		1.4285				2.3		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-21880/1	20JUL13MCAL-09.d
Level 2	IC 410-21880/2	20JUL13MCAL-10.d
Level 3	IC 410-21880/3	20JUL13MCAL-11.d
Level 4	IC 410-21880/4	20JUL13MCAL-12.d
Level 5	ICISAV 410-21880/5	20JUL13MCAL-13.d
Level 6	IC 410-21880/6	20JUL13MCAL-14.d
Level 7	IC 410-21880/7	20JUL13MCAL-15.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid		LID1F	69431 11997076	159609 21699496	568737	2307540	5893808	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanoic acid		LID1F	60355 10716753	135471 18772184	468526	2068908	5174022	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorobutanesulfonic acid		LID1F	22664 5367662	59971 9692086	217149	933881	2455186	0.177 44.3	0.443 88.5	1.77	7.08	17.7
4:2 Fluorotelomer sulfonic acid		LID1F	7332 1536385	18875 3162711	76188	301882	752317	0.187 46.7	0.467 93.4	1.87	7.47	18.7
Perfluorohexanoic acid		LID1F	58199 11591241	135324 20502706	521855	2167887	5408586	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanesulfonic acid		LID1F	12678 2440032	31992 4857412	108620	472356	1199342	0.188 46.9	0.469 93.8	1.88	7.50	18.8
HFPODA		LID1F	34561 7023501	72311 13093215	287758	1240060	3203287	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoroheptanoic acid		LID1F	73855 13334156	161195 23106466	649206	2591483	6577812	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexanesulfonic acid		LID1F	20760 4248612	52641 7688445	190062	808498	2018139	0.182 45.6	0.456 91.2	1.82	7.30	18.2
DONA		LID1F	72038 14209258	166389 25604154	660667	2744557	7009023	0.189 47.3	0.473 94.5	1.89	7.56	18.9
6:2 Fluorotelomer sulfonic acid		LID1F	6641 1164970	15874 2035851	59880	236702	581944	0.190 47.4	0.474 94.8	1.90	7.58	19.0
Perfluoroheptanesulfonic acid		LID1F	19904 3940256	45889 7178851	176306	736943	1840412	0.190 47.6	0.476 95.2	1.90	7.62	19.0
Perfluorooctanoic acid		LID1F	60367 10176627	123330 17819051	434956	1873655	4775161	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctanesulfonic acid		LID1F	22427 4651450	52878 8174235	186865	799832	2009892	0.185 46.3	0.463 92.6	1.85	7.40	18.5
Perfluorononanoic acid		LID1F	36667 8875235	108379 15392947	389162	1579833	4088902	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
9Cl-PF3ONS		LID1F	44297 9967823	110928 18027720	415755	1781698	4601723	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorononanesulfonic acid		LID1F	13072 2987403	35160 5328626	136968	553252	1408086	0.192 48.0	0.480 96.0	1.92	7.68	19.2
Perfluorodecanoic acid		LID1F	34802 7038801	90209 12428914	306878	1361542	3438285	0.200 50.0	0.500 100	2.00	8.00	20.0
8:2 Fluorotelomer sulfonic acid		LID1F	8430 1271643	17787 2129847	56622	275027	641449	0.192 47.9	0.479 95.8	1.92	7.66	19.2
Perfluorooctanesulfonamide		LID1F	47764 9358734	106402 15845241	407551	1626363	4366515	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSAA		LID1F	10831 2506871	27205 4450282	106948	467568	1188868	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorodecanesulfonic acid		LID1F	11243 2318979	29390 4321524	104478	438481	1065608	0.193 48.2	0.482 96.4	1.93	7.71	19.3
Perfluoroundecanoic acid		LID1F	31810 6091736	72988 10035051	300247	1099950	2809263	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSAA		LID1F	10870 1796027	19813 3307195	80133	357513	917471	0.200 50.0	0.500 100	2.00	8.00	20.0
11Cl-PF3OUdS		LID1F	34109 8076972	86079 14422884	320345	1383286	3661137	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorododecanoic acid		LID1F	44749 8042843	103792 13848305	367022	1650105	3702240	0.200 50.0	0.500 100	2.00	8.00	20.0
10:2 FTS		LID1F	8999 1458729	22412 2512243	75506	317228	719734	0.193 48.2	0.482 96.4	1.93	7.71	19.3
NMeFOSE		LID1F	7857 1659332	17848 3345516	74211	304475	801539	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSA		LID1F	4491 995516	10862 1972954	40284	174195	464354	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorododecanesulfonic acid		LID1F	5018 1154877	13202 2119602	47809	206401	545361	0.194 48.4	0.484 96.8	1.94	7.74	19.4
NEtFOSE		LID1F	7587 1425894	16371 2631088	57856	246035	632999	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotridecanoic acid		LID1F	54259 11344399	141674 17494575	496169	2208799	5361638	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSA		LID1F	2972 808303	8810 1486807	34546	143370	355680	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotetradecanoic acid		LID1F	52917 10302571	130977 18466864	498582	2178289	4896020	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexadecanoic acid		LID1F	34408 6158348	76124 10677212	272466	1128232	2867156	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctadecanoic acid		LID1F	25925 5694959	63052 10154360	240515	1041196	2605568	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	13C3 PFBA	Ave	3172761 2967355	3392193 2711103	3265430	3571913	3370379	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C5 PFPeA	13C3 PFBA	Ave	2590654 2391896	2638706 2139665	2553330	2798856	2674657	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFBS	13C3 PFBA	Ave	1187092 1107237	1267062 1029883	1177328	1301876	1217071	9.36 9.36	9.36 9.36	9.36	9.36	9.36
M2-4:2 FTS	13PF OA	Ave	200563 197174	201303 186893	199374	226154	206649	9.34 9.34	9.34 9.34	9.34	9.34	9.34
13C5 PFHxA	13PF OA	Ave	3273785 3072617	3421335 2911805	3246481	3643084	3362725	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 HFPO-DA	13PF OA	Ave	633422 547355	589131 612248	636627	763240	721090	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C4 PFHpA	13PF OA	Ave	2358626 2229584	2538267 2172379	2375745	2589725	2539922	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFHxS	13PF OA	Ave	974106 873592	1053086 825076	1032100	1083353	1012703	9.46 9.46	9.46 9.46	9.46	9.46	9.46
M2-6:2 FTS	13PF OA	Ave	192607 144708	198775 133021	168324	183740	165283	9.50 9.50	9.50 9.50	9.50	9.50	9.50
13C8 PFOA	13PF OA	Ave	3140803 2863293	3318758 2599837	3228402	3432261	3250829	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C8 PFOS	PFOS	Ave	930927 903269	999590 825974	1000612	1049925	1048412	9.57 9.57	9.57 9.57	9.57	9.57	9.57
13C9 PFNA	PFOS	Ave	2116048 2056283	2370192 1857996	2214810	2411734	2269415	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C6 PFDA	PFDA	Ave	2968733 2525669	3089643 2245347	2956151	2995795	2930285	10.0 10.0	10.0 10.0	10.0	10.0	10.0
M2-8:2 FTS	PFDA	Ave	226054 151775	215416 140862	183511	196268	187389	9.58 9.58	9.58 9.58	9.58	9.58	9.58
13C8 FOSA	PFDA	Ave	2281818 1853618	2219989 1712452	2032844	2202758	2112267	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMeFOSAA	PFDA	Ave	535016 490279	571252 500717	518928	581266	553080	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C7 PFUnA	PFDA	Ave	2648646 2324946	2799073 2188460	2615147	2794411	2635910	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtFOSAA	PFDA	Ave	468432 391407	441433 350292	410778	459613	440737	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2-PFDoDA	PFDA	Ave	2996738 2896111	3470214 2564330	3157905	3615759	3279252	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d7-N-MeFOSE-M	PFDA	Ave	432562 378809	406159 347192	399598	432371	407198	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMePFOSA	PFDA	Ave	240434 184906	213299 188350	205987	221342	217721	10.0 10.0	10.0 10.0	10.0	10.0	10.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
d9-N-EtFOSE-M	PFDA	Ave	452957 367932	420175 355735	395079	436785	423734	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtPFOSA	PFDA	Ave	187664 155641	173408 155963	172104	180374	178466	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2 PFTeDA	PFDA	Ave	2499498 2311591	2585189 2156163	2496449	2685634	2508441	10.0 10.0	10.0 10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD
LID1F = Linear 1/Conc IsoDil FZ

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-21880/1	20JUL13MCAL-09.d
Level 2	IC 410-21880/2	20JUL13MCAL-10.d
Level 3	IC 410-21880/3	20JUL13MCAL-11.d
Level 4	IC 410-21880/4	20JUL13MCAL-12.d
Level 5	ICISAV 410-21880/5	20JUL13MCAL-13.d
Level 6	IC 410-21880/6	20JUL13MCAL-14.d
Level 7	IC 410-21880/7	20JUL13MCAL-15.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanoic acid	34.6 -1.5	15.8	7.2	-0.6	7.6	-0.5	50 30	30	30	30	30	30
Perfluoropentanoic acid	30.0 -2.1	14.6	2.4	3.2	8.0	0.0	50 30	30	30	30	30	30
Perfluorobutanesulfonic acid	0.0 -1.4	-0.8	-3.4	-6.0	5.7	1.6	50 30	30	30	30	30	30
4:2 Fluorotelomer sulfonic acid	9.4 1.2	12.2	14.3	-0.2	8.9	-6.8	50 30	30	30	30	30	30
Perfluorohexanoic acid	21.4 -3.9	8.0	9.7	1.6	9.8	3.0	50 30	30	30	30	30	30
Perfluoropentanesulfonic acid	14.9 1.5	8.7	-0.7	-2.4	6.0	-5.1	50 30	30	30	30	30	30
HFPODA	20.5 -5.5	8.4	-0.2	-10.3	-1.9	13.3	50 30	30	30	30	30	30
Perfluoroheptanoic acid	37.5 -6.6	11.5	20.0	9.9	13.7	5.0	50 30	30	30	30	30	30
Perfluorohexanesulfonic acid	12.1 -2.0	5.2	-3.1	-1.9	4.8	2.3	50 30	30	30	30	30	30
DONA	23.5 -4.7	6.0	12.4	7.1	11.5	3.0	50 30	30	30	30	30	30
6:2 Fluorotelomer sulfonic acid	8.8 -3.4	0.8	12.2	1.6	11.1	1.6	50 30	30	30	30	30	30
Perfluoroheptanesulfonic acid	15.8 -1.4	-1.2	-3.2	-3.6	3.0	2.2	50 30	30	30	30	30	30
Perfluorooctanoic acid	37.7 -1.8	6.5	-3.5	-2.2	5.2	1.8	50 30	30	30	30	30	30
Perfluorooctanesulfonic acid	21.0 -0.6	6.3	-6.2	-4.3	-3.7	3.5	50 30	30	30	30	30	30
Perfluorononanoic acid	2.4 -2.1	8.0	3.8	-3.3	6.4	2.0	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
9Cl-PF3ONS	8.8 -0.2	1.5	-5.0	-3.0	0.3	0.9	50 30	30	30	30	30	30
Perfluorononanesulfonic acid	7.4 -1.3	7.6	4.7	0.7	2.7	1.2	50 30	30	30	30	30	30
Perfluorodecanoic acid	4.9 -0.9	4.5	-7.1	1.7	5.0	-0.2	50 30	30	30	30	30	30
8:2 Fluorotelomer sulfonic acid	17.2 -5.0	3.8	-3.0	10.1	7.6	5.3	50 30	30	30	30	30	30
Perfluorooctanesulfonamide	8.8 -3.8	-0.3	4.2	-4.0	7.5	5.0	50 30	30	30	30	30	30
NMeFOSAA	6.2 -6.8	-0.1	8.1	5.5	12.7	7.3	50 30	30	30	30	30	30
Perfluorodecanesulfonic acid	16.3 0.8	13.3	0.6	0.6	-2.1	-1.1	50 30	30	30	30	30	30
Perfluoroundecanoic acid	23.1 -6.0	6.9	17.6	0.8	9.2	7.4	50 30	30	30	30	30	30
NEtFOSAA	22.2 -0.5	-5.4	2.8	2.4	9.7	-3.3	50 30	30	30	30	30	30
11Cl-PF3OUdS	4.6 -0.3	-1.7	-8.6	-6.0	-0.3	2.1	50 30	30	30	30	30	30
Perfluorododecanoic acid	36.0 -1.7	8.9	5.8	3.9	2.8	1.1	50 30	30	30	30	30	30
10:2 FTS	7.5 -3.7	12.4	11.1	9.1	3.7	3.8	50 30	30	30	30	30	30
NMeFOSE	-3.1 2.8	-6.2	-0.9	-6.1	5.0	-6.5	50 30	30	30	30	30	30
NMeFOSA	-11.4 -0.6	-3.4	-7.2	-6.7	1.2	2.2	50 30	30	30	30	30	30
Perfluorododecanesulfonic acid	5.2 0.2	3.1	-6.7	-4.1	1.6	-0.2	50 30	30	30	30	30	30
NEtFOSE	11.8 -1.2	4.1	-2.2	-6.0	-0.3	3.5	50 30	30	30	30	30	30
Perfluorotridecanoic acid	23.9 -6.6	11.8	7.5	4.5	11.9	7.2	50 30	30	30	30	30	30
NEtFOSA	-19.5 -3.1	3.3	2.0	1.0	1.3	5.6	50 30	30	30	30	30	30
Perfluorotetradecanoic acid	19.1 -3.6	14.0	12.4	14.1	9.8	0.3	50 30	30	30	30	30	30
Perfluorohexadecanoic acid	33.3 -4.1	14.0	5.7	1.7	10.7	3.2	50 30	30	30	30	30	30
Perfluorooctadecanoic acid	7.3 -2.5	1.0	-0.3	0.3	7.5	2.0	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
13C4 PFBA	0.7 -5.1	4.5	3.6	0.0	-1.2	-2.6	30 30	30	30	30	30	30
13C5 PFPeA	3.8 -5.5	2.6	2.2	-1.1	-1.1	-0.9	30 30	30	30	30	30	30
13C3 PFBS	2.0 -2.4	5.7	1.1	-1.3	-3.4	-1.6	30 30	30	30	30	30	30
M2-4:2 FTS	-1.3 -0.7	0.0	-0.7	3.0	-2.0	1.8	30 30	30	30	30	30	30
13C5 PFHxA	-0.3 -4.3	5.1	0.0	2.7	-1.3	-1.9	30 30	30	30	30	30	30
13C3 HFPO-DA	-1.6 2.6	-7.7	0.0	9.7	7.9	-10.8	30 30	30	30	30	30	30
13C4 PFHpA	-2.0 -2.6	6.4	-0.2	-0.5	1.7	-2.8	30 30	30	30	30	30	30
13C3 PFHxS	-0.7 -9.2	8.4	6.4	2.2	-0.5	-6.6	30 30	30	30	30	30	30
M2-6:2 FTS	13.5 -15.4	18.2	0.3	0.2	-6.2	-10.6	30 30	30	30	30	30	30
13C8 PFOA	0.5 -10.2	7.2	4.5	1.6	0.3	-3.9	30 30	30	30	30	30	30
13C8 PFOS	-2.7 -4.5	2.8	7.6	-1.7	2.3	-3.8	30 30	30	30	30	30	30
13C9 PFNA	-2.3 -5.0	7.7	5.2	-0.2	-2.1	-3.2	30 30	30	30	30	30	30
13C6 PFDA	5.7 -6.2	5.8	1.0	-2.0	3.4	-7.6	30 30	30	30	30	30	30
M2-8:2 FTS	22.0 -10.8	11.9	-5.0	-2.6	0.3	-15.8	30 30	30	30	30	30	30
13C8 FOSA	10.9 -2.3	3.8	-5.2	-1.6	1.8	-7.4	30 30	30	30	30	30	30
d3-NMeFOSAA	-0.3 9.5	2.4	-7.2	-0.5	2.2	-6.1	30 30	30	30	30	30	30
13C7 PFUnA	3.1 -0.1	4.8	-2.4	-0.1	1.7	-7.0	30 30	30	30	30	30	30
d5-NEtFOSAA	10.8 -2.8	0.4	-6.8	-0.1	3.3	-4.9	30 30	30	30	30	30	30
13C2-PFDoDA	-4.3 -3.9	6.6	-3.3	6.1	3.8	-5.0	30 30	30	30	30	30	30
d7-N-MeFOSE-M	8.0 1.7	-2.5	-4.3	-0.8	0.8	-2.8	30 30	30	30	30	30	30
d3-NMePFOSA	14.2 5.0	-2.5	-6.1	-3.4	2.5	-9.7	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 21880

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/13/2020 13:01 Calibration End Date: 07/13/2020 13:55 Calibration ID: 6740

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
d9-N-EtFOSE-M	11.1 2.4	-0.8	-7.0	-1.5	3.1	-7.2	30 30	30	30	30	30	30
d5-NEtPFOSA	9.0 6.3	-3.1	-4.1	-3.7	2.7	-7.1	30 30	30	30	30	30	30
13C2 PFTeDA	1.5 2.7	1.0	-2.8	0.2	1.0	-3.5	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 23948

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/18/2020 12:45 Calibration End Date: 07/18/2020 14:30 Calibration ID: 7113

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-23948/1	20JUL18MCAL-27.d
Level 2	IC 410-23948/2	20JUL18MCAL-17.d
Level 3	IC 410-23948/3	20JUL18MCAL-18.d
Level 4	IC 410-23948/4	20JUL18MCAL-19.d
Level 5	ICISAV 410-23948/5	20JUL18MCAL-20.d
Level 6	IC 410-23948/6	20JUL18MCAL-21.d
Level 7	IC 410-23948/7	20JUL18MCAL-22.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanoic acid	1.1645 0.8136	0.9310 0.7903	0.8266	0.7842	0.8436	LID1F		0.8036							0.9990		0.9900
Perfluoropentanoic acid	1.2698 0.9047	1.1104 0.8756	0.9432	0.8937	1.0282	LID1F		0.9032							0.9970		0.9900
Perfluorobutanesulfonic acid	1.0470 1.0028	0.9683 0.9810	1.0325	0.9541	1.0181	LID1F		0.9906							1.0000		0.9900
4:2 Fluorotelomer sulfonic acid	1.7964 1.6766	1.9096 1.7845	1.7508	1.6979	1.7576	LID1F		1.7478							0.9990		0.9900
Perfluorohexanoic acid	0.8790 0.7643	0.8111 0.7161	0.7458	0.6970	0.7859	LID1F		0.7371							0.9980		0.9900
Perfluoropentanesulfonic acid	0.5343 0.4802	0.5143 0.4771	0.4839	0.4749	0.5096	LID1F		0.4817							1.0000		0.9900
HFPODA	1.9503 1.8296	1.7755 1.7164	1.8159	1.7916	1.7982	LID1F		1.7616							0.9990		0.9900
Perfluoroheptanoic acid	1.6019 1.2769	1.4091 1.2095	1.3727	1.2935	1.3308	LID1F		1.2481							0.9980		0.9900
Perfluorohexanesulfonic acid	1.1489 0.9999	1.0422 0.9648	1.0061	0.9609	0.9831	LID1F		0.9773							1.0000		0.9900
DONA	1.5408 1.5158	1.5051 1.4180	1.5473	1.4081	1.5499	LID1F		1.4611							0.9990		0.9900
6:2 Fluorotelomer sulfonic acid	2.0695 1.7267	1.6520 1.6667	1.6914	1.6218	1.6855	LID1F		1.6840							1.0000		0.9900
Perfluoroheptanesulfonic acid	1.0375 0.8843	0.9100 0.8770	0.8773	0.8339	0.9343	LID1F		0.8838							0.9990		0.9900
Perfluorooctanoic acid	0.8377 0.6389	0.7075 0.6673	0.6140	0.5963	0.6765	LID1F		0.6570							0.9990		0.9900
Perfluorooctanesulfonic acid	1.2353 0.9945	1.0469 0.9564	1.0230	0.9809	0.9852	LID1F		0.9725							1.0000		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 23948

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/18/2020 12:45 Calibration End Date: 07/18/2020 14:30 Calibration ID: 7113

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorononanoic acid	0.9871 0.9051	0.8955 0.8153	0.8299	0.8614	0.8582	LID1F		0.8475							0.9980		0.9900
9Cl-PF3ONS	2.4676 2.1699	2.2974 2.2058	2.1842	2.1099	2.2317	LID1F		2.1948							1.0000		0.9900
Perfluorononanesulfonic acid	0.6045 0.6674	0.7340 0.6247	0.6644	0.6157	0.6744	LID1F		0.6423							0.9990		0.9900
Perfluorodecanoic acid	0.6381 0.4911	0.4895 0.4605	0.4805	0.4132	0.4925	LID1F		0.4709							0.9980		0.9900
8:2 Fluorotelomer sulfonic acid	1.8964 1.5593	1.6004 1.5320	1.7677	1.4823	1.6654	LID1F		1.5553							0.9990		0.9900
Perfluorooctanesulfonamide	1.0425 0.9505	0.9876 0.9685	0.9852	0.9997	1.0006	LID1F		0.9688							1.0000		0.9900
NMeFOSAA	0.9081 0.9216	1.1209 1.0433	1.0440	1.0255	0.9258	LID1F		0.9959							0.9960		0.9900
Perfluorodecanesulfonic acid	0.5175 0.5046	0.5345 0.5154	0.5208	0.5238	0.5558	LID1F		0.5174							0.9990		0.9900
Perfluoroundecanoic acid	0.5415 0.4289	0.5068 0.4554	0.4555	0.4571	0.4747	LID1F		0.4505							0.9990		0.9900
NEtFOSAA	0.9845 0.8883	0.9895 0.9675	1.0154	0.9761	1.1103	LID1F		0.9624							0.9960		0.9900
11Cl-PF3OUdS	2.0448 1.8300	1.8261 1.7664	1.9008	1.7927	1.8165	LID1F		1.7927							1.0000		0.9900
Perfluorododecanoic acid	0.6736 0.5013	0.5499 0.5042	0.5450	0.5277	0.5537	LID1F		0.5107							0.9990		0.9900
10:2 FTS	2.6313 2.2212	2.0532 2.0357	2.2490	1.9662	2.1682	LID1F		2.1017							0.9980		0.9900
NMeFOSE	0.9117 0.8609	0.8239 0.9852	0.9709	0.7863	0.9709	LID1F		0.9397							0.9950		0.9900
NMeFOSA	1.3580 1.0132	0.9964 1.0878	1.0272	0.9734	1.0594	LID1F		1.0583							0.9990		0.9900
Perfluorododecanesulfonic acid	0.2942 0.2662	0.2860 0.2566	0.2943	0.2430	0.2651	LID1F		0.2601							0.9990		0.9900
NEtFOSE	0.5923 0.6834	0.5665 0.7023	0.7008	0.6446	0.6882	LID1F		0.6924							0.9990		0.9900
Perfluorotridecanoic acid	1.0088 0.6919	0.8471 0.6770	0.8261	0.8040	0.7974	LID1F		0.7026							0.9950		0.9900
NEtFOSA	1.0990 1.0346	1.1142 0.9165	0.9813	1.0254	1.0021	LID1F		0.9649							0.9970		0.9900
Perfluorotetradecanoic acid	1.0600 0.9380	1.0980 0.8544	0.8977	0.9400	0.9559	LID1F		0.8940							0.9970		0.9900

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 23948

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/18/2020 12:45 Calibration End Date: 07/18/2020 14:30 Calibration ID: 7113

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorohexadecanoic acid	0.7483 0.5750	0.6990 0.5612	0.5824	0.5674	0.6040	LID1F		0.5709							0.9990		0.9900
Perfluorooctadecanoic acid	0.5896 0.5345	0.5930 0.5112	0.5166	0.5124	0.5735	LID1F		0.5250							0.9980		0.9900
13C4 PFBA	1.1260 1.0611	1.1284 1.0819	1.1298	1.0857	1.1105	Ave		1.1033				2.5		20.0			
13C5 PFPeA	0.9436 0.8873	0.9383 0.9310	0.9602	0.9024	0.9163	Ave		0.9256				2.7		20.0			
13C3 PFBS	0.4570 0.4297	0.4417 0.4461	0.4571	0.4276	0.4499	Ave		0.4441				2.7		20.0			
M2-4:2 FTS	0.1157 0.1114	0.1088 0.0952	0.1054	0.1068	0.1112	Ave		0.1078				6.0		20.0			
13C5 PFHxA	1.6403 1.6126	1.7687 1.4901	1.7414	1.6859	1.5886	Ave		1.6468				5.8		20.0			
13C3 HFPO-DA	0.3960 0.3792	0.4203 0.3607	0.3716	0.3793	0.3834	Ave		0.3843				5.0		20.0			
13C4 PFHpA	1.1505 1.0834	1.1799 0.9956	1.0862	1.1004	1.1150	Ave		1.1016				5.3		20.0			
13C3 PFHxS	0.5311 0.4900	0.5525 0.4486	0.5326	0.5165	0.5022	Ave		0.5105				6.7		20.0			
M2-6:2 FTS	0.0902 0.0763	0.0906 0.0655	0.0875	0.0835	0.0835	Ave		0.0824				10.8		20.0			
13C8 PFOA	1.5122 1.4870	1.6414 1.3045	1.6175	1.5887	1.5067	Ave		1.5226				7.4		20.0			
13C8 PFOS	1.0100 1.0207	1.0150 0.9976	0.9830	0.9951	0.9888	Ave		1.0015				1.4		20.0			
13C9 PFNA	1.8992 1.8983	2.0132 1.8695	1.8982	1.8739	1.8932	Ave		1.9065				2.5		20.0			
13C6 PFDA	1.7104 1.6697	1.8807 1.7600	1.8015	1.9327	1.9211	Ave		1.8109				5.7		20.0			
M2-8:2 FTS	0.1301 0.1107	0.1382 0.1082	0.1255	0.1288	0.1306	Ave		0.1246				8.9		20.0			
13C8 FOSA	1.5191 1.4671	1.5161 1.4083	1.4632	1.4119	1.3934	Ave		1.4542				3.5		20.0			
d3-NMeFOSAA	0.4348 0.4703	0.4314 0.4421	0.4029	0.4487	0.4769	Ave		0.4439				5.6		20.0			
13C7 PFUnA	1.9034 1.7173	1.9482 1.6304	1.8707	1.7655	1.7630	Ave		1.7998				6.2		20.0			
d5-NEtFOSAA	0.3534 0.3362	0.3314 0.3134	0.3166	0.3231	0.3064	Ave		0.3258				4.9		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 23948

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/18/2020 12:45 Calibration End Date: 07/18/2020 14:30 Calibration ID: 7113

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5		B	M1	M2								
13C2-PFDoDA	2.1845 2.2241	2.3029 2.0784	2.2639	2.2490	2.1824	Ave		2.2122				3.3		20.0			
d7-N-MeFOSE-M	0.2906 0.2883	0.2910 0.2787	0.2752	0.3086	0.2884	Ave		0.2887				3.7		20.0			
d3-NMePFOSA	0.1532 0.1426	0.1418 0.1449	0.1308	0.1438	0.1447	Ave		0.1431				4.6		20.0			
d9-N-EtFOSE-M	0.3076 0.2851	0.3010 0.2956	0.2965	0.3066	0.2949	Ave		0.2982				2.6		20.0			
d5-NEtPFOSA	0.1183 0.1148	0.1190 0.1310	0.1131	0.1147	0.1262	Ave		0.1196				5.5		20.0			
13C2 PFTeDA	1.6975 1.7443	1.6612 1.8253	1.8050	1.7952	1.7553	Ave		1.7548				3.4		20.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 23948

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/18/2020 12:45 Calibration End Date: 07/18/2020 14:30 Calibration ID: 7113

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-23948/1	20JUL18MCAL-27.d
Level 2	IC 410-23948/2	20JUL18MCAL-17.d
Level 3	IC 410-23948/3	20JUL18MCAL-18.d
Level 4	IC 410-23948/4	20JUL18MCAL-19.d
Level 5	ICISAV 410-23948/5	20JUL18MCAL-20.d
Level 6	IC 410-23948/6	20JUL18MCAL-21.d
Level 7	IC 410-23948/7	20JUL18MCAL-22.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
Perfluorobutanoic acid		LID1F	62237 10268818	134830 18000244	467347	1835534	4518569	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanoic acid		LID1F	56872 9547876	133720 17161821	453193	1738812	4544828	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorobutanesulfonic acid		LID1F	20098 4535395	48577 8153343	209007	778548	1955209	0.177 44.3	0.443 88.5	1.77	7.08	17.7
4:2 Fluorotelomer sulfonic acid		LID1F	6966 1484724	16877 2708510	62669	258037	659263	0.187 46.7	0.467 93.4	1.87	7.47	18.7
Perfluorohexanoic acid		LID1F	51752 10492168	124778 18216357	472076	1790855	4509708	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoropentanesulfonic acid		LID1F	10871 2302002	27346 4202460	103814	410697	1037355	0.188 46.9	0.469 93.8	1.88	7.50	18.8
HFPODA		LID1F	27717 5905937	64900 10567880	245247	1035672	2490715	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluoroheptanoic acid		LID1F	66150 11776173	144612 20555962	541996	2169402	5360086	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexanesulfonic acid		LID1F	19974 3803398	45676 6737677	177646	689930	1626341	0.182 45.6	0.456 91.2	1.82	7.30	18.2
DONA		LID1F	60128 13210900	145960 22774153	577340	2231841	5899307	0.189 47.3	0.473 94.5	1.89	7.56	18.9
6:2 Fluorotelomer sulfonic acid		LID1F	6354 1063286	12341 1766930	51021	195660	481717	0.190 47.4	0.474 94.8	1.90	7.58	19.0
Perfluoroheptanesulfonic acid		LID1F	18829 3511251	41629 6393149	161704	625024	1613498	0.190 47.6	0.476 95.2	1.90	7.62	19.0
Perfluorooctanoic acid		LID1F	45466 8087111	101003 14859736	361013	1443976	3681750	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctanesulfonic acid		LID1F	22372 4060990	46456 7227158	180684	706254	1700699	0.185 46.3	0.463 92.6	1.85	7.40	18.5
Perfluorononanoic acid		LID1F	36321 7427714	85152 12475172	305829	1261948	3064964	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 23948

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/18/2020 12:45 Calibration End Date: 07/18/2020 14:30 Calibration ID: 7113

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
9Cl-PF3ONS		LID1F	44906 8904153	102442 16749923	387657	1526504	3871324	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorononanesulfonic acid		LID1F	11356 2826827	33783 4896452	121725	459809	1207658	0.192 48.0	0.480 96.0	1.92	7.68	19.2
Perfluorodecanoic acid		LID1F	30722 5228200	63727 9271314	246403	899514	2536346	0.200 50.0	0.500 100	2.00	8.00	20.0
8:2 Fluorotelomer sulfonic acid		LID1F	6655 1054038	14664 1816895	60510	205923	558747	0.192 47.9	0.479 95.8	1.92	7.66	19.2
Perfluorooctanesulfonamide		LID1F	44578 8889948	103642 15602641	410354	1589778	3738068	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSAA		LID1F	11114 2763201	33470 5276895	119741	518290	1183714	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorodecanesulfonic acid		LID1F	9761 2146192	24703 4056606	95817	392847	999404	0.193 48.2	0.482 96.4	1.93	7.71	19.3
Perfluoroundecanoic acid		LID1F	29010 4695826	68341 8493979	242558	908985	2243471	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSAA		LID1F	9794 1903824	22697 3468714	91520	355178	912089	0.200 50.0	0.500 100	2.00	8.00	20.0
11Cl-PF3OUdS		LID1F	37211 7509285	81426 13413262	337370	1296954	3150990	0.186 46.5	0.465 93.0	1.86	7.44	18.6
Perfluorododecanoic acid		LID1F	41417 7108052	87661 11988374	351205	1336701	3239593	0.200 50.0	0.500 100	2.00	8.00	20.0
10:2 FTS		LID1F	9292 1510861	18931 2429355	77466	274856	732000	0.193 48.2	0.482 96.4	1.93	7.71	19.3
NMeFOSE		LID1F	7458 1582132	16594 3141058	76068	273303	750607	0.200 50.0	0.500 100	2.00	8.00	20.0
NMeFOSA		LID1F	5855 921077	9779 1802988	38238	157668	411058	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorododecanesulfonic acid		LID1F	5572 1137147	13273 2027873	54371	182967	478644	0.194 48.4	0.484 96.8	1.94	7.74	19.4
NEtFOSE		LID1F	5128 1242212	11802 2374818	59143	222573	544089	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotridecanoic acid		LID1F	62030 9811615	135030 16095684	532404	2036564	4665590	0.200 50.0	0.500 100	2.00	8.00	20.0
NEtFOSA		LID1F	3660 757301	9177 1373347	31601	132473	339002	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorotetradecanoic acid		LID1F	50650 10431582	126259 17841397	461272	1900624	4498143	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorohexadecanoic acid		LID1F	35753 6394573	80379 11719285	299252	1147229	2842184	0.200 50.0	0.500 100	2.00	8.00	20.0
Perfluorooctadecanoic acid		LID1F	28174 5943943	68181 10675165	265447	1036067	2698911	0.200 50.0	0.500 100	2.00	8.00	20.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 23948

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/18/2020 12:45 Calibration End Date: 07/18/2020 14:30 Calibration ID: 7113

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
13C4 PFBA	13C3 PFBA	Ave	2672279 2524227	2896326 2277676	2826807	2925901	2678216	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C5 PFPeA	13C3 PFBA	Ave	2239342 2110757	2408583 1959977	2402432	2432009	2210006	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFBS	13C3 PFBA	Ave	1015093 956686	1061154 879019	1070478	1078767	1015575	9.36 9.36	9.36 9.36	9.36	9.36	9.36
M2-4:2 FTS	13PF OA	Ave	193888 177115	176755 151784	178969	189969	187543	9.34 9.34	9.34 9.34	9.34	9.34	9.34
13C5 PFHxA	13PF OA	Ave	2943799 2745408	3076587 2543700	3165048	3211908	2869248	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 HFPO-DA	13PF OA	Ave	710600 645608	731068 615690	675294	722586	692553	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C4 PFHpA	13PF OA	Ave	2064732 1844487	2052485 1699496	1974203	2096524	2013872	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C3 PFHxS	13PF OA	Ave	901674 789108	909187 724360	915796	930990	858024	9.46 9.46	9.46 9.46	9.46	9.46	9.46
M2-6:2 FTS	13PF OA	Ave	153838 123421	149725 106240	151147	151120	143199	9.50 9.50	9.50 9.50	9.50	9.50	9.50
13C8 PFOA	13PF OA	Ave	2713837 2531658	2855143 2226920	2939789	3026850	2721282	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C8 PFOS	PFOS	Ave	935839 844074	917205 780985	912710	930122	892058	9.57 9.57	9.57 9.57	9.57	9.57	9.57
13C9 PFNA	PFOS	Ave	1839707 1641304	1901872 1530181	1842508	1831271	1785713	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C6 PFDA	PFDA	Ave	2407343 2129035	2603534 2013422	2564191	2720973	2575214	10.0 10.0	10.0 10.0	10.0	10.0	10.0
M2-8:2 FTS	PFDA	Ave	175465 135192	183258 118595	171152	173654	167751	9.58 9.58	9.58 9.58	9.58	9.58	9.58
13C8 FOSA	PFDA	Ave	2138066 1870669	2098784 1611038	2082664	1987721	1867822	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMeFOSAA	PFDA	Ave	611911 599685	597197 505795	573468	631730	639271	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C7 PFUnA	PFDA	Ave	2678864 2189705	2696960 1865124	2662657	2485578	2363184	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtFOSAA	PFDA	Ave	497435 428632	458745 358524	450669	454866	410729	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2-PFDoDA	PFDA	Ave	3074513 2835934	3187970 2377636	3222254	3166306	2925434	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d7-N-MeFOSE-M	PFDA	Ave	409012 367556	402816 318825	391752	434491	386534	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d3-NMePFOSA	PFDA	Ave	215580 181815	196285 165751	186134	202475	193996	10.0 10.0	10.0 10.0	10.0	10.0	10.0

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 23948

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/18/2020 12:45 Calibration End Date: 07/18/2020 14:30 Calibration ID: 7113

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	LVL 5
d9-N-EtFOSE-M	PFDA	Ave	432911 363556	416699 338158	421966	431638	395304	10.0 10.0	10.0 10.0	10.0	10.0	10.0
d5-NEtPFOSA	PFDA	Ave	166518 146395	164728 149854	161020	161484	169151	10.0 10.0	10.0 10.0	10.0	10.0	10.0
13C2 PFTeDA	PFDA	Ave	2389066 2224144	2299716 2088072	2569206	2527427	2352906	10.0 10.0	10.0 10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD
LID1F = Linear 1/Conc IsoDil FZ

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 23948

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/18/2020 12:45 Calibration End Date: 07/18/2020 14:30 Calibration ID: 7113

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 410-23948/1	20JUL18MCAL-27.d
Level 2	IC 410-23948/2	20JUL18MCAL-17.d
Level 3	IC 410-23948/3	20JUL18MCAL-18.d
Level 4	IC 410-23948/4	20JUL18MCAL-19.d
Level 5	ICISAV 410-23948/5	20JUL18MCAL-20.d
Level 6	IC 410-23948/6	20JUL18MCAL-21.d
Level 7	IC 410-23948/7	20JUL18MCAL-22.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanoic acid	44.9 -1.7	15.9	2.9	-2.4	5.0	1.2	50 30	30	30	30	30	30
Perfluoropentanoic acid	40.6 -3.1	22.9	4.4	-1.0	13.8	0.2	50 30	30	30	30	30	30
Perfluorobutanesulfonic acid	5.7 -1.0	-2.2	4.2	-3.7	2.8	1.2	50 30	30	30	30	30	30
4:2 Fluorotelomer sulfonic acid	2.8 2.1	9.3	0.2	-2.9	0.6	-4.1	50 30	30	30	30	30	30
Perfluorohexanoic acid	19.2 -2.8	10.0	1.2	-5.4	6.6	3.7	50 30	30	30	30	30	30
Perfluoropentanesulfonic acid	10.9 -1.0	6.8	0.5	-1.4	5.8	-0.3	50 30	30	30	30	30	30
HFPODA	10.7 -2.6	0.8	3.1	1.7	2.1	3.9	50 30	30	30	30	30	30
Perfluoroheptanoic acid	28.3 -3.1	12.9	10.0	3.6	6.6	2.3	50 30	30	30	30	30	30
Perfluorohexanesulfonic acid	17.6 -1.3	6.6	2.9	-1.7	0.6	2.3	50 30	30	30	30	30	30
DONA	5.5 -2.9	3.0	5.9	-3.6	6.1	3.7	50 30	30	30	30	30	30
6:2 Fluorotelomer sulfonic acid	22.9 -1.0	-1.9	0.4	-3.7	0.1	2.5	50 30	30	30	30	30	30
Perfluoroheptanesulfonic acid	17.4 -0.8	3.0	-0.7	-5.6	5.7	0.1	50 30	30	30	30	30	30
Perfluorooctanoic acid	27.5 1.6	7.7	-6.5	-9.2	3.0	-2.8	50 30	30	30	30	30	30
Perfluorooctanesulfonic acid	27.0 -1.7	7.7	5.2	0.9	1.3	2.3	50 30	30	30	30	30	30
Perfluorononanoic acid	16.5 -3.8	5.7	-2.1	1.6	1.3	6.8	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 23948

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/18/2020 12:45 Calibration End Date: 07/18/2020 14:30 Calibration ID: 7113

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
9Cl-PF3ONS	12.4 0.5	4.7	-0.5	-3.9	1.7	-1.1	50 30	30	30	30	30	30
Perfluorononanesulfonic acid	-5.9 -2.7	14.3	3.4	-4.1	5.0	3.9	50 30	30	30	30	30	30
Perfluorodecanoic acid	35.5 -2.2	4.0	2.0	-12.2	4.6	4.3	50 30	30	30	30	30	30
8:2 Fluorotelomer sulfonic acid	21.9 -1.5	2.9	13.7	-4.7	7.1	0.3	50 30	30	30	30	30	30
Perfluorooctanesulfonamide	7.6 0.0	1.9	1.7	3.2	3.3	-1.9	50 30	30	30	30	30	30
NMeFOSAA	-8.8 4.8	12.6	4.8	3.0	-7.0	-7.5	50 30	30	30	30	30	30
Perfluorodecanesulfonic acid	0.0 -0.4	3.3	0.7	1.3	7.4	-2.5	50 30	30	30	30	30	30
Perfluoroundecanoic acid	20.2 1.1	12.5	1.1	1.5	5.4	-4.8	50 30	30	30	30	30	30
NEtFOSAA	2.3 0.5	2.8	5.5	1.4	15.4	-7.7	50 30	30	30	30	30	30
11Cl-PF3OUdS	14.1 -1.5	1.9	6.0	0.0	1.3	2.1	50 30	30	30	30	30	30
Perfluorododecanoic acid	31.9 -1.3	7.7	6.7	3.3	8.4	-1.8	50 30	30	30	30	30	30
10:2 FTS	25.2 -3.1	-2.3	7.0	-6.4	3.2	5.7	50 30	30	30	30	30	30
NMeFOSE	-3.0 4.8	-12.3	3.3	-16.3	3.3	-8.4	50 30	30	30	30	30	30
NMeFOSA	28.3 2.8	-5.8	-2.9	-8.0	0.1	-4.3	50 30	30	30	30	30	30
Perfluorododecanesulfonic acid	13.1 -1.4	9.9	13.1	-6.6	1.9	2.3	50 30	30	30	30	30	30
NEtFOSE	-14.5 1.4	-18.2	1.2	-6.9	-0.6	-1.3	50 30	30	30	30	30	30
Perfluorotridecanoic acid	43.6 -3.6	20.6	17.6	14.4	13.5	-1.5	50 30	30	30	30	30	30
NEtFOSA	13.9 -5.0	15.5	1.7	6.3	3.9	7.2	50 30	30	30	30	30	30
Perfluorotetradecanoic acid	18.6 -4.4	22.8	0.4	5.1	6.9	4.9	50 30	30	30	30	30	30
Perfluorohexadecanoic acid	31.1 -1.7	22.4	2.0	-0.6	5.8	0.7	50 30	30	30	30	30	30
Perfluorooctadecanoic acid	12.3 -2.6	12.9	-1.6	-2.4	9.2	1.8	50 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 23948

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/18/2020 12:45 Calibration End Date: 07/18/2020 14:30 Calibration ID: 7113

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
13C4 PFBA	2.1 -1.9	2.3	2.4	-1.6	0.6	-3.8	30 30	30	30	30	30	30
13C5 PFPeA	1.9 0.6	1.4	3.7	-2.5	-1.0	-4.1	30 30	30	30	30	30	30
13C3 PFBS	2.9 0.4	-0.6	2.9	-3.7	1.3	-3.3	30 30	30	30	30	30	30
M2-4:2 FTS	7.3 -11.7	0.9	-2.2	-0.9	3.2	3.4	30 30	30	30	30	30	30
13C5 PFHxA	-0.4 -9.5	7.4	5.7	2.4	-3.5	-2.1	30 30	30	30	30	30	30
13C3 HFPO-DA	3.0 -6.2	9.4	-3.3	-1.3	-0.2	-1.3	30 30	30	30	30	30	30
13C4 PFHpA	4.4 -9.6	7.1	-1.4	-0.1	1.2	-1.6	30 30	30	30	30	30	30
13C3 PFHxS	4.0 -12.1	8.2	4.3	1.2	-1.6	-4.0	30 30	30	30	30	30	30
M2-6:2 FTS	9.4 -20.5	9.9	6.2	1.3	1.2	-7.4	30 30	30	30	30	30	30
13C8 PFOA	-0.7 -14.3	7.8	6.2	4.3	-1.0	-2.3	30 30	30	30	30	30	30
13C8 PFOS	0.9 -0.4	1.4	-1.8	-0.6	-1.3	1.9	30 30	30	30	30	30	30
13C9 PFNA	-0.4 -1.9	5.6	-0.4	-1.7	-0.7	-0.4	30 30	30	30	30	30	30
13C6 PFDA	-5.5 -2.8	3.9	-0.5	6.7	6.1	-7.8	30 30	30	30	30	30	30
M2-8:2 FTS	4.5 -13.1	10.9	0.7	3.3	4.9	-11.2	30 30	30	30	30	30	30
13C8 FOSA	4.5 -3.2	4.3	0.6	-2.9	-4.2	0.9	30 30	30	30	30	30	30
d3-NMeFOSAA	-2.1 -0.4	-2.8	-9.2	1.1	7.4	6.0	30 30	30	30	30	30	30
13C7 PFUnA	5.8 -9.4	8.2	3.9	-1.9	-2.0	-4.6	30 30	30	30	30	30	30
d5-NEtFOSAA	8.5 -3.8	1.7	-2.8	-0.8	-5.9	3.2	30 30	30	30	30	30	30
13C2-PFDoDA	-1.3 -6.0	4.1	2.3	1.7	-1.3	0.5	30 30	30	30	30	30	30
d7-N-MeFOSE-M	0.7 -3.5	0.8	-4.7	6.9	-0.1	-0.1	30 30	30	30	30	30	30
d3-NMePFOSA	7.0 1.2	-0.9	-8.6	0.5	1.1	-0.4	30 30	30	30	30	30	30

FORM VI
LCMS BY ISOTOPIC DILUTION - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1 Analy Batch No.: 23948

SDG No.:

Instrument ID: 27632 GC Column: Gemini C18 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 07/18/2020 12:45 Calibration End Date: 07/18/2020 14:30 Calibration ID: 7113

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 # LVL 7 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1 LVL 7	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
d9-N-EtFOSE-M	3.2 -0.9	0.9	-0.6	2.8	-1.1	-4.4	30 30	30	30	30	30	30
d5-NEtPFOSA	-1.1 9.5	-0.5	-5.4	-4.1	5.5	-4.0	30 30	30	30	30	30	30
13C2 PFTeDA	-3.3 4.0	-5.3	2.9	2.3	0.0	-0.6	30 30	30	30	30	30	30

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Lab Sample ID: ICV 410-21880/9 Calibration Date: 07/13/2020 14:13

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL13MCAL-17.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8892		2.19	2.00	9.4	30.0
Perfluoropentanoic acid	LID1F		0.9489		2.12	2.00	5.9	30.0
Perfluorobutanesulfonic acid	LID1F		0.9843		1.73	1.77	-2.5	30.0
Perfluorohexanoic acid	LID1F		0.7442		2.03	2.00	1.6	30.0
HFPODA	LID1F		1.981		1.75	2.00	-12.5	30.0
Perfluoroheptanoic acid	LID1F		1.196		2.10	2.00	5.1	30.0
Perfluorohexanesulfonic acid	LID1F		0.9822		1.88	1.89	-0.4	30.0
DONA	LID1F		1.349		1.94	1.88	3.0	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8982		1.95	1.90	2.4	30.0
Perfluorooctanoic acid	LID1F		0.6907		1.98	2.00	-1.1	30.0
Perfluorooctanesulfonic acid	LID1F		0.9295		1.73	1.91	-9.7	30.0
Perfluorononanoic acid	LID1F		0.7876		1.86	2.00	-7.0	30.0
9Cl-PF3ONS	LID1F		2.105		1.74	1.86	-6.4	30.0
Perfluorodecanoic acid	LID1F		0.5408		1.94	2.00	-3.2	30.0
NMeFOSAA	LID1F		1.087		2.28	2.00	14.0	30.0
Perfluorodecanesulfonic acid	LID1F		0.5334		1.99	1.93	3.6	30.0
Perfluoroundecanoic acid	LID1F		0.5127		2.10	2.00	5.1	30.0
NEtFOSAA	LID1F		0.9705		2.04	2.00	2.2	30.0
11Cl-PF3OUdS	LID1F		1.579		1.65	1.88	-12.3	30.0
Perfluorododecanoic acid	LID1F		0.6358		2.32	2.00	15.8	30.0
Perfluorotridecanoic acid	LID1F		0.8820		2.41	2.00	20.7	30.0
Perfluorotetradecanoic acid	LID1F		0.9386		2.11	2.00	5.6	30.0
13C4 PFBA	Ave	1.110	1.011		9.10	10.0	-9.0	30.0
13C5 PFPeA	Ave	0.8798	0.8057		9.16	10.0	-8.4	30.0
13C3 PFBS	Ave	0.4382	0.3957		8.45	9.36	-9.7	30.0
M2-4:2 FTS	Ave	0.0956	0.0886		8.65	9.34	-7.3	30.0
13C5 PFHxA	Ave	1.443	1.356		9.40	10.0	-6.0	30.0
13C3 HFPO-DA	Ave	0.2830	0.2916		10.3	10.0	3.1	30.0
13C3 PFHxS	Ave	0.4556	0.4280		8.89	9.46	-6.1	30.0
13C4 PFHpA	Ave	1.058	0.9544		9.02	10.0	-9.8	30.0
M2-6:2 FTS	Ave	0.0785	0.0775		9.38	9.50	-1.3	30.0
13C8 PFOA	Ave	1.373	1.287		9.37	10.0	-6.3	30.0
13C8 PFOS	Ave	1.014	0.9808		9.25	9.57	-3.3	30.0
13C9 PFNA	Ave	2.195	2.189		9.98	10.0	-0.2	30.0
13C6 PFDA	Ave	1.629	1.499		9.20	10.0	-8.0	30.0
M2-8:2 FTS	Ave	0.1121	0.1068		9.13	9.58	-4.7	30.0
13C8 FOSA	Ave	1.193	1.082		9.07	10.0	-9.3	30.0
d3-NMeFOSAA	Ave	0.3112	0.2701		8.68	10.0	-13.2	30.0
13C7 PFUnA	Ave	1.490	1.399		9.39	10.0	-6.1	30.0
d5-NEtFOSAA	Ave	0.2452	0.2427		9.90	10.0	-1.0	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Lab Sample ID: ICV 410-21880/9 Calibration Date: 07/13/2020 14:13

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL13MCAL-17.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C2-PFDoDA	Ave	1.816	1.514		8.33	10.0	-16.7	30.0
d7-N-MeFOSE-M	Ave	0.2323	0.2172		9.35	10.0	-6.5	30.0
d3-NMePFOSA	Ave	0.1221	0.1059		8.68	10.0	-13.2	30.0
d9-N-EtFOSE-M	Ave	0.2364	0.2077		8.79	10.0	-12.1	30.0
d5-NEtPFOSA	Ave	0.0999	0.0904		9.05	10.0	-9.5	30.0
13C2 PFTeDA	Ave	1.429	1.288		9.02	10.0	-9.8	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Lab Sample ID: CCV 410-22981/1 Calibration Date: 07/16/2020 09:32

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL16-06.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8453		2.08	2.00	4.0	30.0
Perfluoropentanoic acid	LID1F		0.8888		1.98	2.00	-0.8	30.0
Perfluorobutanesulfonic acid	LID1F		0.9686		1.70	1.77	-4.0	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		1.868		2.09	1.87	11.7	30.0
Perfluorohexanoic acid	LID1F		0.7976		2.18	2.00	8.9	30.0
Perfluoropentanesulfonic acid	LID1F		0.4857		1.96	1.88	4.7	30.0
HFPODA	LID1F		2.266		2.00	2.00	0.0	30.0
Perfluoroheptanoic acid	LID1F		1.252		2.20	2.00	9.9	30.0
Perfluorohexanesulfonic acid	LID1F		0.996		1.84	1.82	1.1	30.0
DONA	LID1F		1.541		2.23	1.89	17.7	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		1.807		2.16	1.90	13.8	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9330		2.03	1.90	6.4	30.0
Perfluorooctanoic acid	LID1F		0.7192		2.06	2.00	3.0	30.0
Perfluorooctanesulfonic acid	LID1F		1.060		1.91	1.85	3.0	30.0
Perfluorononanoic acid	LID1F		0.8962		2.12	2.00	5.9	30.0
9Cl-PF3ONS	LID1F		2.173		1.80	1.86	-3.4	30.0
Perfluorononanesulfonic acid	LID1F		0.6582		1.94	1.92	1.0	30.0
Perfluorodecanoic acid	LID1F		0.5898		2.11	2.00	5.6	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		1.590		1.92	1.92	-0.0	30.0
Perfluorooctanesulfonamide	LID1F		0.9922		2.06	2.00	3.2	30.0
NMeFOSAA	LID1F		1.119		2.35	2.00	17.4	30.0
Perfluorodecanesulfonic acid	LID1F		0.5090		1.91	1.93	-1.2	30.0
Perfluoroundecanoic acid	LID1F		0.4861		1.99	2.00	-0.4	30.0
NEtFOSAA	LID1F		0.8708		1.83	2.00	-8.3	30.0
11Cl-PF3OUdS	LID1F		1.836		1.90	1.86	1.9	30.0
Perfluorododecanoic acid	LID1F		0.6078		2.21	2.00	10.7	30.0
10:2 FTS	LID1F		2.271		2.38	1.93	23.4	30.0
NMeFOSE	LID1F		0.9608		2.05	2.00	2.5	30.0
NMeFOSA	LID1F		1.000		1.90	2.00	-5.1	30.0
Perfluorododecanesulfonic acid	LID1F		0.2517		1.93	1.94	-0.5	30.0
NEtFOSE	LID1F		0.6764		1.81	2.00	-9.7	30.0
NEtFOSA	LID1F		1.070		2.18	2.00	8.8	30.0
Perfluorotridecanoic acid	LID1F		0.8511		2.33	2.00	16.5	30.0
Perfluorotetradecanoic acid	LID1F		0.9719		2.19	2.00	9.4	30.0
Perfluorohexadecanoic acid	LID1F		0.5133		1.99	2.00	-0.6	30.0
Perfluorooctadecanoic acid	LID1F		0.4167		1.72	2.00	-13.8	30.0
13C4 PFBA	Ave	1.110	1.116		10.0	10.0	0.5	30.0
13C5 PFPeA	Ave	0.8798	0.8719		9.91	10.0	-0.9	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Lab Sample ID: CCV 410-22981/1 Calibration Date: 07/16/2020 09:32

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL16-06.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.4382	0.3881		8.29	9.36	-11.4	30.0
M2-4:2 FTS	Ave	0.0956	0.1008		9.85	9.34	5.5	30.0
13C5 PFHxA	Ave	1.443	1.603		11.1	10.0	11.1	30.0
13C3 HFPO-DA	Ave	0.2830	0.3229		11.4	10.0	14.1	30.0
13C3 PFHxS	Ave	0.4556	0.5004		10.4	9.46	9.8	30.0
13C4 PFHpA	Ave	1.058	1.118		10.6	10.0	5.7	30.0
M2-6:2 FTS	Ave	0.0785	0.0807		9.77	9.50	2.8	30.0
13C8 PFOA	Ave	1.373	1.516		11.0	10.0	10.4	30.0
13C8 PFOS	Ave	1.014	1.030		9.72	9.57	1.6	30.0
13C9 PFNA	Ave	2.195	2.134		9.72	10.0	-2.8	30.0
13C6 PFDA	Ave	1.629	1.635		10.0	10.0	0.3	30.0
M2-8:2 FTS	Ave	0.1121	0.1086		9.27	9.58	-3.2	30.0
13C8 FOSA	Ave	1.193	1.279		10.7	10.0	7.2	30.0
d3-NMeFOSAA	Ave	0.3112	0.3473		11.2	10.0	11.6	30.0
13C7 PFUnA	Ave	1.490	1.742		11.7	10.0	16.9	30.0
d5-NEtFOSAA	Ave	0.2452	0.3140		12.8	10.0	28.0	30.0
13C2-PFDoDA	Ave	1.816	1.866		10.3	10.0	2.7	30.0
d7-N-MeFOSE-M	Ave	0.2323	0.2354		10.1	10.0	1.3	30.0
d3-NMePFOSA	Ave	0.1221	0.1230		10.1	10.0	0.7	30.0
d9-N-EtFOSE-M	Ave	0.2364	0.2500		10.6	10.0	5.8	30.0
d5-NEtPFOSA	Ave	0.0999	0.1016		10.2	10.0	1.7	30.0
13C2 PFTeDA	Ave	1.429	1.551		10.9	10.0	8.6	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Lab Sample ID: CCV 410-22981/14 Calibration Date: 07/16/2020 11:30

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL16-19.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8056		7.93	8.00	-0.9	30.0
Perfluoropentanoic acid	LID1F		0.8391		7.49	8.00	-6.3	30.0
Perfluorobutanesulfonic acid	LID1F		0.9633		6.76	7.08	-4.6	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		1.684		7.53	7.47	0.7	30.0
Perfluorohexanoic acid	LID1F		0.7590		8.29	8.00	3.6	30.0
Perfluoropentanesulfonic acid	LID1F		0.4354		7.05	7.50	-6.1	30.0
HFPODA	LID1F		2.047		7.23	8.00	-9.6	30.0
Perfluoroheptanoic acid	LID1F		1.226		8.61	8.00	7.7	30.0
Perfluorohexanesulfonic acid	LID1F		0.9603		7.11	7.30	-2.6	30.0
DONA	LID1F		1.486		8.58	7.56	13.5	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		1.568		7.49	7.58	-1.3	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8444		7.33	7.62	-3.7	30.0
Perfluorooctanoic acid	LID1F		0.6872		7.88	8.00	-1.6	30.0
Perfluorooctanesulfonic acid	LID1F		0.9384		6.75	7.40	-8.8	30.0
Perfluorononanoic acid	LID1F		0.7759		7.33	8.00	-8.3	30.0
9Cl-PF3ONS	LID1F		2.143		7.09	7.44	-4.7	30.0
Perfluorononanesulfonic acid	LID1F		0.6308		7.44	7.68	-3.2	30.0
Perfluorodecanoic acid	LID1F		0.5272		7.55	8.00	-5.6	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		1.524		7.34	7.66	-4.2	30.0
Perfluorooctanesulfonamide	LID1F		0.9810		8.16	8.00	2.0	30.0
NMeFOSAA	LID1F		0.9837		8.25	8.00	3.2	30.0
Perfluorodecanesulfonic acid	LID1F		0.4855		7.27	7.71	-5.7	30.0
Perfluoroundecanoic acid	LID1F		0.5064		8.30	8.00	3.8	30.0
NEtFOSAA	LID1F		1.074		9.05	8.00	13.1	30.0
11Cl-PF3OUdS	LID1F		1.708		7.05	7.44	-5.2	30.0
Perfluorododecanoic acid	LID1F		0.5786		8.43	8.00	5.4	30.0
10:2 FTS	LID1F		2.224		9.32	7.71	20.8	30.0
NMeFOSA	LID1F		0.9918		7.53	8.00	-5.9	30.0
NMeFOSE	LID1F		0.9095		7.76	8.00	-3.0	30.0
Perfluorododecanesulfonic acid	LID1F		0.2423		7.42	7.74	-4.2	30.0
NEtFOSE	LID1F		0.7318		7.82	8.00	-2.3	30.0
Perfluorotridecanoic acid	LID1F		0.8337		9.13	8.00	14.1	30.0
NEtFOSA	LID1F		0.9810		7.98	8.00	-0.3	30.0
Perfluorotetradecanoic acid	LID1F		0.9223		8.30	8.00	3.8	30.0
Perfluorohexadecanoic acid	LID1F		0.4511		6.99	8.00	-12.7	30.0
Perfluorooctadecanoic acid	LID1F		0.3950		6.54	8.00	-18.2	30.0
13C4 PFBA	Ave	1.110	1.093		9.85	10.0	-1.5	30.0
13C5 PFPeA	Ave	0.8798	0.8711		9.90	10.0	-1.0	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Lab Sample ID: CCV 410-22981/14 Calibration Date: 07/16/2020 11:30

Instrument ID: 27632 Calib Start Date: 07/13/2020 13:01

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/13/2020 13:55

Lab File ID: 20JUL16-19.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.4382	0.3848		8.22	9.36	-12.2	30.0
M2-4:2 FTS	Ave	0.0956	0.0969		9.47	9.34	1.4	30.0
13C5 PFHxA	Ave	1.443	1.563		10.8	10.0	8.3	30.0
13C3 HFPO-DA	Ave	0.2830	0.3407		12.0	10.0	20.4	30.0
13C3 PFHxS	Ave	0.4556	0.4912		10.2	9.46	7.8	30.0
13C4 PFHpA	Ave	1.058	1.090		10.3	10.0	3.1	30.0
M2-6:2 FTS	Ave	0.0785	0.0762		9.22	9.50	-3.0	30.0
13C8 PFOA	Ave	1.373	1.461		10.6	10.0	6.4	30.0
13C8 PFOS	Ave	1.014	1.008		9.51	9.57	-0.6	30.0
13C9 PFNA	Ave	2.195	2.134		9.72	10.0	-2.8	30.0
13C6 PFDA	Ave	1.629	1.579		9.69	10.0	-3.1	30.0
M2-8:2 FTS	Ave	0.1121	0.1021		8.72	9.58	-9.0	30.0
13C8 FOSA	Ave	1.193	1.327		11.1	10.0	11.3	30.0
d3-NMeFOSAA	Ave	0.3112	0.3687		11.8	10.0	18.5	30.0
13C7 PFUnA	Ave	1.490	1.589		10.7	10.0	6.6	30.0
d5-NEtFOSAA	Ave	0.2452	0.2775		11.3	10.0	13.1	30.0
13C2-PFDoDA	Ave	1.816	1.865		10.3	10.0	2.7	30.0
d7-N-MeFOSE-M	Ave	0.2323	0.2513		10.8	10.0	8.1	30.0
d3-NMePFOSA	Ave	0.1221	0.1244		10.2	10.0	1.9	30.0
d9-N-EtFOSE-M	Ave	0.2364	0.2432		10.3	10.0	2.9	30.0
d5-NEtPFOSA	Ave	0.0999	0.1069		10.7	10.0	7.1	30.0
13C2 PFTeDA	Ave	1.429	1.646		11.5	10.0	15.3	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Lab Sample ID: ICV 410-23948/9 Calibration Date: 07/18/2020 14:48

Instrument ID: 27632 Calib Start Date: 07/18/2020 12:45

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/18/2020 14:30

Lab File ID: 20JUL18MCAL-29.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8673		2.16	2.00	7.9	30.0
Perfluoropentanoic acid	LID1F		0.9734		2.16	2.00	7.8	30.0
Perfluorobutanesulfonic acid	LID1F		1.000		1.79	1.77	1.0	30.0
Perfluorohexanoic acid	LID1F		0.7576		2.06	2.00	2.8	30.0
HFPODA	LID1F		1.665		1.89	2.00	-5.5	30.0
Perfluoroheptanoic acid	LID1F		1.409		2.26	2.00	12.9	30.0
Perfluorohexanesulfonic acid	LID1F		0.9920		1.92	1.89	1.5	30.0
DONA	LID1F		1.439		1.85	1.88	-1.5	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9549		2.06	1.90	8.1	30.0
Perfluorooctanoic acid	LID1F		0.6794		2.07	2.00	3.4	30.0
Perfluorooctanesulfonic acid	LID1F		0.9574		1.88	1.91	-1.6	30.0
Perfluorononanoic acid	LID1F		0.8859		2.09	2.00	4.5	30.0
9Cl-PF3ONS	LID1F		2.147		1.82	1.86	-2.2	30.0
Perfluorodecanoic acid	LID1F		0.4629		1.97	2.00	-1.7	30.0
NMeFOSAA	LID1F		1.185		2.38	2.00	19.0	30.0
Perfluorodecanesulfonic acid	LID1F		0.5307		1.98	1.93	2.6	30.0
Perfluoroundecanoic acid	LID1F		0.4268		1.89	2.00	-5.3	30.0
NEtFOSAA	LID1F		0.9037		1.88	2.00	-6.1	30.0
11Cl-PF3OUdS	LID1F		1.698		1.78	1.88	-5.3	30.0
Perfluorododecanoic acid	LID1F		0.5122		2.01	2.00	0.3	30.0
Perfluorotridecanoic acid	LID1F		0.7555		2.15	2.00	7.5	30.0
Perfluorotetradecanoic acid	LID1F		0.9170		2.05	2.00	2.6	30.0
13C4 PFBA	Ave	1.103	1.027		9.31	10.0	-6.9	30.0
13C5 PFPeA	Ave	0.9256	0.8791		9.50	10.0	-5.0	30.0
13C3 PFBS	Ave	0.4441	0.4222		8.90	9.36	-4.9	30.0
M2-4:2 FTS	Ave	0.1078	0.1096		9.50	9.34	1.7	30.0
13C5 PFHxA	Ave	1.647	1.531		9.30	10.0	-7.0	30.0
13C3 HFPO-DA	Ave	0.3843	0.3713		9.66	10.0	-3.4	30.0
13C4 PFHpA	Ave	1.102	1.029		9.34	10.0	-6.6	30.0
13C3 PFHxS	Ave	0.5105	0.4901		9.08	9.46	-4.0	30.0
M2-6:2 FTS	Ave	0.0824	0.0850		9.80	9.50	3.1	30.0
13C8 PFOA	Ave	1.523	1.466		9.63	10.0	-3.7	30.0
13C8 PFOS	Ave	1.001	0.8515		8.13	9.57	-15.0	30.0
13C9 PFNA	Ave	1.906	1.599		8.39	10.0	-16.1	30.0
13C6 PFDA	Ave	1.811	1.754		9.68	10.0	-3.2	30.0
M2-8:2 FTS	Ave	0.1246	0.1207		9.28	9.58	-3.1	30.0
13C8 FOSA	Ave	1.454	1.454		10.0	10.0	0.0	30.0
d3-NMeFOSAA	Ave	0.4439	0.4221		9.51	10.0	-4.9	30.0
13C7 PFUnA	Ave	1.800	1.839		10.2	10.0	2.2	30.0
d5-NEtFOSAA	Ave	0.3258	0.3149		9.66	10.0	-3.4	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Lab Sample ID: ICV 410-23948/9 Calibration Date: 07/18/2020 14:48

Instrument ID: 27632 Calib Start Date: 07/18/2020 12:45

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/18/2020 14:30

Lab File ID: 20JUL18MCAL-29.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C2-PFDoDA	Ave	2.212	2.185		9.88	10.0	-1.2	30.0
d7-N-MeFOSE-M	Ave	0.2887	0.2789		9.66	10.0	-3.4	30.0
d3-NMePFOSA	Ave	0.1431	0.1394		9.74	10.0	-2.6	30.0
d9-N-EtFOSE-M	Ave	0.2982	0.2913		9.77	10.0	-2.3	30.0
d5-NEtPFOSA	Ave	0.1196	0.1195		9.99	10.0	-0.1	30.0
13C2 PFTeDA	Ave	1.755	1.764		10.1	10.0	0.5	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Lab Sample ID: CCV 410-24107/12 Calibration Date: 07/20/2020 14:24

Instrument ID: 27632 Calib Start Date: 07/18/2020 12:45

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/18/2020 14:30

Lab File ID: 20JUL20-29.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8371		2.08	2.00	4.2	30.0
Perfluoropentanoic acid	LID1F		0.9392		2.08	2.00	4.0	30.0
Perfluorobutanesulfonic acid	LID1F		0.998		1.78	1.77	0.7	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		1.713		1.83	1.87	-2.0	30.0
Perfluorohexanoic acid	LID1F		0.7859		2.13	2.00	6.6	30.0
Perfluoropentanesulfonic acid	LID1F		0.4691		1.83	1.88	-2.6	30.0
HFPODA	LID1F		1.844		2.09	2.00	4.7	30.0
Perfluoroheptanoic acid	LID1F		1.316		2.11	2.00	5.4	30.0
Perfluorohexanesulfonic acid	LID1F		0.9360		1.75	1.82	-4.2	30.0
DONA	LID1F		1.456		1.88	1.89	-0.4	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		1.810		2.04	1.90	7.5	30.0
Perfluoroheptanesulfonic acid	LID1F		0.8641		1.86	1.90	-2.2	30.0
Perfluorooctanoic acid	LID1F		0.6315		1.92	2.00	-3.9	30.0
Perfluorooctanesulfonic acid	LID1F		0.9730		1.85	1.85	0.0	30.0
Perfluorononanoic acid	LID1F		0.8611		2.03	2.00	1.6	30.0
9Cl-PF3ONS	LID1F		2.245		1.90	1.86	2.3	30.0
Perfluorononanesulfonic acid	LID1F		0.7119		2.13	1.92	10.8	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		1.779		2.19	1.92	14.4	30.0
Perfluorodecanoic acid	LID1F		0.4966		2.11	2.00	5.5	30.0
Perfluorooctanesulfonamide	LID1F		1.058		2.18	2.00	9.2	30.0
NMeFOSAA	LID1F		1.006		2.02	2.00	1.0	30.0
Perfluorodecanesulfonic acid	LID1F		0.4952		1.85	1.93	-4.3	30.0
Perfluoroundecanoic acid	LID1F		0.4398		1.95	2.00	-2.4	30.0
NEtFOSAA	LID1F		0.8993		1.87	2.00	-6.6	30.0
11Cl-PF3OUdS	LID1F		1.904		1.98	1.86	6.2	30.0
Perfluorododecanoic acid	LID1F		0.5711		2.24	2.00	11.8	30.0
10:2 FTS	LID1F		2.126		1.95	1.93	1.2	30.0
NMeFOSE	LID1F		0.9153		1.95	2.00	-2.6	30.0
NMeFOSA	LID1F		1.022		1.93	2.00	-3.4	30.0
Perfluorododecanesulfonic acid	LID1F		0.2857		2.13	1.94	9.8	30.0
Perfluorotridecanoic acid	LID1F		0.8727		2.48	2.00	24.2	30.0
NEtFOSE	LID1F		0.6998		2.02	2.00	1.1	30.0
NEtFOSA	LID1F		0.8991		1.86	2.00	-6.8	30.0
Perfluorotetradecanoic acid	LID1F		0.9543		2.13	2.00	6.7	30.0
Perfluorohexadecanoic acid	LID1F		0.5843		2.05	2.00	2.3	30.0
Perfluorooctadecanoic acid	LID1F		0.5213		1.99	2.00	-0.7	30.0
13C4 PFBA	Ave	1.103	1.146		10.4	10.0	3.9	30.0
13C5 PFPeA	Ave	0.9256	0.9076		9.81	10.0	-1.9	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Lab Sample ID: CCV 410-24107/12 Calibration Date: 07/20/2020 14:24

Instrument ID: 27632 Calib Start Date: 07/18/2020 12:45

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/18/2020 14:30

Lab File ID: 20JUL20-29.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.4441	0.4125		8.69	9.36	-7.1	30.0
M2-4:2 FTS	Ave	0.1078	0.1073		9.30	9.34	-0.4	30.0
13C5 PFHxA	Ave	1.647	1.767		10.7	10.0	7.3	30.0
13C3 HFPO-DA	Ave	0.3843	0.4005		10.4	10.0	4.2	30.0
13C3 PFHxS	Ave	0.5105	0.5500		10.2	9.46	7.7	30.0
13C4 PFHpA	Ave	1.102	1.217		11.1	10.0	10.5	30.0
M2-6:2 FTS	Ave	0.0824	0.0769		8.86	9.50	-6.8	30.0
13C8 PFOA	Ave	1.523	1.653		10.9	10.0	8.6	30.0
13C8 PFOS	Ave	1.001	1.039		9.93	9.57	3.8	30.0
13C9 PFNA	Ave	1.906	1.937		10.2	10.0	1.6	30.0
13C6 PFDA	Ave	1.811	2.005		11.1	10.0	10.7	30.0
M2-8:2 FTS	Ave	0.1246	0.1225		9.42	9.58	-1.7	30.0
13C8 FOSA	Ave	1.454	1.527		10.5	10.0	5.0	30.0
d3-NMeFOSAA	Ave	0.4439	0.5129		11.6	10.0	15.5	30.0
13C7 PFUnA	Ave	1.800	2.079		11.5	10.0	15.5	30.0
d5-NEtFOSAA	Ave	0.3258	0.3750		11.5	10.0	15.1	30.0
13C2-PFDoDA	Ave	2.212	2.344		10.6	10.0	6.0	30.0
d7-N-MeFOSE-M	Ave	0.2887	0.3252		11.3	10.0	12.6	30.0
d3-NMePFOSA	Ave	0.1431	0.1592		11.1	10.0	11.2	30.0
d9-N-EtFOSE-M	Ave	0.2982	0.3465		11.6	10.0	16.2	30.0
d5-NEtPFOSA	Ave	0.1196	0.1491		12.5	10.0	24.7	30.0
13C2 PFTeDA	Ave	1.755	2.079		11.8	10.0	18.5	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Lab Sample ID: CCV 410-24107/23 Calibration Date: 07/20/2020 16:04

Instrument ID: 27632 Calib Start Date: 07/18/2020 12:45

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/18/2020 14:30

Lab File ID: 20JUL20-40.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanoic acid	LID1F		0.8477		21.1	20.0	5.5	30.0
Perfluoropentanoic acid	LID1F		0.9398		20.8	20.0	4.1	30.0
Perfluorobutanesulfonic acid	LID1F		1.061		19.0	17.7	7.1	30.0
4:2 Fluorotelomer sulfonic acid	LID1F		1.828		19.5	18.7	4.6	30.0
Perfluorohexanoic acid	LID1F		0.7908		21.5	20.0	7.3	30.0
Perfluoropentanesulfonic acid	LID1F		0.4880		19.0	18.8	1.3	30.0
HFPODA	LID1F		2.136		24.2	20.0	21.2	30.0
Perfluoroheptanoic acid	LID1F		1.376		22.0	20.0	10.2	30.0
Perfluorohexanesulfonic acid	LID1F		1.050		19.6	18.2	7.5	30.0
DONA	LID1F		1.633		21.1	18.9	11.8	30.0
6:2 Fluorotelomer sulfonic acid	LID1F		1.752		19.7	19.0	4.0	30.0
Perfluoroheptanesulfonic acid	LID1F		0.9792		21.1	19.0	10.8	30.0
Perfluorooctanoic acid	LID1F		0.6931		21.1	20.0	5.5	30.0
Perfluorooctanesulfonic acid	LID1F		1.034		19.7	18.5	6.3	30.0
Perfluorononanoic acid	LID1F		0.8961		21.1	20.0	5.7	30.0
9Cl-PF3ONS	LID1F		2.456		20.8	18.6	11.9	30.0
Perfluorononanesulfonic acid	LID1F		0.7203		21.5	19.2	12.1	30.0
Perfluorodecanoic acid	LID1F		0.5052		21.5	20.0	7.3	30.0
8:2 Fluorotelomer sulfonic acid	LID1F		1.684		20.7	19.2	8.3	30.0
Perfluorooctanesulfonamide	LID1F		1.019		21.0	20.0	5.1	30.0
NMeFOSAA	LID1F		0.9729		19.5	20.0	-2.3	30.0
Perfluorodecanesulfonic acid	LID1F		0.5744		21.4	19.3	11.0	30.0
Perfluoroundecanoic acid	LID1F		0.4959		22.0	20.0	10.1	30.0
NEtFOSAA	LID1F		0.9682		20.1	20.0	0.6	30.0
11Cl-PF3OUdS	LID1F		2.056		21.3	18.6	14.7	30.0
Perfluorododecanoic acid	LID1F		0.5840		22.9	20.0	14.3	30.0
10:2 FTS	LID1F		2.418		22.2	19.3	15.1	30.0
NMeFOSE	LID1F		0.8722		18.6	20.0	-7.2	30.0
NMeFOSA	LID1F		1.148		21.7	20.0	8.5	30.0
Perfluorododecanesulfonic acid	LID1F		0.2777		20.7	19.4	6.8	30.0
Perfluorotridecanoic acid	LID1F		0.8371		23.8	20.0	19.1	30.0
NEtFOSE	LID1F		0.7055		20.4	20.0	1.9	30.0
NEtFOSA	LID1F		1.106		22.9	20.0	14.6	30.0
Perfluorotetradecanoic acid	LID1F		1.036		23.2	20.0	15.9	30.0
Perfluorohexadecanoic acid	LID1F		0.6024		21.1	20.0	5.5	30.0
Perfluorooctadecanoic acid	LID1F		0.5682		21.6	20.0	8.2	30.0
13C4 PFBA	Ave	1.103	1.061		9.62	10.0	-3.8	30.0
13C5 PFPeA	Ave	0.9256	0.9001		9.72	10.0	-2.8	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Lab Sample ID: CCV 410-24107/23 Calibration Date: 07/20/2020 16:04

Instrument ID: 27632 Calib Start Date: 07/18/2020 12:45

GC Column: Gemini C18 50mm ID: 3.00(mm) Calib End Date: 07/18/2020 14:30

Lab File ID: 20JUL20-40.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
13C3 PFBS	Ave	0.4441	0.4007		8.44	9.36	-9.8	30.0
M2-4:2 FTS	Ave	0.1078	0.1040		9.02	9.34	-3.5	30.0
13C5 PFHxA	Ave	1.647	1.545		9.38	10.0	-6.2	30.0
13C3 HFPO-DA	Ave	0.3843	0.3390		8.82	10.0	-11.8	30.0
13C4 PFHpA	Ave	1.102	1.056		9.59	10.0	-4.1	30.0
13C3 PFHxS	Ave	0.5105	0.4665		8.64	9.46	-8.6	30.0
M2-6:2 FTS	Ave	0.0824	0.0740		8.52	9.50	-10.3	30.0
13C8 PFOA	Ave	1.523	1.434		9.42	10.0	-5.8	30.0
13C8 PFOS	Ave	1.001	1.012		9.66	9.57	1.0	30.0
13C9 PFNA	Ave	1.906	1.979		10.4	10.0	3.8	30.0
13C6 PFDA	Ave	1.811	1.571		8.68	10.0	-13.2	30.0
M2-8:2 FTS	Ave	0.1246	0.0994		7.64	9.58	-20.2	30.0
13C8 FOSA	Ave	1.454	1.352		9.30	10.0	-7.0	30.0
d3-NMeFOSAA	Ave	0.4439	0.4540		10.2	10.0	2.3	30.0
13C7 PFUnA	Ave	1.800	1.719		9.55	10.0	-4.5	30.0
d5-NEtFOSAA	Ave	0.3258	0.3284		10.1	10.0	0.8	30.0
13C2-PFDoDA	Ave	2.212	2.048		9.26	10.0	-7.4	30.0
d7-N-MeFOSE-M	Ave	0.2887	0.2871		9.94	10.0	-0.6	30.0
d3-NMePFOSA	Ave	0.1431	0.1374		9.60	10.0	-4.0	30.0
d9-N-EtFOSE-M	Ave	0.2982	0.2932		9.83	10.0	-1.7	30.0
d5-NEtPFOSA	Ave	0.1196	0.1164		9.73	10.0	-2.7	30.0
13C2 PFTeDA	Ave	1.755	1.719		9.80	10.0	-2.0	30.0

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Instrument ID: 27632 Start Date: 07/13/2020 13:01

Analysis Batch Number: 21880 End Date: 07/13/2020 14:22

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 410-21880/1		07/13/2020 13:01	1	20JUL13MCAL-09.d	Gemini C18 50mm 3(mm)
IC 410-21880/2		07/13/2020 13:10	1	20JUL13MCAL-10.d	Gemini C18 50mm 3(mm)
IC 410-21880/3		07/13/2020 13:19	1	20JUL13MCAL-11.d	Gemini C18 50mm 3(mm)
IC 410-21880/4		07/13/2020 13:28	1	20JUL13MCAL-12.d	Gemini C18 50mm 3(mm)
ICISAV 410-21880/5		07/13/2020 13:37	1	20JUL13MCAL-13.d	Gemini C18 50mm 3(mm)
IC 410-21880/6		07/13/2020 13:46	1	20JUL13MCAL-14.d	Gemini C18 50mm 3(mm)
IC 410-21880/7		07/13/2020 13:55	1	20JUL13MCAL-15.d	Gemini C18 50mm 3(mm)
ICB 410-21880/8		07/13/2020 14:04	1	20JUL13MCAL-16.d	Gemini C18 50mm 3(mm)
ICV 410-21880/9		07/13/2020 14:13	1	20JUL13MCAL-17.d	Gemini C18 50mm 3(mm)
WDM 410-21880/10		07/13/2020 14:22	1	20JUL13MCAL-18.d	Gemini C18 50mm 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Instrument ID: 27632 Start Date: 07/16/2020 09:32

Analysis Batch Number: 22981 End Date: 07/17/2020 10:10

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 410-22981/1		07/16/2020 09:32	1	20JUL16-06.d	Gemini C18 50mm 3(mm)
MB 410-21514/1-A		07/16/2020 09:41	1	20JUL16-07.d	Gemini C18 50mm 3(mm)
LCS 410-21514/2-A		07/16/2020 09:50	1	20JUL16-08.d	Gemini C18 50mm 3(mm)
LCSD 410-21514/3-A		07/16/2020 09:59	1	20JUL16-09.d	Gemini C18 50mm 3(mm)
410-7056-1		07/16/2020 10:08	1	20JUL16-10.d	Gemini C18 50mm 3(mm)
410-7056-2		07/16/2020 10:17	1	20JUL16-11.d	Gemini C18 50mm 3(mm)
410-7056-3		07/16/2020 10:26	1	20JUL16-12.d	Gemini C18 50mm 3(mm)
410-7056-4		07/16/2020 10:35	1	20JUL16-13.d	Gemini C18 50mm 3(mm)
410-7056-5		07/16/2020 10:44	1	20JUL16-14.d	Gemini C18 50mm 3(mm)
410-7056-6		07/16/2020 10:54	1	20JUL16-15.d	Gemini C18 50mm 3(mm)
410-7056-7		07/16/2020 11:03	1	20JUL16-16.d	Gemini C18 50mm 3(mm)
410-7056-8		07/16/2020 11:12	1	20JUL16-17.d	Gemini C18 50mm 3(mm)
410-7056-9		07/16/2020 11:21	1	20JUL16-18.d	Gemini C18 50mm 3(mm)
CCV 410-22981/14		07/16/2020 11:30	1	20JUL16-19.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 11:39	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 11:48	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 11:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 12:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 12:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 12:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 12:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 12:43	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 12:52	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 13:01	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 13:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 13:19	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 13:28	1		Gemini C18 50mm 3(mm)
CCV 410-22981/28		07/16/2020 13:37	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 13:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 13:55	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 14:04	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 14:13	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 14:22	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 14:31	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 14:40	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 14:50	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 14:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 15:08	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 15:17	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 15:26	1		Gemini C18 50mm 3(mm)
CCV 410-22981/41		07/16/2020 15:35	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 15:44	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 15:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 16:02	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 16:11	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Instrument ID: 27632 Start Date: 07/16/2020 09:32

Analysis Batch Number: 22981 End Date: 07/17/2020 10:10

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/16/2020 16:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 16:29	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 16:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 16:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 16:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 17:05	1		Gemini C18 50mm 3(mm)
CCV 410-22981/52		07/16/2020 17:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 17:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 17:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 17:42	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 17:51	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 18:00	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 18:09	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 18:18	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 18:27	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 18:36	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 18:45	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 18:54	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 19:03	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 19:12	1		Gemini C18 50mm 3(mm)
CCV 410-22981/66		07/16/2020 19:21	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 19:30	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 19:39	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 19:49	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 19:58	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 20:07	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 20:16	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 20:25	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 20:34	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 20:43	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 20:52	1		Gemini C18 50mm 3(mm)
CCV 410-22981/77		07/16/2020 21:01	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 21:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 21:19	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 21:28	1		Gemini C18 50mm 3(mm)
CCV 410-22981/81		07/16/2020 21:37	1		Gemini C18 50mm 3(mm)
CCV 410-22981/93		07/16/2020 23:26	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 23:35	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 23:44	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/16/2020 23:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 00:02	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 00:11	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 00:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 00:29	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 00:38	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Instrument ID: 27632 Start Date: 07/16/2020 09:32

Analysis Batch Number: 22981 End Date: 07/17/2020 10:10

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/17/2020 00:48	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 00:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 01:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 01:15	1		Gemini C18 50mm 3(mm)
CCV 410-22981/106		07/17/2020 01:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 01:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 01:42	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 01:51	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 02:00	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 02:09	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 02:18	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 02:27	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 02:36	1		Gemini C18 50mm 3(mm)
CCV 410-22981/115		07/17/2020 02:45	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 02:55	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 03:04	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 03:13	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 03:22	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 03:31	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 03:40	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 03:49	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 03:58	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 04:07	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 04:16	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 04:25	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 04:34	1		Gemini C18 50mm 3(mm)
CCV 410-22981/137		07/17/2020 04:43	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 04:52	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 05:01	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 05:10	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 05:19	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 05:29	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 05:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 05:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 05:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 06:05	1		Gemini C18 50mm 3(mm)
CCV 410-22981/138		07/17/2020 06:14	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 06:23	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 06:32	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 06:41	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 06:50	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 06:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 07:08	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 07:17	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 07:26	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Instrument ID: 27632 Start Date: 07/16/2020 09:32

Analysis Batch Number: 22981 End Date: 07/17/2020 10:10

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/17/2020 07:36	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 07:45	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 07:54	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 08:03	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 08:12	1		Gemini C18 50mm 3(mm)
CCV 410-22981/153		07/17/2020 08:21	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 08:30	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 08:39	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 08:48	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 08:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 09:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 09:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 09:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 09:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 09:42	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 09:52	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/17/2020 10:01	1		Gemini C18 50mm 3(mm)
CCV 410-22981/164		07/17/2020 10:10	1		Gemini C18 50mm 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Instrument ID: 27632 Start Date: 07/18/2020 12:45

Analysis Batch Number: 23948 End Date: 07/18/2020 14:57

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 410-23948/2		07/18/2020 12:45	1	20JUL18MCAL-17.d	Gemini C18 50mm 3(mm)
IC 410-23948/3		07/18/2020 12:54	1	20JUL18MCAL-18.d	Gemini C18 50mm 3(mm)
IC 410-23948/4		07/18/2020 13:03	1	20JUL18MCAL-19.d	Gemini C18 50mm 3(mm)
ICISAV 410-23948/5		07/18/2020 13:12	1	20JUL18MCAL-20.d	Gemini C18 50mm 3(mm)
IC 410-23948/6		07/18/2020 13:21	1	20JUL18MCAL-21.d	Gemini C18 50mm 3(mm)
IC 410-23948/7		07/18/2020 13:30	1	20JUL18MCAL-22.d	Gemini C18 50mm 3(mm)
ICB 410-23948/8		07/18/2020 13:39	1	20JUL18MCAL-23.d	Gemini C18 50mm 3(mm)
IC 410-23948/1		07/18/2020 14:30	1	20JUL18MCAL-27.d	Gemini C18 50mm 3(mm)
ICV 410-23948/9		07/18/2020 14:48	1	20JUL18MCAL-29.d	Gemini C18 50mm 3(mm)
WDM 410-23948/10		07/18/2020 14:57	1	20JUL18MCAL-30.d	Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Instrument ID: 27632 Start Date: 07/20/2020 14:24

Analysis Batch Number: 24107 End Date: 07/21/2020 05:15

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 410-24107/12		07/20/2020 14:24	1	20JUL20-29.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 14:51	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 15:00	1		Gemini C18 50mm 3(mm)
410-7056-6 RA		07/20/2020 15:10	1	20JUL20-34.d	Gemini C18 50mm 3(mm)
410-7056-7 RA		07/20/2020 15:19	1	20JUL20-35.d	Gemini C18 50mm 3(mm)
410-7056-8 RA		07/20/2020 15:28	1	20JUL20-36.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 15:37	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 15:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 15:55	100		Gemini C18 50mm 3(mm)
CCV 410-24107/23		07/20/2020 16:04	1	20JUL20-40.d	Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 16:13	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 16:22	100		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 16:31	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 16:40	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 16:49	10		Gemini C18 50mm 3(mm)
CCV 410-24107/29		07/20/2020 16:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 17:08	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 17:17	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 17:26	10		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 17:35	100		Gemini C18 50mm 3(mm)
CCV 410-24107/34		07/20/2020 17:44	1		Gemini C18 50mm 3(mm)
CCV 410-24107/67		07/20/2020 22:44	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 22:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 23:02	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 23:11	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 23:20	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 23:29	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 23:38	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 23:47	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/20/2020 23:56	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 00:06	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 00:15	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 00:24	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 00:33	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 00:42	1		Gemini C18 50mm 3(mm)
CCV 410-24107/83		07/21/2020 00:51	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 01:00	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 01:09	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 01:28	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 01:37	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 01:46	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 01:55	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 02:04	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 02:13	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 02:22	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS ANALYSIS RUN LOG

Lab Name: Eurofins Lancaster Laboratories Env Job No.: 410-7056-1

SDG No.:

Instrument ID: 27632 Start Date: 07/20/2020 14:24

Analysis Batch Number: 24107 End Date: 07/21/2020 05:15

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
ZZZZZ		07/21/2020 02:31	1		Gemini C18 50mm 3(mm)
CCV 410-24107/108		07/21/2020 02:40	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 02:50	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 02:59	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 03:08	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 03:17	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 03:26	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 03:35	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 03:44	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 03:53	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 04:02	1		Gemini C18 50mm 3(mm)
CCV 410-24107/109		07/21/2020 04:11	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 04:21	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 04:30	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 04:39	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 04:48	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 04:57	1		Gemini C18 50mm 3(mm)
ZZZZZ		07/21/2020 05:06	1		Gemini C18 50mm 3(mm)
CCV 410-24107/110		07/21/2020 05:15	1		Gemini C18 50mm 3(mm)

EPA 537 (Mod)

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-7056-1

SDG No.:

Batch Number: 21514 Batch Start Date: 07/11/20 10:47 Batch Analyst: Barnhart, Toby B

Batch Method: EPA 537 (mod) Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	PFC_MS_MODWX 00016	PFC_SS_MODX 00021
MB 410-21514/1		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL		25 uL
LCS 410-21514/2		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL	40 uL	25 uL
LCSD 410-21514/3		EPA 537 (mod), EPA 537 (Mod)		300 g	50 g	250 mL	1 mL	40 uL	25 uL
410-7056-A-1	EQB-WL-070720	EPA 537 (mod), EPA 537 (Mod)	T	301.09 g	27.35 g	273.7 mL	1 mL		25 uL
410-7056-A-2	MSA-FB-070720	EPA 537 (mod), EPA 537 (Mod)	T	307.42 g	27.28 g	280.1 mL	1 mL		25 uL
410-7056-A-3	GSP-MW-13-070720	EPA 537 (mod), EPA 537 (Mod)	T	296.11 g	27.44 g	268.7 mL	1 mL		25 uL
410-7056-A-4	MSA-DUP-5-070720	EPA 537 (mod), EPA 537 (Mod)	T	294.89 g	27.16 g	267.7 mL	1 mL		25 uL
410-7056-A-5	GSP-MW-16-070720	EPA 537 (mod), EPA 537 (Mod)	T	295.58 g	27.17 g	268.4 mL	1 mL		25 uL
410-7056-A-6	GSP-SWSD-C3-070720	EPA 537 (mod), EPA 537 (Mod)	T	327.69 g	27.28 g	300.4 mL	1 mL		25 uL
410-7056-A-7	GSP-SWSD-C2-070720	EPA 537 (mod), EPA 537 (Mod)	T	303.39 g	27.16 g	276.2 mL	1 mL		25 uL
410-7056-A-8	GSP-SWSD-C1-070720	EPA 537 (mod), EPA 537 (Mod)	T	316.76 g	27.15 g	289.6 mL	1 mL		25 uL
410-7056-A-9	EQB-Peri-070720	EPA 537 (mod), EPA 537 (Mod)	T	297.73 g	26.96 g	270.8 mL	1 mL		25 uL

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: Eurofins Lancaster Laboratorie Job No.: 410-7056-1

SDG No.:

Batch Number: 21514 Batch Start Date: 07/11/20 10:47 Batch Analyst: Barnhart, Toby B

Batch Method: EPA 537 (mod) Batch End Date:

Batch Notes	
Balance ID	B629764122
H2O ID	House A372
Manifold ID	12
Methanol ID	DX610-US
Analyst ID - IS Reagent Drop Witness	BC 19191
Solvent Lot #	3090607032033A; 2731907062033A
Solvent Name	1:1 ACN:MeOH; 0.3% NH4OH in MeOH
SPE Cartridge Lot ID	6509097-02

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LOCATION	GSP-SWSD-C1	GSP-SWSD-C2	GSP-SWSD-C3
SAMPLE ID	GSP-SWSD-C1-070720	GSP-SWSD-C2-070720	GSP-SWSD-C3-070720
SAMPLE DATE	20200707	20200707	20200707
POLYFLUOROALKYL SUBSTANCES (ng/L)			
6:2 FLUOROTELOMER SULFONATE (6:2FTS)	8.9	9.3	9.7
8:2 FLUOROTELOMER SULFONATE (8:2FTS)	8.2	9.2	11
PENTADECAFLUOROOCTANOIC ACID (PFOA)	19	18	21
PERFLUOROBUTANESULFONIC ACID (PFBS)	0.81 J	1 J	1.1 J
PERFLUOROBUTANOIC ACID (PFBA)	15	15	14
PERFLUORODECANOIC ACID (PFDA)	3.2	3.3	3.3
PERFLUOROHEPTANOIC ACID (PFHPA)	17	17	20
PERFLUOROHEXANESULFONIC ACID (PFHXS)	1.6 J	1.5 J	2.2
PERFLUOROHEXANOIC ACID (PFHXA)	18	17	18
PERFLUORONONANOIC ACID (PFNA)	7.5	8.3	9.3
PERFLUOROOCTANESULFONIC ACID (PFOS)	3.4	3.4	4.7
PERFLUOROPENTANOIC ACID (PFPEA)	26	27 J	27

-- - not detected
J - estimated concentration
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances

Baltimore #201

n of Custody Record 321394

410-6246 Chain of Custody

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Samantha Brenner	Site Contact: Patrick O'Brien	Date: 6/29/20	COC No:
Company Name: Tetra Tech	Tel/Fax: 301-528-3556	Lab Contact:	Carrier: Fedex	1 of 1 COCs
Address: 10251 Century Blvd., Suite 200	Analysis Turnaround Time			Sampler:
City/State/Zip: Germantown, MD 20874	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 301-528-5552	TAT if different from Below			Walk-in Client:
Fax: 301-528-5080	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day — Standard			Lab Sampling:
Project Name: MSA PFAS GW Round 2				Job / SDG No.:
Site: MSA				
PO# 112E109023				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	PFAS (Method 537)	Sample Specific Notes:
EQB-WL-062920	6/29/20	0830	G	GW	2	N	N	X	
MSA-MW-48I-062920	6/29/20	1030	G	GW	2	N	N	X	
MSA-MW-49S-062920	6/29/20	1130	G	GW	2	N	N	X	
MSA-FB-062920	6/29/20	1355	G	GW	2	N	N	X	Trizma preserved FRB
MSA-MW-34S-062920	6/29/20	1330	G	GW	2	N	N	X	
MSA-MW-34I-062920	6/29/20	1440	G	GW	2	N	N	X	
EQB-WL-062920	6/29/20	0800	G	GW	2	N	N	X	
MSA-MW-40S-062920		1035	G		2			X	
MSA-MW-40I-062920		1150	G		2			X	
MSA-DMW-7S-062920		1435	G		2			X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: 0.8 Corr'd: 0.8	Therm ID No.: DT42-03

	Company	Date/Time	Received by:	Company	Date/Time
Relinquished by:	Tetra Tech	6/29/20		ETA	6/29/20 1535
Relinquished by:	~~6/29/20 1900~~	6/30/20 1130		ELLE	6/30/20 11:30
Relinquished by:	ELLE	6/30/20 1610	Received in Laboratory by:	ELLE	6-30-20 1630

410-6410 Chain of Custody

Chain of Custody Record 321393

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Samantha Brenner	Site Contact: Patrick O'Brien	Date: 6/30/20	COC No:
Company Name: Tetra Tech	Tel/Fax: 301-528-3556	Lab Contact: Stephen Gordon	Carrier: Fedex	1 of 1 COCs
Address: 10251 Century Blvd. Suite 400	Analysis Turnaround Time			Sampler:
City/State/Zip: Germantown, MD 20874	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 301-528-5552	TAT if different from Below			Walk-in Client:
Fax: 301-528-5080	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day — Standard			Lab Sampling:
Project Name: MSA PFAS GW Round 2				Job / SDG No.:
Site: MSA				
PO # 117FD09023				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFAS (Method 537)	Sample Specific Notes:
EQB-WL-063020	6/30/20		G	GW	2	N	N	X	
MSA-FB-063020	6/30/20	0945	G	GW	2			X	Trizma preserved FB
MSA-MW-44S-063020	6/30/20	1005	G	GW	2			X	
MSA-MW-46S-063020	6/30/20	1105	G	GW	2			X	
MSA-MW-35S-063020	6/30/20	1315	G	GW	2			X	
MSA-DUP-1-063020	6/30/20	0000	G	GW	2			X	
MSA-DMW-5S-063020		1200	G	GW	2			X	
MSA-DMW-5I-063020		1257	G	GW	2			X	
MSA-DMW-4S-063020		1425	G	GW	6			X	MS/MSD

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: 2.8 Corr'd: 2.8	Therm ID No.: 01-42-04
Relinquished by:	Company: Tetra Tech	Date/Time: 6/30/20	Received by:	Company: FEDEX	Date/Time: 6/30/20 1545
Relinquished by:	Company: EFA	Date/Time: 7/1/20 1340	Received by:	Company: ELE	Date/Time: 7/1/20 10:40
Relinquished by:	Company: ELE	Date/Time: 7/1/20 1800	Received in Laboratory by:	Company: ELE	Date/Time: 7-1-20 1834

CT

410-6630 Chain of Custody

Chain of Custody Record 321391

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

am: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Samantha Brenner	Site Contact: P. O'Brien	Date: 7/2/20	COC No:
Company Name: Tetra Tech	Tel/Fax: 301-528-3052	Lab Contact: Stephen Gordon	Carrier: Fedex	1 of 1 COCs
Address: 20251 Century Blvd., Suite 200	Analysis Turnaround Time			Sampler:
City/State/Zip: Germantown, MD 20875	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 301-528-5552	TAT if different from Below			Walk-in Client:
Fax: 301-528-5080	☐ 2 weeks			Lab Sampling:
Project Name: MSA PFAS GW Round 2	☐ 1 week Standard			
Site: MSA	☐ 2 days			Job / SDG No.:
P O # 112EC04023	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFAS (Method 537)	Sample Specific Notes:
MSA-FB-070220	7/2/20	0915	G	GW	2	N	N	X	Trizma preserved FRB
GSP-FD03-070220	7/2/20	0000	G	GW	2	N	N	X	
GSP-MW-12-070220	7/2/20	1100	G	GW	6	N	Y	X	MS/MSD
GSP-MW-14-070220	7/2/20	0910	G	GW	2	N	N	X	
GSP-MW-20-070220	↓	1044	↓	↓	2	N	N	X	
GSP-MW-23I-070220	↓	1150	↓	↓	2	N	N	X	
EQB-WL-070220	↓	0730	↓	↓	2	N	N	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	Tetra Tech	7/2/20	[signature]	ETA	7/2/20 1245
[signature]	E+A	7/2/20 1305	[signature]	EarcLab	7-2-20 1305
[signature]	EarcLab	7-2-20 16:00	Received in Laboratory by: [signature]	[signature]	7-2-20 1625

410-6854 Chain of Custody

Chain of Custody Record

321390

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Samantha Brenner	Site Contact: P. O'Brien	Date: 7/6/20	COC No:
Company Name: Tetra Tech	Tel/Fax: 301-528-3056	Lab Contact: Stephen Gordon	Carrier: Fedex	1 of 1 COCs
Address: 20251 Century Blvd, Suite 200	Analysis Turnaround Time			Sampler:
City/State/Zip: Germantown, MD 20874	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 301-528-5552	TAT if different from Below			Walk-in Client:
Fax: 301-528-5050	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day — Standard			Lab Sampling:
Project Name: MSA PFAS GW Round 2				Job / SDG No.:
Site: MSA				
PO# 1127109023				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFAS (Method 537)	Sample Specific Notes:
EQB-WL-070620	7/6/20	0815	GRAB	GW	2	N	N	X	
MSA-FB-070620		1300						X	Trizma preserved FRB
MSA-DUP-4-070620		0000						X	
BSP-MW-7-070620		1120						X	
BSP-MW-15-070620		0935			6		Y	X	MS/MSD
BSP-MW-10-070620		1340			2		N	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: 1.4 Corr'd: 1.4 | Therm ID No.:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Tetra Tech	7/6/20 1530			7/6/20 17:15
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	ELE	7/7/20 1745		ELE	7/7/20 13:45
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
	ELE	7/7/20 17:45	W Martins	ELE	7/7/20 1745

410-7056 Chain of Custody

Chain of Custody Record 321389

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Shannon Brenner	Site Contact: P. O'Brien	Date: 7/7/20	COC No:
Company Name: Tetra Tech	Tel/Fax: 301-528-3056	Lab Contact: Stephen Coreless	Carrier: Fedex	1 of 1 COCs
Address: 20251 Century Blvd. Suite 200	Analysis Turnaround Time			Sampler:
City/State/Zip: Germantown, MD 20874	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 301-528-5552	TAT if different from Below _____			Walk-in Client:
Fax: 301-528-5082	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day — Standard			Lab Sampling:
Project Name: MSA PFAS GW Round 2				Job / SDG No.:
Site: MSA				
PO # 112G09023				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PFAS (Method 537)	Sample Specific Notes:
EQB-WL-070720	7/7/20	1000	Grab	GW	2	N	N	X	
MSA-FB-070720	7/7/20	1300	Grab	GW	2	N	N	X	Trizma preserved FTCB
GSP-MW-13-070720	7/7/20	1135	Grab	GW	2	N	N	X	
MSA-DUP-5-070720	7/7/20	0000	Grab	GW	2	N	N	X	
GSP-MW-16-070720	7/7/20	1345	Grab	GW	2	N	N	X	
GSP-SWSD-03-070720	7/7/20	1415	Grab	SW	2	N	N	X	Extended list
GSP-SWSD-02-070720	7/7/20	1425	Grab	SW	2	N	N	X	Extended list
GSP-SWSD-01-070720	7/7/20	1430	Grab	SW	2	N	N	X	Extended list
EQB-Pec1-070720	7/7/20	1450	Grab	GW	2	N	N	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: 0.0 Corr'd: 0.7 | Therm ID No: 167300600WS

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Tetra Tech	7/7/20 1530			7/7/20 15:30
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	STA	7/8/20 1150		GLC	7/8/20 11:50
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
	GLC	7/8/20 7:00		GLC	7-8-20 1715

ICAM

APPENDIX F— WASTE MANAGEMENT PLAN

Lockheed Martin Corporation
6801 Rockledge Drive
MP CCT 246
Bethesda, MD 20817
Telephone (301) 548-2223

May 15, 2018 **VIA LOCKHEED MARTIN SECURE INFORMATION EXCHANGE**

Ms. Jann M. Richardson
CDM Smith co Lockheed Martin
1195 Sarasota Blvd.
Sarasota, FL 34240

Subject: Transmittal of Investigation–Derived Waste Management Plan Martin State Airport and Satellite Sites
Lockheed Martin Corporation; Martin State Airport
701 Wilson Point Road, Middle River, Baltimore County, Maryland

Dear Ms. Richardson:

Please find enclosed the *Investigation–Derived Waste Management Plan Martin State Airport and Satellite Sites* for the record.

Please let me know if you have any questions. My office phone is (301) 548-2223.

Sincerely,

Charles Trione
Project Lead, Environmental Remediation
Lockheed Martin Corporation

cc: (via email without enclosure)
Christine Kline, Lockheed Martin
Norman Varney, Lockheed Martin
Paul Calligan, Lockheed Martin
Michael Martin, Tetra Tech
Peter Shilland, CDM Smith
Mark Salvetti, CDM Smith

INVESTIGATION–DERIVED WASTE MANAGEMENT PLAN
MARTIN STATE AIRPORT AND SATELLITE SITES
701 WILSON POINT ROAD
MIDDLE RIVER, MARYLAND

Prepared for:
Lockheed Martin Corporation

Prepared by:
Tetra Tech, Inc.

May 2018

Approved by:
Lockheed Martin, Inc.

Revision: 0



Michael Martin, P.G.
Regional Manager

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ACRONYMS AND ABBREVIATIONS

CFR	*Code of Federal Regulations*
COMAR	*Code of Maryland Regulations*
EESH	Energy, Environment, Safety, and Health
HAZMAT	hazardous materials
HAZWOPER	hazardous waste operations and emergency response
IDW	investigation-derived waste
LMCPI	LMC Properties, Inc.
Lockheed Martin	Lockheed Martin Corporation
MAA	Maryland Aviation Administration
MDANG	Maryland Air National Guard
MDE	Maryland Department of the Environment
MDOT	Maryland Department of Transportation
MSA	Martin State Airport
MT	Main Terminal
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
TCLP	toxicity characteristic leaching procedure
Tetra Tech	Tetra Tech, Inc.
TSCA	Toxic Substances Control Act
TSD	treatment, storage, and disposal
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

SECTION 1
PURPOSE

On behalf of Lockheed Martin Corporation (Lockheed Martin), Tetra Tech, Inc. (Tetra Tech) has prepared this *Investigation-Derived Waste Management Plan* due to the potentially contaminated nature of the waste that will be generated as part of the field investigations conducted at the Martin State Airport (MSA) Dump Road Area, Main Terminal (MT) area, Greater Strawberry Point, and adjacent creeks (Figure 1). Solid and liquid waste materials will be generated and handled as investigation-derived waste (IDW). Following proper investigation-derived waste management procedures, the investigation-derived wastes generated will be collected in United States Department of Transportation (USDOT)–approved containers, stored at a designated location, sampled for waste profiling and characterization, and once characterized, disposed of off-site at a Lockheed Martin-approved facility. Investigation-derived wastes generated during Martin State Airport field investigations will include, but will not be limited to; soil, sediment, water (surface water, groundwater, purge water, and/or decontamination water), personal protective equipment (PPE), and disposable sampling equipment (i.e., tubing, filters, and acetate liners from soil coring).

A Tetra Tech geologist or field technician will be on-site for all field activities performed by Lockheed Martin at Martin State Airport. All site investigation field work and related waste management activities conducted by a subcontractor will be performed under the direction of the Tetra Tech geologist or field technician and in full compliance with applicable local, state, and federal statutes and regulations, including Maryland Department of Transportation (MDOT) regulations, the federal Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA), and Occupational Safety and Health Administration (OSHA), and with Lockheed Martin's Energy, Environment, Safety and Health (EESH) Remediation Operating Procedure EROP-03 (Appendix A). Investigation-derived wastes will be handled in accordance with the United States Environmental Protection Agency (USEPA) guidance *Management of Investigation Derived Wastes during Site Inspections,* OERR Directive 9345.3-02, May 1991.

This *Investigation-Derived Waste Management Plan* specifically covers investigation-derived waste resulting from field investigations conducted at the Martin State Airport Dump Road Area, Main Terminal area, Greater Strawberry Point, and adjacent creeks.

This plan is organized as follows:

Section 2—Responsibilities and Training Requirements: Presents the requirements and responsibilities of Tetra Tech and the subcontractors.

Section 3—Hazardous Waste Determination and Process: Presents how the waste characterization will be completed.

Section 4—Storage and Shipping Requirements: Presents pre-shipment, shipping, and post-shipping requirements.

Section 5—Reporting Requirements: Presents statutory and regulatory reporting requirements.

SECTION 2
RESPONSIBILITIES AND TRAINING REQUIREMENTS

Training in accordance with all applicable state and federal protocols is required for all Tetra Tech, Inc. (Tetra Tech) personnel and subcontractors involved in hazardous waste operations at Martin State Airport (MSA). All personnel will complete appropriate federal Occupational Safety and Health Administration (OSHA) hazardous waste and emergency response operations (HAZWOPER) training and annual refresher training as specified in 29 *Code of Federal Regulations (CFR)* §1910.120. All subcontractor-training certifications will be provided electronically to the Lockheed Martin Corporation (Lockheed Martin) Project Lead or authorized delegates. Tetra Tech personnel certificates are maintained internally and can be provided to Lockheed Martin upon request. Training requirements are provided in Section 6 of the Energy, Environment, Safety and Health (EESH) Remediation Operating Procedure No: EROP-03 included in Appendix A.

United States Department of Transportation (USDOT) Hazardous Materials (HAZMAT) training is required for anyone involved in preparing hazardous waste for shipment and offering hazardous waste for transport, including signing of hazardous waste manifests (see 49 CFR 172, Subpart H). The waste management subcontractor must have completed HAZMAT employee training and will renew the training as necessary to meet USDOT requirements for hazardous waste transportation. Tetra Tech will verify subcontractor training compliance prior to initiating any waste removal activities. Lockheed Martin's presence at MSA is as a "large quantity generator" (MDR000518760) under regulations administered by the United States Environmental Protection Agency (USEPA). Large quantity generators must comply with the emergency preparedness and personnel training requirements outlined in 40 CFR §265.16 (see 40 CFR §262.34[a][4]). Tetra Tech personnel will receive this training, which will be provided by a person qualified in hazardous waste management and emergency response procedures.

SECTION 3
HAZARDOUS WASTE DETERMINATION AND PROCESS

Hazardous waste determinations will be made in accordance with 40 *Code of Federal Regulations* (CFR) 262.11, using a combination of process knowledge and analytical evaluation of waste samples. Hazardous waste determinations will be reevaluated whenever any of the following occurs:

- the process that produces the waste changes (e.g. a new chemical constituent is discovered, the treatment process changes);
- the treatment media changes (e.g. new media vendor or media type);
- waste was tainted by inadvertent mixing with another waste; and
- a change occurs to the hazardous waste statutes or regulations governing that waste.

Investigation-derived waste (IDW) containing polychlorinated biphenyls (PCBs) may require disposal at facilities regulated under the Toxic Substances Control Act (TSCA). Regulations governing the management of IDW containing PCBs, which are generally based on *in situ* concentrations, are included in 40 CFR 761. PCB-contaminated material with concentrations less than 50 parts per million (ppm) are generally not regulated under TSCA and may be disposed in approved Subtitle D facilities at their discretion.

Waste generated during field investigations will include (but is not limited to) soil, sediment, water (surface, groundwater, purge, and/or decontamination water), disposable personal protective equipment (PPE) and disposable sampling equipment. IDW such as disposable PPE and sampling equipment may be decontaminated and rendered nonhazardous according to the site manager's best professional judgment, placed in trash bags, and disposed of in a facility trash receptacle designated by Martin State Airport (MSA) personnel. Other IDW generated during field activities will be segregated based upon historical data (as applicable) into appropriate containers. Per the requirements presented in Section 4.1.2 of this plan, each container will be properly labeled to indicate the locations from which the waste was generated, and the generation

date. IDW generated during the field activities will be properly characterized as described below and disposed of in accordance with state regulations unless state requirements are less stringent than federal requirements, in which case federal requirements will apply. The handling of all IDW will comply with United States Department of Transportation (USDOT) protocols.

Tetra Tech will record each container on a master site-specific IDW tracking form (see Appendix B). The tracking form will be maintained electronically by Tetra Tech and will be sent out to the project team on a weekly basis. Information provided on the IDW tracking form will include:

- container type
- container contents
- project name
- first generation date
- waste characterization sample date
- hazardous or non-hazardous classification
- field inspection dates and field inspector name
- actions taken based on inspections
- date removed from the site
- removal deadline

Note that the removal deadline for hazardous IDW is 90 days from its generation date. However, every attempt will be made to remove all IDW (both hazardous and nonhazardous) within 75 days of its generation date.

The "Waste Listing Assessment Form" is provided in Appendix C. This form will be completed by the Tetra Tech project manager as the first step in the IDW classification/removal process. It serves as first notification and is presented to Lockheed Martin's remediation technical operations (RTO) contractor for review. The form presents pertinent information such as the project name, description of the waste, date generated, type and classification of waste.

A waste characterization sample for each waste stream will be collected from a representative amount of containers and sent to an offsite laboratory for analysis, including volatile organic compounds (VOCs), toxicity characteristic leaching procedure (TCLP) metals, PCBs, and

ignitability. Sampling bottleware, analytical methods, preservation, and holding times utilized are shown on Table 1.

All waste characterization data will be presented to the IDW subcontractor for classification. The IDW subcontractor will complete the waste profiles based on analytical data provided and will classify the waste as nonhazardous or hazardous. Following receipt of the approved analytical data, the IDW subcontractor will develop a waste profile. Waste profiles are to be sent to the Tetra Tech project manager for initial review. The Tetra Tech project manager will review them and forward the waste profile forms to the appropriate site contact. All forms related to IDW from MSA will be signed and approved by Mr. Mike Musheno or Mr. Chris Keller of LMC Properties, Inc. (LMCPI).

Lockheed Martin Corporation (Lockheed Martin) may choose to issue a Lockheed Martin "Hazardous-Waste-Manifest Signatory Authorization Form," presented in Appendix D. This form authorizes a Lockheed Martin subcontractor to sign for the IDW and certifies that the representative has taken the USDOT training delineated in 49 CFR Part 172, Subpart H and is in compliance with all state and federal requirements for hazardous waste manifesting. Lockheed Martin remains responsible for the hazardous waste being disposed.

Following signature of the waste profile forms by Lockheed Martin or an authorized representative, the IDW will be scheduled for removal from the site. The Tetra Tech project manager will coordinate the IDW removal with the appropriate Lockheed Martin site contact. The Lockheed Martin site contact or authorized representative will be on-site to sign the bills of lading for nonhazardous IDW or the waste manifests for hazardous IDW. Signed copies of the returned bills of lading and waste manifests will be kept on file for at least three years by Tetra Tech and LMCPI and be available for review if requested.

Before IDW leaves the site, the Lockheed Martin site contact or authorized representative will complete a waste shipment checklist. The "Hazardous Material/Waste Shipment Checklist" is presented in Appendix E for reference. Completion of this checklist ensures that all protocols, standards and requirements have been adhered to and that the waste can be removed from the site. The checklist includes such line-item prompts as ensuring that the truck is fitted with proper waste placards and that waste manifests and bills of lading have been properly completed. IDW will be removed from the site after the Lockheed Martin representative completes the checklist.

Once the IDW is removed from the site, the Lockheed Martin representative and the Tetra Tech field technician will each be provided a copy of the associated documentation.

A site contact list (Appendix F) will be maintained listing who will be contacted in case of an emergency at the site or if questions arise about IDW disposal. An emergency action plan will be incorporated into the on-site health and safety plan and it will comply with all current and applicable regulations and requirements including, but not limited to 29 CFR 1903, 1904, 1910, and 1926. Lockheed Martin will be listed as the waste generator on all paperwork, including those waste profile sheets on which the generator was initially listed as Glenn L. Martin State Airport.

SECTION 4
STORAGE AND SHIPPING REQUIREMENTS

4.1 PRE-SHIPMENT REQUIREMENTS

Waste generated during the field investigation will include, but is not limited to soil, sediment, and water (groundwater, surface, purge, and/or decontamination water), personal protective equipment (PPE) and disposable sampling equipment. Investigation derived waste (IDW) generated during field investigations will be characterized as non-hazardous or hazardous waste. Pre-shipping requirements have been discussed in detail in Section 3.0.

4.1.1 Packing

Waste materials will be predominantly collected in new or properly reconditioned United States Department of Transportation-(USDOT-) approved 55-gallon steel drums that will be sealed at the end of daily sampling. Special consideration will be made to manage certain wastes (such as bentonite grout) separately from other IDW so as not to increase the volume of material that may be classified as hazardous due to elevated pH. Other approved containers may be used depending on the type and volume of waste generated including but not limited to plastic drums, tanks, and roll-off containers. Packing requirements will be determined and specified for the specific containers as necessary.

4.1.2 Labeling

As soon as the material is placed in each container, the container will be marked with an appropriate label(s) containing the following information:

- **site** – name of the site where waste was generated (i.e. Martin State Airport)
- **location** – location where the waste was generated (i.e., well identification, soil boring, test pit, sediment, and surface water location number)
- **date** – when waste materials accumulation began
- **container number** – in the series of drums from this sampling event
- **contents** – type of waste (e.g., sediment, soil cuttings, groundwater and surface water)

- **volume** – an estimated volume not to exceed three quarters of drum capacity

- **site contact and emergency contact information** – for the designated authorized Lockheed Martin Corporation (Lockheed Martin) representative for the site and the telephone number of the local fire department.

If the material in the container is classified as hazardous, as determined by analysis and subsequent profiling of a waste characterization sample, a label denoting its classification (i.e., a "hazardous" label) will be affixed to the container. Similar labels will be affixed to all containers used to store IDW (e.g., plastic drums, roll-offs, and tanks).

4.1.3 Storing

IDW storage areas (for smaller containers such as drums) will meet the following specifications to permit access to conduct spill/leak monitoring, sampling, and extraction once the disposal route is determined:

- Secondary containment will be placed under the containers to contain any spills or leaks, and may include a temporary spill containment system made of polyethylene sheeting and two-inch by six-inch wooden boards creating a bermed edge and/or a polyethylene spill containment pallet. The dimensions of the temporary spill-containment area will depend on the number of 55-gallon drums at the site. For most jobs, the spill containment area will likely be 10-feet by 20-feet. Drum capacity of the polyethylene spill containment pallets ranges between two and four drums. The integrity of the containment systems will be monitored weekly as described below. Secondary containment systems will be large enough to hold 55 gallons (the largest volume for a container stored in the system). Fifty-five-gallon drums will be stored on wooden pallets, with four or fewer drums per pallet. The wooden pallets will be stored on a hard, flat surface inside the spill containment system and will be covered with polyethylene sheeting.

- Drums containing IDW profiled as hazardous waste will be segregated from drums containing non-hazardous IDW and will be designated by proper fencing and hazardous waste signage.

- The drum-closure bolt and label will be readily visible.

- Approximately four feet of space will be left between each row of pallets/drums to allow access for sampling, drum removal, and spill response.

- Caution tape or temporary fencing will be placed around the drums to help identify and secure the area.

- Signs will be posted in front of the IDW storage area identifying the site, location, date of collection, number of drums, drum contents, volume of contents, site and emergency contact information, and the location of spill control materials for the wastes.

- Appropriate onsite personnel (Maryland Air National Guard [MDANG], Martin State Airport [MSA]/MDANG fire department, and MSA Operations) will be informed that hazardous waste materials are on-site and of emergency response procedures.

- A copy of work plans, waste management plans, and the IDW inventory list will be maintained inside a weatherproof lock box on-site at each IDW storage location.

- Spill response equipment including oil booms, absorbent pads, shovels, buckets of clean water, and an overpack drum, will be readily available.

- Appropriate equipment will be used to move containers whenever possible, to avoid injury. When not possible to apply appropriate equipment, personnel will obtain help to manipulate containers.

- All storage containers and secondary containment pads containing waste that is pending characterization or has been determined to be hazardous will be inspected weekly to ensure that they remain in good condition, and to ensure that no leaks or spills have occurred. The weekly inspections will be conducted starting the week of generation and will continue until the waste is removed from the site or determined to be non-hazardous. If the waste is deemed nonhazardous, weekly inspections will no longer be required. Observations from weekly inspections (including photographs) will be documented in a field logbook and on a tracking form dedicated to the site and will be stored in a weatherproof lock box at each IDW storage location.

Other containers such as roll-offs and tanks will be lined and double-walled as required based on the contents stored in each container (e.g., lined roll-offs will be used to store wet soils).

Three central IDW drum storage areas at MSA have been designated and approved by the Maryland Aviation Administration (MAA) and the MDANG: a flat concrete pad area inside Gate 12, a flat grass-covered area in the central portion of the DRA and a gravel lot located near the Maintenance Building in the Greater Strawberry Point portion of the site (Figure 2). Alternative areas may be used for certain projects to minimize drum transportation. Airport personnel will confirm satellite IDW storage areas at Dump Road Area and Greater Strawberry Point prior to the start of field activities. Main Terminal area IDW will be stored at the DRA location. Single drums will be temporarily staged on wooden pallets on a hard, flat surface overlain by a temporary, secondary spill-containment system made of polyethylene sheeting and wooden boards with sufficient capacity to contain the contents of one 55-gallon drum. All IDW drums will be stored within the secondary containment until they can be removed from the site. Other containers that may be used to store IDW such as roll-offs and tanks will be also staged and maintained on flat surfaces in accordance with Resource Conservation and Recovery Act (RCRA) regulations.

Standard procedures include daily removal of all IDW from the point of generation and relocation to one of the designated and approved IDW storage areas. Satellite accumulation provisions under 40 CFR 262.34 (c) allow generators to accumulate up to 55 gallons of hazardous waste (or one quart of acute hazardous waste) in containers that are at or near any point of generation, and that are under the control of the operator with fewer requirements than for central accumulation areas, provided the generator complies with the requirements of 262.34(c). If hazardous waste is ever staged at the point of generation, all satellite accumulation protocols pursuant to 40 CFR 262.34 (c) will be followed.

Hazardous waste accumulation times discussed in 40 CFR 262.34 generally allow up to 90 days to remove the hazardous waste drums and other containers from the facility. Despite this 90 day allowance, every attempt will be made to expedite IDW removal within 75 days of its generation date. Access for the subcontractor's representative and IDW transport carrier will be coordinated by Tetra Tech.

4.1.4 Material Identification and Classification

All waste materials will be identified and classified per USDOT requirements (49 CFR Parts 100-185).

4.1.5 Waste Shipment

Tetra Tech will subcontract all IDW removal. Tetra Tech will ensure the use of Lockheed Martin purchasing agreements and associated Lockheed Martin-approved waste-management vendors and will ensure that hazardous waste is transported by an approved vendor to a treatment, storage, and disposal (TSD) facility on the Lockheed Martin Corporate Hazardous Waste Approved Vendors List. Non-hazardous waste is not required to be managed by Lockheed Martin approved waste management vendors but will be transported to a Lockheed Martin approved industrial waste disposal facility. The Lockheed Martin "Hazardous Waste Manifest Signatory Authorization" form (Appendix D) must be completed by the Lockheed Martin Project Lead in coordination with the Tetra Tech project manager if the IDW is hazardous.

4.1.6 Hazardous Waste Generator Identification Number

The Lockheed Martin USEPA identification number for hazardous waste generation at MSA is MDR000518760. All IDW will be removed from the site by a subcontractor adhering to the shipping requirements in Section 4.2.

4.2 SHIPPING REQUIREMENTS

USDOT hazardous materials (HAZMAT) employee training is required for anyone involved in shipment preparation and transportation of hazardous waste, including signing hazardous waste manifests (see 49 CFR 172, Subpart H). The manifest for shipped waste must be certified as accurate. Non-hazardous materials do not require the signature of a USDOT HAZMAT-trained individual. Waste manifests for all hazardous wastes, and bills of lading for all non-hazardous wastes will be signed by Mr. Mike Musheno or Mr. Chris Keller (LMC Properties, Inc. [LMCPI]). Preparation and pre-transport review of non-hazardous and hazardous waste shipments will be documented using the Lockheed Martin "Hazardous Material/Waste Shipment Checklist" (Appendix D). A completed electronic copy will be provided to Tetra Tech and to the Lockheed Martin Project Lead, along with the shipping documentation.

Detailed records of authorized work will be maintained by the subcontractor, and will include the following:

- all manifests of waste transported to the approved off-site disposal facility,
- receipt of waste acceptance by the approved treatment/disposal facility,
- certification that the waste has been disposed of at the approved facility,
- receipt of acceptance of waste containers by the approved disposal facility,
- certification of disposal of waste containers by the approved disposal facility,
- weighing slips, and
- any other documentation required by local, state, or federal requirements.

4.3 POST-SHIPMENT REQUIREMENTS

Records of waste characterization, chain of custody, transportation, and destruction will be maintained by both Tetra Tech and LMCPI. This includes profile sheets, the "Hazardous Material/Waste Checklist," the generator's copy of the waste manifest, a copy of the signed TSD

manifest, Land Disposal Restriction forms, and certificates of waste destruction (where applicable). Tetra Tech will submit all records associated with each year's waste generation activities to Lockheed Martin's RTO contractor in the first quarter of the following year, or as directed by the Project Lead. The documentation noted above must be retained for three years. All documents should be properly stored and available for review upon request.

SECTION 5
REPORTING REQUIREMENTS

5.1 BIENNIAL REPORTING REQUIREMENTS

The Code of Maryland Regulations (COMAR) 26.13.03.06B requires facilities that manage hazardous waste to file a biennial hazardous waste report every two years that includes hazardous waste activity for the preceding calendar year. Facilities are required to submit the biennial report for a given site if:

1. The facility either (a) generates hazardous waste and ships it offsite to a facility in the United States, **or** (b) treats, stores, or disposes of hazardous waste on-site; and

2. The facility is regulated under Maryland's hazardous waste regulations because it (a) generates 220 pounds or more of hazardous waste (or more than 2.2 pounds of acute hazardous waste) in a calendar month, **or** (b) accumulates, at any time, more than 220 pounds of hazardous waste (or more than 2.2 pounds of acute hazardous waste).

Guidance for completing the biennial report form is available at the Maryland Department of the Environment's (MDE) Biennial Report web page, which is available at http://www.mde.maryland.gov/programs/land/HazardousWaste/Pages/biennialreport.aspxThe report must be completed, typically by March 1 of even numbered years (e.g. 2018, 2020), and filed with:

Maryland Department of the Environment
Land Management Administration
Operational Services Program
1800 Washington Boulevard, Suite 650
Baltimore, Maryland 21230-1719

Before each report is filed, the Maryland hazardous waste regulations must be consulted to confirm or update regulatory thresholds.

5.2 WASTE MINIMIZATION

Hazardous waste generators, when preparing a manifest, are required to certify they have taken steps to minimize the volume and toxicity of hazardous waste generated. Waste minimization

efforts are required under COMAR 26.13.03.06B(1)(d)(vi) to be reported on the biennial report submittal.

Efforts should be taken, to the degree economically practicable, to reduce the volume and toxicity of hazardous waste generated and a reasonable method of treatment, storage, or disposal should be selected that will minimize the present and future threat to human health and the environment.

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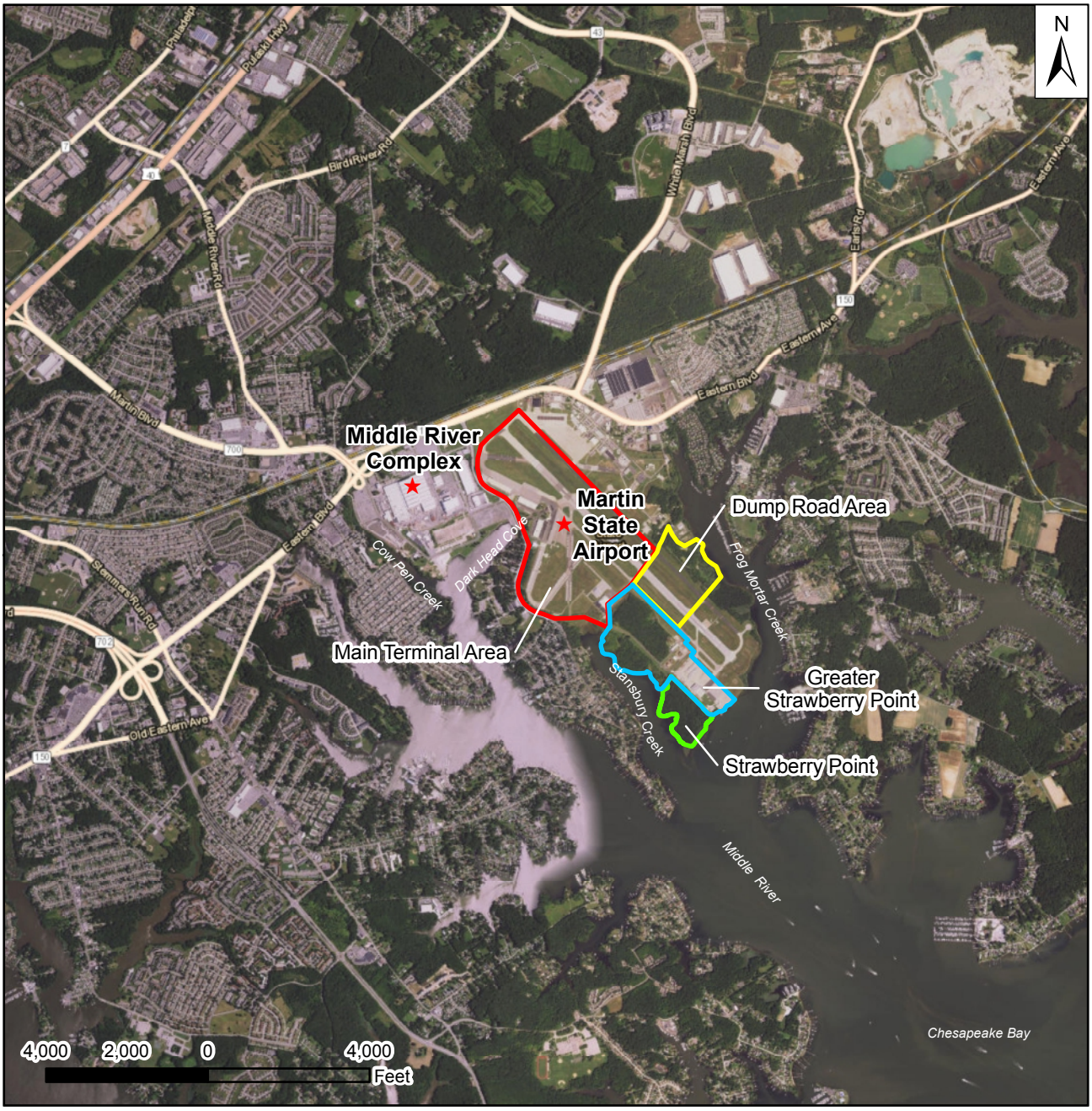
FIGURES

Figure 1 2018 Site Location Map

Figure 2 Martin State Airport Investigation Derived Waste Storage Areas, 2018



Aerial photograph provided by ESRI's ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).

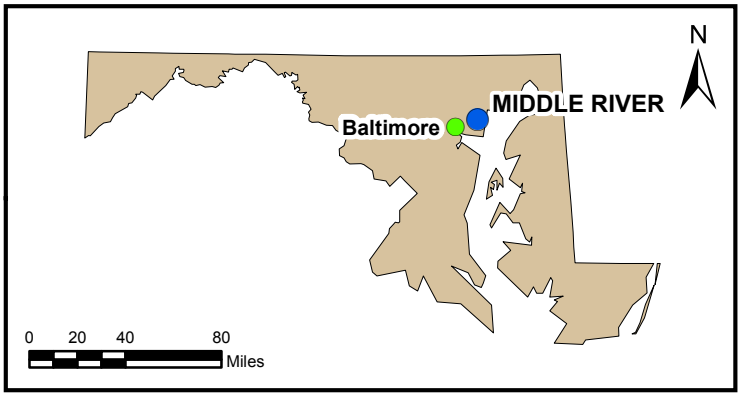


FIGURE 1-1

2017 SITE LOCATION MAP

Lockheed Martin, Martin State Airport
Middle River, Maryland

DATE MODIFIED:	CREATED BY:
02/24/17	JEE

TETRA TECH

Map Document: (P:\GIS\Lockheed_MSA\MapDocs\MXD\msa_overview_map_feb2017.mxd)
02/24/17 -- JEE

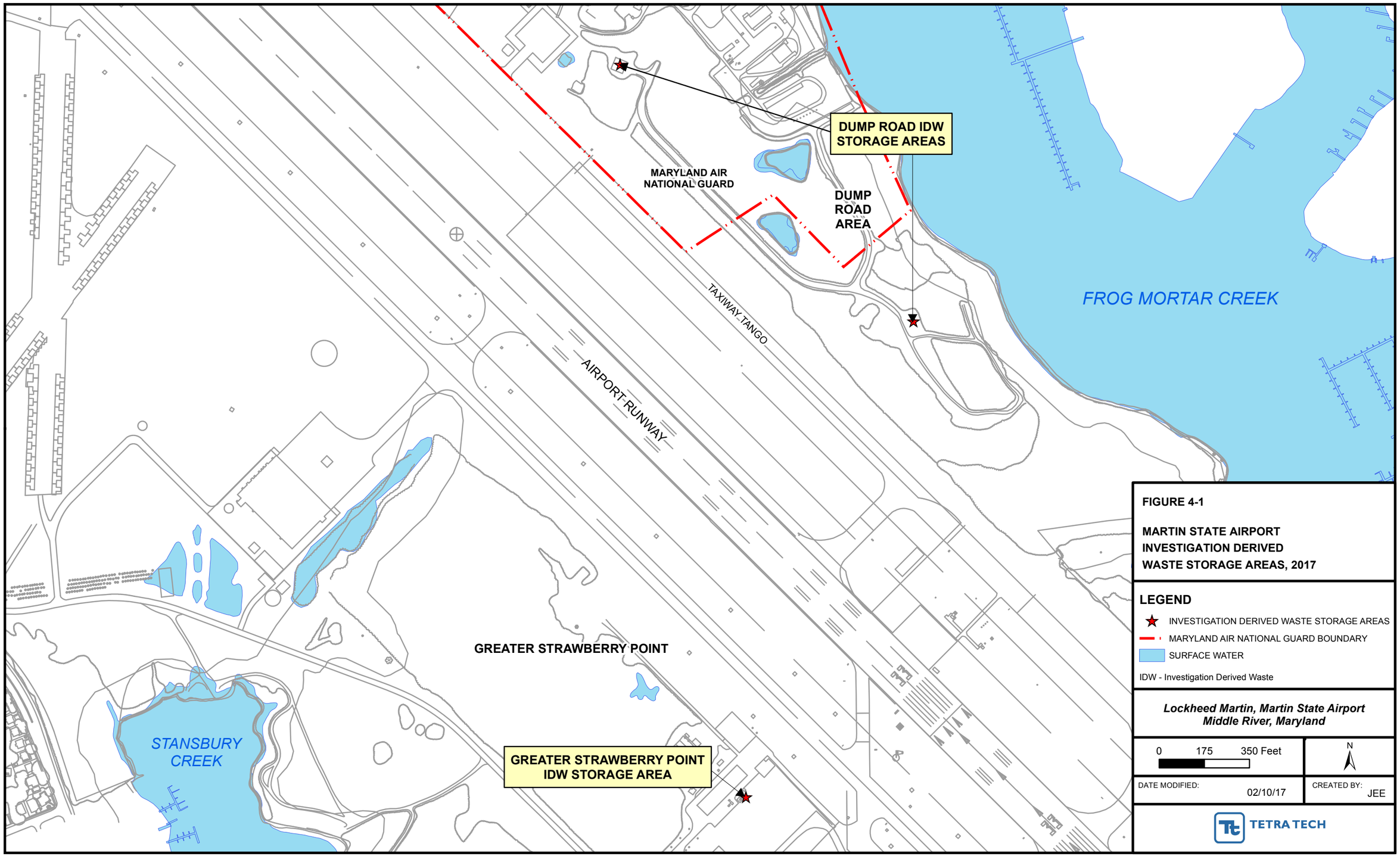


FIGURE 4-1

MARTIN STATE AIRPORT
INVESTIGATION DERIVED
WASTE STORAGE AREAS, 2017

LEGEND

- INVESTIGATION DERIVED WASTE STORAGE AREAS
- MARYLAND AIR NATIONAL GUARD BOUNDARY
- SURFACE WATER

IDW - Investigation Derived Waste

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 175 350 Feet

N

DATE MODIFIED: 02/10/17

CREATED BY: JEE

TETRA TECH

Map Document: (P:\GIS\Lockheed_MSA\MapDocs\MXD\msa_waste_storage_area_feb2017.mxd)
02/10/17 -- JEE

TABLES

Table 1 Bottleware, Preservation, and Holding Time Requirements

Table 1
Bottleware, Preservation, and Holding Times
Martin State Airport
Middle River, Maryland

Matrix	Analytical Group	Analytical and Preparation Method	Containers (number, size, and type)	Preservation Requirements	Maximum Holding Time (preparation / analysis)
AQUEOUS WC SAMPLES	VOCs	SW-846 8260C	Three 40‑milliliter (mL) glass vials	Hydrochloric acid (HCl) to pH<2; Cool to ≤ 6°Celsuis (°C); no headspace	14 days to analysis
	TCLP Metals	SW-846 1311/6010	two 1-liter amber jars	Cool to ≤ 6°C	various[1]
	PCBs	SW-846 8082A	two 1-liter amber jars	Cool to ≤ 6°C	1 year to analysis
	Ignitability	SW-846 1010	one 250-mL poly	Cool to ≤ 6°C	none
SOIL WC SAMPLES	VOCs	SW-846 8260C	one 2-ounce glass jar no headspace	Cool to ≤ 6°C	14 days to analysis
	TCLP Metals	SW-846 1311/6010	one 8-ounce glass jar	Cool to ≤ 6°C	various[1]
	PCBs	SW-846 8082A	one 4-ounce glass jar	Cool to ≤ 6°C	1 year to analysis
	Ignitability	SW-846 1030	included in 4-ounce glass jar	Cool to ≤ 6°C	none

[1] TCLP Metals holding times include leachate prep (7 days from collection), mercury (28 days from collection), and metals (6 months from collection)
PCB - polychlorinated biphenyls
TCLP - toxicity characteristic leaching procedure
VOC - volatile organic compound
WC - waste characterization

APPENDICES

Appendix A—EESH Remediation Operating Procedure No: EROP-03, "EESH Remediation Waste Management"

Appendix B—IDW Tracking Form

Appendix C—Waste Listing Assessment Form

Appendix D—Hazardous Waste Manifest Signature Authorization Form

Appendix E—Hazardous Material/Waste Shipment Checklist

Appendix F—Site Contact Sheet

Appendix A—EESH Remediation Operating Procedure No: EROP-03, "EESH Remediation Waste Management"

Appendix A

Remediation Contractor's ESH Handbook

Including:

Appendix A – Lockheed Martin Minimum Requirements for Intrusive Fieldwork

Including:

Appendix A

Including:

Enterprise Operations Procedure EO-28

Dig Permit - Form E0-28-1

Risk Handling Checklist - Form EO-28-2

Appendix B – Utility/Underground Structure Clearance Chart

Appendix C – Lockheed Martin Invasive Fieldwork Authorization Form

Appendix B – EESH Remediation Operating Procedure No. EROP-03 (LMC Waste Management Procedure)

Including:

Attachment #1- Waste Listing Assessment Form

Attachment #2-Hazardous Waste Manifest Signature Authorization Form

Attachment #3-Hazardous Material/Waste Shipment Checklist

Attachment #4-Non-Specification Bulk Container Packing and Closing Instructions

Appendix C – LMC 6S Checklist

Appendix D – LMC ORR Process Documents

Including:

ORR Agenda

ORR Compliance Checklist

LOCKHEED MARTIN

REMEDIATION CONTRACTOR'S ESH HANDBOOK

May 1, 2014

Revision 2

Lockheed Martin Corporation
Energy, Environment, Safety & Health

A COPY OF THE JOB SPECIFIC HASP SHALL BE AVAILABE AT THE JOB SITE FOR THE DURATION OF THE PROJECT

REVISION STATUS

REVISION	DATE	COMMENTS
1	06/10/2009	
2	05/01/2014	Near miss, Operational Readiness Review, Housekeeping

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CONTRACTOR'S ESH HANDBOOK

GENERAL

Lockheed Martin Corporation management at all levels is committed to conducting operations and activities in a manner that provides and maintains safe and healthful working conditions, protects the environment, and conserves natural resources.

This *Contractor's ESH Handbook* has been prepared to assist each project jobsite employer/contractor in satisfying its' contractual and legal accident prevention responsibilities, in such a manner that a safe, efficient operation is assured. All applicable requirements outlined in this handbook shall be incorporated into the contractor's site specific Safety and Health Plan The site specific Safety and Health plan shall be submitted to the Lockheed Martin Project Lead at least two weeks prior to starting work on any Lockheed Martin remediation projects.

This material must not be considered to be all inclusive as to the hazards that might be encountered, safe practices that should be performed, or safe conditions that should be maintained during the course of any project. Moreover, this handbook does not replace the contractor's legal obligation to its employees under all relevant environmental, safety and health requirements and laws. All legal standards not specifically referenced in this handbook shall apply when applicable.

1 CONTRACT RESPONSIBILITIES

The Contractor agrees to comply with all rules and procedures contained in this document, known as the *Remediation Contractor's ESH Handbook*, unless Lockheed Martin specifically agrees, in writing, to a modification or exemption. In addition, the Contractor and subcontractors, at any tier, shall:

1.1 Conduct an Operational Readiness Review (ORR) meeting prior to each phase of construction work, start-up of a new or modified treatment system or if major changes have occurred in how the O&M will take place at a site. An Operational Readiness Review Compliance Checklist shall be completed for each ORR meeting. See Appendix D. The Lockheed Martin Project Lead shall coordinate with the Lockheed Martin ESH manager at the early planning stages to determine need and schedule for an Operational Readiness Review meeting.

1.2

1.3 Maintain Lockheed Martin as a drug free-work workplace. This requirement extends to contractors working on Lockheed Martin remediation projects. Additionally, the use of tobacco is not permitted on Lockheed Martin owned property.

1.4 Take all prudent and proper environmental, safety and health (ESH) precautions to protect Lockheed Martin employees, all other workers, and the public from ESH hazards associated with contractor activities.

1.5 Comply with all applicable Federal, State, municipal, local, and any other applicable occupational safety and health statutes, rules, ordinances, regulations, and requirements issued or imposed by any governmental authority (including, but not limited to *Title 29, Code of Federal Regulations Parts 1903, 1904, 1910* and *1926*).

1.6 Comply with all applicable Federal, State, municipal, local, and any other applicable air pollution statutes, rules, ordinances, regulations, and requirements issued or imposed by any governmental authority.

1.7 Comply with all Federal, State, municipal, local and Lockheed Martin hazardous materials, hazardous waste, and non-hazardous waste statutes, rules, ordinances, regulations, and requirements (including, but not limited to *Title 40, Code of Federal Regulations*).

1.8 Obtain the applicable ESH permits to conduct the work in compliance with local, state, federal ESH regulations and site requirements (including, but not limiting to *Title 29, Code of Federal Regulations, 1910 and 1926*).

1.9 Ensure that all employees and subcontractors have received the appropriate level of ESH training in accordance with applicable ESH regulations necessary for the performance of the work requested by Lockheed Martin.

1.10 Instruct, prior to commencement of operations, all employees on the jobsite about relevant governmental laws and regulations, specific hazards expected to be encountered and proper safety precautions to be observed. In addition, jobsite employees shall read and certify that they have read and understand the job specific health and safety plan (HASP). The certification forms provided by the contractor within the HASP shall be electronically sent to the Lockheed Martin Project Lead.

1.11 Provide all jobsite visitors with a safety orientation prior to commencing work or touring the site. A visitor log shall be kept to document the orientation.

1.12 Ensure Contractor's job specific health and safety plan (HASP) encompasses Federal, State, municipal, local and the Lockheed Martin requirements found within this document the HASP should contain a section on crisis management / emergency response. A copy of the job specific HASP shall be maintained at the job site where jobsite employees have access to a copy. All Contractor Project Managers shall be provided a copy of the *Contractor's ESH Handbook* found within the Lockheed Martin Request for Proposal or as an appendix of the Key National Contractor Agreement. Contractors shall flow these requirements down to their subcontractors.

1.13 Contractor understands that Lockheed Martin may immediately stop Contractor's work if Contractor violates any applicable Federal, State, municipal, local, or any other rules, regulations, and requirements, *Remediation Contractor's ESH Handbook* provisions, or other contract terms and conditions regarding environmental, safety and health compliance. Lockheed Martin shall not incur work stoppage charges unless the contractor demonstrates that the work stoppage

was unwarranted for any of the reasons stated above. Any dispute regarding work stoppage charges must be resolved through binding arbitration.

1.14 Contractor is advised that the Project may be inspected from time to time by Lockheed Martin or a representative of Lockheed Martin. Periodic Lockheed Martin inspections in no way relieve the Contractor of their obligation to maintain its own inspection program to identify unsafe conditions or acts. ESH violations will be considered in evaluation of Contractor's performance.

1.15 Lockheed Martin is not responsible for training or supervising Contractor employees or abating workplace hazards created by the Contractor or to which the Contractor's employees are exposed.

1.16 Contractor agrees to maintain copies of all pertinent ESH records at the job site. Pertinent records include, but is not limited to, personnel training documentation, evidence of enrollment in a medical surveillance program, accident/injury reporting, work area inspections, periodic safety meetings, MSDS's, air monitoring data, waste container inspections, etc. These records shall also be provided electronically to the Lockheed Martin Project Lead.

1.17 Contractor shall contact the Lockheed Martin Project Lead immediately in the event of a fatal or serious injury, an unpermitted environmental release, or any ESH incident that is likely to generate significant publicity or an adverse situation for Lockheed Martin (e.g., alleged releases of contaminants beyond property boundaries, purported fish or wildlife impacts, allegations of adverse community health or property impacts, etc.)

2 DEFINITION

2.1 Contractor: any agent/agency engaged by Lockheed Martin through written contract (or other written agreement) to perform work on Lockheed Martin Remediation Sites. For the purposes of this *Remediation Contractor's ESH Handbook*, "Contractor" shall also include Contractor's subcontractors at any tier.

2.2 EPA: the Environmental Protection Agency.

2.3 Fed/OSHA: the Federal Occupational Safety and Health Administration

2.4 Hazard Communication Program: a written program meeting the requirements of Title 29, Code of Federal Regulations, Section 1910.1200 - Hazard Communication.

2.5 Lockheed Martin: Lockheed Martin Corporation, Corporate Energy, Environment, Safety & Health

2.6 Lockheed Martin Project Lead: the Lockheed Martin Corporate Environment, Safety & Health individual that has been designated to manage a specific project.

2.7 Lockheed Martin Contract Representative: the Lockheed Martin Corporate Environment, Safety & Health contract representative (Contract Administrator/Buyer) for the project.

2.8 RCRA: the Federal Resource Conservation and Recovery Act and all amendments or revisions.

3 SAFETY & HEALTH

Contractor shall comply with applicable provisions of Federal, State, municipal, local, and any other applicable occupational safety and health statutes, rules, ordinances, regulations and requirements. Contractor shall take all precautions for the protection of the safety and health of Contractor employees, subcontractor employees, and Lockheed Martin employees to prevent accidents or injury to them or to other persons on, about, or adjacent to site of work performance. Notwithstanding this handbook, Contractor will hold harmless Lockheed Martin for any incident, violation, regulatory agency inspection resulting in a finding, or any other ESH issue that occurs to a Contractor employee.

Within Section 3.0, Lockheed Martin is identifying specific requirements within the Federal regulations that need extra attention. These are not all encompassing and adherence to the all rules and regulations must be followed.

3.1 PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

1926 Subpart E or 1910 Subpart I
1910.139 / 1926.103
ANSI Z87.1
ANSI Z41 Standard
ANSI Z89.1 Standard

3.1.1 Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

- Eye Protection. Safety eyewear meeting ANSI Z87.1 shall be worn in areas designated as "Eye Protection Required" and on all jobs where a potential injury to the eyes is possible whether or not the area is posted.
- Foot Protection. Affected employee(s) shall wear protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and where such employee's feet are exposed to electrical hazards. Safety shoes and boots which meet the ANSI Z41 Standard shall be provided when impact and/or compression hazards exist. Soft-shoes, including but not limited to, tennis shoes, athletic shoes, moccasins, sandals, and open-toed or open-heeled shoes shall not be worn.
- Respiratory Protection Devices. Appropriate, MSHA/NIOSH-approved respiratory protective devices must be worn when applicable state and/or federal action levels or OSHA permissible exposure levels (PELs) are exceeded. Contractor must have fully implemented a respiratory protection program meeting the requirements of *Title 29, Code of Federal Regulations, Section 1910.139 / 1926.103* or applicable state OSHA regulations prior to issuing and using respiratory equipment. Contractor shall supply and maintain

appropriate air monitoring and respiratory protection equipment if inhalation hazards are anticipated.

- Protective Clothing such as suits, aprons, boots, or gloves shall be worn where there is a hazard to the body through dermal contact with chemicals, dusts, heat or other harmful agents or conditions.
- Hearing Protection (muffs and/or plugs) must be worn in all areas posted to indicate high noise level or where Contractor employees are exposed to noise levels in excess of the OSHA action level (85 dBA over a 8-hour time-weighted average or a dose of fifty percent).
- Hard Hats will be worn in all areas where there is a danger of impact to the head or hazard from falling or moving objects. Hard hats must meet the ANSI Z89.1 Standard.

3.1.2 Contractor will issue or cause to be issued prior to commencing the job all necessary personal protective equipment and air monitoring equipment to all its agents and employees, together with full instructions and training on the use of said equipment.

3.1.3 Contractor will meet all applicable Federal, Sate, municipal, local, and Lockheed Martin requirements for protective clothing and equipment. Contractor will properly supervise all its agents and employees to ensure protective clothing and equipment are used in conformance with applicable rules and regulations.

3.2 HAZARD COMMUNICATION - USE OF HAZARDOUS MATERIALS

Title 29, Code of Federal Regulations, Section 1926.59 Hazard Communication
Title 29, Code of Federal Regulations, Section 1910.1200 Hazard Communication

3.2.1 Contractor personnel shall not bring any hazardous substances (as defined by OSHA) onto Lockheed Martin remediation sites unless accompanied by a Material Safety Data Sheet (MSDS) and the containers are appropriately labeled. MSDS's must be maintained at the job site.

3.2.2 Contractor shall notify the Lockheed Martin Project Lead prior to bringing onto Lockheed Martin remediation sites any quantity of hazardous materials.

3.2.3 Contractor shall ensure all containers of hazardous materials are labeled in accordance with the Fed OSHA Hazard Communication Standard, 29 CFR 1910.1200 or applicable state OSHA standard.

3.2.4 Do not handle or use any hazardous material that does not have adequate safety warning labels.

3.2.5 Do not dump, drain or discharge any hazardous materials or wastes into any sink, drain or sewer.

3.2.6 The Lockheed Martin Project Lead shall inform the Contractor(s) of the identity of hazardous chemicals to which Contractor's employees may be exposed from

Lockheed Martin operations, if applicable. The Lockheed Martin Project Lead shall provide the following information:

- Where to obtain information concerning any hazardous substances used in Lockheed Martin operations that the Contractor's employees may come in contact with while performing their work;
- If Lockheed Martin owns or uses chemicals on a remediation site for any process where contractors could be exposed, Lockheed Martin shall make available to the Contractor Material Safety Data Sheets (MSDS) and sufficient information to permit the Contractor to train its employees on the hazards of the chemical Appropriate protective measure Contractor employees may take to protect themselves from exposure to known hazards from Lockheed Martin operations; and
- Appropriate work practice procedures (safety rules) for the location where work is to be performed.

3.2.7 Contractor shall ensure its employees are trained in the safe handling and use of hazardous materials in accordance with *29 CFR 1910.1200 - Hazard Communication* or the applicable state-OSHA hazard communication standard.

3.2.8 Contractor shall ensure that all applicable employees are medically qualified (as defined by OSHA) to perform the work assigned.

3.2.9 Hazardous materials shall be stored in designated areas and all containers effectively closed. Spill equipment/supplies shall be readily available to contain and/or mitigate accidental spills of hazardous materials.

3.3 CONFINED SPACE ENTRY

Title 29, Code of Federal Regulations, Section 1910.146 Permit-Required Confined Spaces

3.3.1 If Contractor or any other employee must enter a confined space (tank, vat, pit, sewer, etc.), the entry must be performed in accordance with the applicable state OSHA or federal OSHA regulations.

3.3.2 Before Contractor's employees are permitted entry into any confined space, the internal atmosphere shall be tested with a calibrated direct-reading instrument for the following conditions in the order given: 1) Oxygen content, 2) Flammable gases & vapors, and 3) Potential toxic air contaminants. Contractor shall furnish the air testing equipment and a person competent in the use of the testing equipment.

3.3.3 When possible, the Contractor shall notify the Lockheed Martin Project Lead prior to entering a permit required confined space. A permit shall be issued by the contractor prior to entry and electronically submit a copy to the Lockheed Martin Project Lead.

3.3.4 To ensure the safety of Contractor personnel during entry into confined spaces, the Contractor shall have a written confined space entry program.

3.4 HOT WORK REQUIREMENTS (i.e., welding, torch cutting, brazing, etc.)

Title 29, Code of Federal Regulations, Section 1910 Subpart Q
Title 29, Code of Federal Regulations, Section 1926 Subpart J

3.4.1 All hot work activities shall be conducted in accordance with the hot work permit requirements outlined in the site specific HASP (i.e., fire suppression equipment availability, removal of combustibles, fire watch, etc.).

3.4.2 Contractor personnel must secure all oxygen and acetylene cylinders in a manner that will prevent them from falling or tipping over. Oxygen and acetylene cylinders must be stored separately. Oxygen cylinders in storage must be separated from fuel gas cylinders a distance of 20 feet or by a noncombustible barrier 5 feet high. Acetylene cylinders shall not be stored horizontally, lying on their side.

3.4.3 When welding, Contractor personnel shall use welding curtains and/or suitable protective devices to protect persons from indirect exposure to welding flashes.

3.5 LOCKOUT / TAGOUT - Control of Hazardous Energy

Title 29, Code of Federal Regulations, Section 1910.147

3.5.1 Contractors are required to establish a written program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energization, start-up or release of stored energy in order to prevent injury to employee.

3.5.2 Contractor shall not service and/or maintain machines and equipment in which the unexpected energization or start up of the machines or equipment, or release of stored energy could cause injury to employees. Servicing and/or maintaining such equipment shall not be conducted until appropriate energy control methods have been initiated.

The Contractor shall provide training to ensure that the purpose and function of the energy control program are understood by their employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by the employees.

3.5.3 If Contractor needs to service or maintain Lockheed Martin equipment, Contractor(s) shall notify the Lockheed Martin Project Lead and/or on-site facility operator (if applicable) of the intended equipment service for any unscheduled maintenance.

3.5.4 Upon completion of the job, Contractor is to notify the Lockheed Martin Project

Lead and/or on-site facility operator (if applicable) so power can be resumed to the equipment after the lock-outs and tags have been removed.

3.6 USE OF LOCKHEED MARTIN MATERIALS AND EQUIPMENT

3.6.1 Contractor's employees shall not use Lockheed Martin tools, equipment, materials, or personal protective equipment unless otherwise authorized by Lockheed Martin.

3.6.2 Contractor shall not start or stop any production equipment without the approval of the Lockheed Martin Project Lead.

3.6.3 Contractor shall not adjust or relocate any Lockheed Martin process equipment without the approval of the Lockheed Martin Project Lead.

3.7 DANGEROUS OPERATIONS - WARNINGS AND BARRICADES

Title 29, Code of Federal Regulations, Section 1926, Subpart G-Signs, signals and barricades

3.7.1 Contractor shall isolate their work areas from Lockheed Martin operations, employees, and the public by using barricades or other effective means of isolation. Signs, signals and barricades shall be visible at all times where a hazard exists.

3.7.2 Contractor personnel shall erect and properly maintain, at all times, all necessary safeguards for the protection of Contractor personnel, Lockheed Martin employees and the public. This includes:

- If doing any overhead work, Contractor must utilize warning signs and barricades, or station someone on the ground to prevent passers-by from entering the area below the overhead work;
- Contractor must effectively barricade excavations, floor openings, etc., as required by OSHA regulations;
- Contractor must construct and maintain all scaffolds and working platforms in accordance with OSHA regulations; and
- If Contractor's equipment, barricades or other safeguards restrict fire lanes or fire equipment access, the Contractor shall notify the Lockheed Martin Project Lead about its notification to the local fire department.

3.7.3 Prior to commencing work, Contractor must inform Lockheed Martin Project Lead of any work posing a potential danger to personnel.

3.8 EXCAVATIONS, TRENCHES, EARTHWORK

Title 29, Code of Federal Regulations, Section 1926 Subpart P

3.8.1 Review the Lockheed Martin intrusive fieldwork requirements in Appendix A.

3.8.2 If workers are to enter excavations, a competent person must be designated and trained in soil classification and the recognition of trenching and excavation hazards.

3.8.3 Excavations and trenches shall be inspected by a competent person daily and after every rainstorm, earthquake, or other hazard-increasing occurrence.

3.8.4 Inspect the face, banks, and top daily when workers are exposed to falling or rolling materials.

3.8.5 Shore, bench, slope, or use equivalent methods to protect workers in excavations four feet deep or more.

3.8.6 Locate soil at least two feet from the edge of the excavation, or one foot from the edge when the excavation is less than five feet deep.

3.8.7 Ladders or steps shall be provided and secured in all trenches four feet or more in depth. Ladders shall be located to require no more than twenty-five feet of lateral travel before having access or egress and shall extend three feet above the top of the trench bank.

3.8.8 Install crossings with standard guardrails and toeboards when the excavation is more than 7½ feet deep.

3.8.9 All open trenches and other excavations shall be provided with suitable barriers, signs, and lights to the extent that adequate protection is provided to the public.

3.8.10 Do not excavate beneath the level of adjacent foundations, retaining walls, or other structures until a qualified person has determined that the work will not be hazardous. Support undermined sidewalks.

3.9 ELECTRICAL SAFETY

Title 29, Code of Federal Regulations, Section 1926 Subpart K-Electrical
Title 29, Code of Federal Regulations, Section 1910.269 Electrical Power Generation, Transmission and Distribution

3.9.1 Only qualified persons are permitted to work on electrical systems, as defined by *Title 29, Code of Federal Regulations Section 1910.269(a)(2).* Qualified persons shall be trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment;
- The skills and techniques necessary to determine the nominal voltage of exposed live parts;
- The minimum approach distances specified by OSHA corresponding to the voltages to which the qualified employee will be exposed; and

- The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment.

3.9.2 Contractor personnel shall properly ground all electrical tools, mechanical digging or concrete breaking equipment and all other electrical equipment while in use.

3.9.3 All electrical work, installation and wire capacities shall be in accordance with the pertinent provisions of the National Electrical Code, ANSI and OSHA.

3.9.4 Covers or barriers must be installed on boxes, fittings, and enclosures to prevent accidental contact with live parts.

3.9.5 Temporary wiring installations must be grounded.

3.9.6 Electrical systems shall be de-energized utilizing appropriate lockout/tagout procedures prior to conducting work.

3.10 ELEVATED LOCATIONS / FALL PROTECT

Cal/OSHA General Industry Safety Orders, 8 CCR 3210
Title 29, Code of Federal Regulations, Section 1926 Subpart M – Fall Protection

3.10.1 California employers: Guardrails shall be provided on all open sides of unenclosed room openings, open and glazed sides of landings, balconies or porches, platforms, runways, ramps, or working levels more than 30 inches above the floor, ground, or other working areas. The railing must be provided with a toeboard where the platform, runway, or ramp is 6 feet or more above places where employees normally work or pass and the lack of a toeboard could create a hazard from falling tools, material, or equipment.

3.10.2 Contractor must provide fall protection systems whenever a worker is exposed to a fall of four feet or more (in construction the threshold is six feet). Guardrails are the most common forms of fall protection systems. If guardrail systems are not feasible, safety nets, personal fall arrest systems, positioning device systems, warning line systems, or some other demonstrated, effective means of fall protection shall be used. Fall protection systems and devices shall be inspected prior to each use Title 29, Code of Federal Regulations, Section 1926 Subpart M.

3.11 LADDERS

Title 29, Code of Federal Regulations, Section 1910 Subpart D – Walking and Working Surfaces
Title 29, Code of Federal Regulations, Section 1926 Subpart X - Ladders

3.11.1 The use of ladders with broken or missing rungs or steps, broken or split rails or other defective construction is prohibited.

3.11.2 Ladders shall extend no less than 36 inches above landing and be secured to

prevent displacement.

3.11.3 Portable ladders must be equipped with safety shoes.

3.11.4 Wooden ladders shall not be painted.

3.11.5 Do not use metal ladders for electrical work or near live electrical parts.

3.12 SCAFFOLDS

Title 29, Code of Federal Regulations, Section 1910.28 – Safety Requirements for Scaffolding
Title 29, Code of Federal Regulations, Section 1926 Subpart L - Scaffolds

3.12.1 Scaffolds must be provided for all work that cannot be done safely by employees standing on solid construction at least 20 inches wide, except where such work can be safely done from ladders.

3.12.2 Erection and dismantling of scaffolds shall be performed in accordance with good engineering practice.

3.12.3 Footings or anchorage for any scaffold shall be sound, rigid and capable of carrying the maximum intended load without settling or displacement.

3.12.4 No unstable objects such as concrete blocks shall be used to support scaffolds or planks.

3.12.5 Any part of a scaffold weakened or damaged shall be repaired or replaced immediately.

3.12.6 All scaffold planking shall be free of knots and cracks (Class A number) and shall completely cover the work platform.

3.12.7 Scaffold planks shall be laid tight, cleated at both ends or overlapped a minimum of 12 inches and nailed or bolted to prevent movement. Overlaps to occur directly above scaffold supports.

3.12.8 A safe and unobstructed means of access, such as a walkway, stair, or ladder shall be provided to all scaffold platforms.

3.13 HEAVY EQUIPMENT, INDUSTRIAL VEHICLES, AND CRANES

Title 29, Code of Federal Regulations, Section 1926 Subparts N, O and W

3.13.1 Only trained and authorized workers may operate heavy equipment, industrial vehicles, and/or cranes.

3.13.2 The Contractor shall designate a competent person who shall inspect all machinery and equipment prior to each use to make sure it is in safe operating condition.

3.13.3 The Contractor shall comply with the manufacturer's specifications and limitations applicable to the operation of any and all heavy equipment, industrial vehicles, and cranes.

3.13.4 Seatbelts are required to be worn if the vehicle has Roll-Over Protection Structures (ROPS).

3.13.5 The swing radius of cranes shall be barricaded.

3.13.6 Equipment shall not be lubricated while in use.

3.13.7 Rated load capabilities, recommended operating speeds, special hazard warning, specific hand signal diagrams and special instructions shall be visible to the operator while he is at the control station.

3.13.8 Contractor's employees shall not be allowed to work under the load of cranes. Tag lines shall be used on all loads.

3.14 OVERHEAD POWER LINES

Title 29, Code of Federal Regulations, Section 1926.550 (a) (15)

3.14.1 If work is to be performed near overhead power lines, the lines must be de-energized and grounded by the owner or operator of the lines, or other protective measures must be provided before work is started. Protective measures (such as guarding or insulating the lines) must be designed to prevent employees from contacting the lines.

3.14.2 Unqualified employees and mechanical equipment must stay at least 10 feet away from overhead power lines. If the voltage is over 50,000 volts, the clearance should be increased by four inches for each additional 10,000 volts.

3.14.3 When mechanical equipment is being operated near overhead lines, employees standing on the ground may not contact the equipment unless it is located so that the required clearance cannot be violated even at the maximum reach of the equipment.

3.14.4 A person shall be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means.

3.14.5 Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities indicates that it is not energized.

3.15 FIRE PREVENTION / FLAMMABLE LIQUIDS

Title 29, Code of Federal Regulations, Section 1926 Subpart F or 1910 Subpart E

3.15.1 Contractor shall be responsible for fire protection in its work and operational areas,

including offices, tool rooms, and storage areas 24 hours per day, seven days per week through the duration of this Contract. Approved fire-fighting equipment, in adequate quantities, must be provided.

3.15.2 Contractor shall familiarize Contractor's employees with the locations of fire extinguishers in their respective work areas and ensure they are prepared to use them safely if necessary. In certain remote field locations or within abandoned (discontinued) facilities where fire extinguishers may not exist in the immediate work area, contractor shall provide and locate fire extinguisher(s) in close proximity to the active work area(s).

3.15.3 In case of fire, Contractor shall call 9-1-1. Contractor shall also inform all Contractor and Lockheed Martin employees in the area to evacuate to a safe place and direct arriving fire response personnel to the fire. Notify the Lockheed Martin Project Lead as soon as reasonably possible.

3.15.4 Contractor employees shall only attempt to put out a fire when such action can be performed safely.

3.15.5 If a Contractor employee uses a Lockheed Martin fire extinguisher, Contractor shall report its use to the Lockheed Martin Project Lead.

3.15.6 Contractor shall report all fires extinguished by the Contractor to the Lockheed Martin Project Lead.

3.15.7 Contractors are to store, dispense, and use flammable and combustible liquids in accordance with OSHA regulations and the Uniform Fire Code. Bonding and grounding of containers containing flammable liquids will be required.

3.15.8 Open flames and smoking shall not be permitted in flammable or combustible liquid storage areas.

3.15.9 Contractor shall provide sufficient fire extinguishers necessary for their work activities.

3.16 HAND AND POWER TOOLS

Title 29, Code of Federal Regulations, Section 1910 Subpart P – Hand and Portable Powered Tools and Other Hand-Held Equipment
Title 29, Code of Federal Regulations, section 1926 Subpart I – Tools Hand and Power

3.16.1 All hand and power tools, whether furnished by Contractor, or by Contractor’s employee, shall be maintained in a safe condition.

3.16.2 Electrical power tools shall be grounded or double insulated with proper assured equipment grounding inspections or Ground Fault Interrupter (GFI) circuit protection provided.

3.16.3 Pneumatic power tools shall be secured to the hose or whip by some positive means.

3.16.4 Only properly trained Contractor employees shall operate power-actuated tools.

3.16.5 All grinding machines shall conform to OSHA and ANSI requirements.

3.17 COMPRESSED GAS CYLINDERS

Title 29, Code of Federal Regulations, Section 1910.101 – Compressed Gases
Title 29, Code of Federal Regulations, Section 1926.350 – Gas Welding and Cutting

3.17.1 Compressed gas cylinders shall be secured in an upright position at all times.

3.17.2 When transporting, moving and storing cylinders, valve protection caps shall be in place and secured.

3.17.3 Compressed gas cylinders shall be kept away from excessive heat, shall not be stored where they might be damaged or knocked over by passing or falling objects, and shall be stored at least 20 feet away from highly combustible materials.

3.17.4 Cylinders shall be labeled as to the nature of their contents.

3.17.5 Oxygen cylinders in storage shall be separated from fuel gas cylinders or combustible materials a minimum of 20 feet or by a noncombustible barrier at least five feet high having a fire-resistant rating of at least one-half hour.

3.17.6 Acetylene cylinders shall be stored and used in a vertical, valve-end-up position only.

3.17.7 Anti-flashback arrestors shall be installed on all oxygen and acetylene cylinders.

3.18 INCIDENTAL CONTACT WITH ASBESTOS

3.18.1 This section applies to all contractors who incidentally disrupt the matrix of asbestos containing material (ACM) or presumed asbestos containing material (PACM); i.e., contractors who have not been specifically hired to perform ACM abatement.

3.18.2 Contractor shall immediately report to the Lockheed Martin Project Lead and to other employers of employees working at the job site any discovery, disturbance, and/or spill of ACM and/or PACM. Contractor(s) is to cease all operations in the immediate area of the suspect ACM and/or PACM and demarcate the area. The approval of the Lockheed Martin Project Lead is required before resuming operations.

3.18.3 Contractor shall not disturb any pipe insulation, boiler insulation, or any other material reasonably suspected of containing asbestos until the Contractor notifies the Lockheed Martin Project Lead. Lockheed Martin approval is required before operations may commence.

3.18.4 Abatement of asbestos can be performed only by persons properly trained and licensed to perform such activities

3.19 ASBESTOS ABATEMENT CONTRACTORS

3.19.1 This section applies to Contractors performing maintenance, construction, repair, renovation, demolition, salvage, or any other operation in which any material containing more than 1% asbestos is sanded, abrasive blasted, sawed, shoveled, removed, or otherwise handled in a manner that would generate airborne asbestos fibers. These requirements are in addition to any requirements contained in Contractor's scope of work.

3.19.2 All Contractors working with asbestos shall comply with applicable federal and state OSHA, EPA, local air district, and other applicable Federal, State, municipal, and local statutes, regulations, rules, and ordinances; and specific contract terms and conditions regarding the handling of, use of, and work involving asbestos.

3.19.3 The contractor shall ensure that a competent person, as defined by OSHA supervises all asbestos work performed within regulated areas.

3.19.4 Before commencing work, all asbestos abatement contractors shall supply to Lockheed Martin proof of:

- Asbestos abatement contractor certification by the state Contractor's License Board
- Liability insurance for Contractor employees engaged in asbestos work operations
- Copies of asbestos work notification letters to state OSHA
- Local air district Asbestos Demolition/Renovation Notification

3.19.5 Contractors shall minimize the creation and spread of airborne asbestos fibers by using appropriate work practices, engineering controls, and established procedures (i.e., wet methods, HEPA filter vacuums, negative pressure enclosure, local exhaust ventilation equipped with HEPA filter dust collection system, etc.).

3.19.6 All Class I, II and III asbestos work shall be conducted within regulated areas. The regulated area shall be demarcated in any manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne asbestos. Where critical barriers or negative pressure enclosures are used, they may demarcate the regulated area. Signs shall be provided and displayed at each location where a regulated area is required to be established. Signs shall be posted at such a distance from such a location that an employee may read the signs

and take necessary protective steps before entering the area marked by the signs. Warning signs shall bear the following information:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY

3.19.7 On multiple employer worksites requiring the establishment of a regulated area, the asbestos Contractor shall inform other employers on the site of the nature of the work with asbestos and/or PACM, of the existence of and requirements pertaining to regulated areas, and the measures taken to ensure that employees of such other employers are not exposed to asbestos.

3.19.8 Contractors shall package and label asbestos waste in accordance with federal and or applicable state OSHA requirements and federal or applicable state hazardous waste regulations. Labels shall be affixed to all products containing asbestos and to all containers containing such products, including waste containers. Labels shall be printed in large, bold letters on a contrasting background and shall contain the following information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

3.19.9 Contractors shall properly dispose of all asbestos waste. Proper disposal includes the use of hazardous waste manifests and Lockheed Martin approved and licensed waste haulers, and disposal facilities according to federal RCRA law and applicable state hazardous waste regulations. Contractor shall contact the Lockheed Martin Project Lead before transporting or disposing of any hazardous waste. Lockheed Martin must review all hazardous waste manifests prior to shipment.

3.19.10 Contractors shall ensure that employee exposure air monitoring is conducted as required by federal or applicable state OSHA regulations. All other air monitoring (i.e. clearance sampling) shall be conducted by a third-party contracted air monitoring firm not affiliated with the Contractor.

3.19.11 Contractor shall, at no cost to the employee, institute a training program for and ensure the participation of all employees engaged in asbestos-related work who may reasonably be expected to be exposed to asbestos fibers from asbestos containing construction materials.

3.19.12 Contractor shall institute a medical surveillance program for all employees who are or will be exposed to airborne concentrations of fibers of asbestos at or above the TWA and/or excursion limit.

3.20 HAZARDOUS WASTE OPERATIONS and EMERGENCY RESPONSE (HAZWOPER)

Title 29, Code of Federal Regulations, Section 1910.120 - Hazardous Waste Operations and Emergency Response

Title 29, Code of Federal Regulations, Section 1926.65 – Hazardous Waste Operations and Emergency Response

This section applies to Contractors performing hazardous waste-type activities. This includes operations that pose a potential or reasonable possibility for employee exposure to hazardous waste/chemical contaminants during site investigations, clean-up operations, abatement, or hazardous substance removal work (remedial actions). These requirements are in addition to any requirements contained in Contractor's scope of work.

3.20.1 Contractor shall provide a **site-specific safety and health plan** at least two (2) weeks prior to field mobilization to the Lockheed Martin Project Lead (global statement – move to the beginning).

Contractor shall provide a **safety and health plan** in accordance with *Title 29, Code of Federal Regulations, Section 1910.120 - Hazardous Waste Operations and Emergency Response* or the applicable state OSHA standard and, at a minimum, shall contain the following elements:

- Safety and health risk or hazard analysis for each anticipated site task
- Employee training requirements
- Personal protective equipment to be used by employees for each of the site tasks and operations
- Medical surveillance requirements
- Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment to be used
- Site control measures
- Decontamination requirements and procedures
- Emergency response plan
- Confined space procedures (if applicable)
- Emergency response plan
- Confined space procedures (if applicable)
- Spill containment program
- Periodic documented safety meetings
- Periodic documented work area safety inspections and corrective actions

3.20.2 Contractors performing hazardous waste-type operations shall adhere to the requirements specified in *29 CFR 1910.120 - Hazardous Waste Operations and Emergency Response* or the applicable state OSHA standard.

3.20.3 Training: All Contractor and subcontractor employees working on site who are potentially exposed to hazardous substances shall receive initial and annual

refresher training in accordance with *29 CFR 1910.120(e) – Hazardous Waste Operations and Emergency Response* or the applicable state OSHA standard. Lockheed Martin shall be provided with electronic copies of the training certificates.

3.20.4 Medical Surveillance: Contractor employees must be enrolled in a medical surveillance program prior to performing hazardous waste operations. Upon Lockheed Martin request, Contractor shall provide evidence of employee enrollment in a medical surveillance program. Lockheed Martin does not provide medical surveillance examinations to Contractor employees.

3.20.5 Periodic work area inspections: Contractor agrees to perform periodic work area inspections to determine the effectiveness of the site safety and health plan and to identify and correct unsafe conditions in contractor's responsible work area. These inspections shall be documented and available to Lockheed Martin upon request for review.

3.21 MANAGEMENT OF NANOTECHNOLOGY

3.21.1 The Lockheed Martin Project Lead shall work with the designated contractor responsible for nanotechnology to implement this procedure and ensure areas where nanomaterials (materials incorporating engineered nanoparticles or nanoscale features that exhibit unique physical and chemical properties as a result of the nanoparticles or nanoscale features) will be used meet engineering control requirements of this procedure.

3.21.2 The contractor shall ensure that the safety and environmental hazards of nanomaterials are managed as described in the requirements of this section.

3.21.3 A plan must be developed and executed that addresses the following requirements:

3.21.3.1 **Hazard Analysis:** Identify potential adverse health effects and environmental impacts that could result from the chemical and physical properties exhibited by the nanomaterials and/or nanoparticles in use, to be used, under development, or to be developed at the site.

3.21.3.2 **Exposure Assessment**: Evaluate all tasks involving nanomaterials and identify where exposures could occur. The evaluation must include at a minimum, an evaluation of materials; chemical intermediates; by-products; end-products; waste products; processes; process equipment; the amount of material used; material form; degree of containment; duration of use; and work space including laboratory and manufacturing space.

3.21.3.3 **Exposure Control**

- Implement appropriate controls to mitigate worker exposure and environmental emissions identified in sections 3.21.2.1 and 3.21.2.2 of this procedure.

- Implement Control Bands as indicated on the Control Band Matrix below.

Exposure Duration	Bound Materials	Potential Release	Free / Unbound
Hazard Group A (Known to be inert)			
Short	1	1	2
Medium	1	1	2
Long	1	2	2
Hazard Group B (Understand reactivity/function)			
Short	1	2	2
Medium	1	2	3
Long	1	3	3
Hazard Group C (Unknown Properties)			
Short	2	2	3
Medium	2	3	4
Long	2	4	4

Duration Key:
Short - Less than 4 hrs/day; 2 days/week
Medium - Between 4 to 6 hrs/day; 3 to 5 days/week
Long - 6 to > 8 hrs/day; 3 to 5 days/week

Release Key:
Bound Materials: Nanoparticles in a solid matix e.g. polycarbonate
Potential Release: Nanoparticles in friable or solgel matrix
Free / Unbound: Nanoparticles unbound, not aggregated

Control Band:
1. General Ventilation and PPE
2. Engineering Controls and/or Respirators and additional PPE
3. Containment e.g. glove box
4. Specialist Advise

- Establish designated areas for Control Banding. The designated area shall, at a minimum, include warning signs informing employees that they are entering a nanomaterial work area as well as signs specifying administrative controls and personal protective equipment (PPE) required for entry.
- Identify appropriate administrative controls (e.g. good housekeeping methods, HEPA vacuums, wet wipe methods, employee training, safe work practices), engineering controls (e.g. containment, exhaust ventilation) and Personal Protective Equipment (e.g. respiratory protection, protective coveralls, gloves, goggles) based on Control Band and best industry practices.
- Develop and execute procedures for housekeeping, including clean-as-you-go practices that do not re-suspend particles.
- Develop and execute procedures for management of nanomaterial-associated waste.

4 ENVIRONMENTAL

Contractors shall comply with all applicable provisions of Federal, State, municipal, local, and other environmental statutes, rules, and regulations. Contractor shall take all necessary precautions to protect the environment. Contractor shall also store, transport, dispose, or otherwise handle hazardous wastes and non-hazardous wastes to prevent discharges of materials into the environment except in accordance with applicable governmental regulations.

4.1 HAZARDOUS WASTE DISPOSAL

4.1.1 Contractor shall develop a Waste Management Plan in accordance with the requirements outlined in the LMC Remediation Waste Management Procedure in Appendix B. Lockheed Martin shall approve the Waste Management Plan prior to work commencement.

4.1.2 Contractor must segregate hazardous from non-hazardous waste; all hazardous waste generated by its operations must be labeled in accordance with all governmental regulations.

4.1.3 Contractor shall dispose of all hazardous waste within the time frame stipulated by local, state, or federal regulations. Contractor shall not leave behind on Lockheed Martin remediation sites any containers of hazardous materials or waste (including drums, roll-offs, maintenance chemicals, etc.), empty or not, after the termination of operations.

4.1.4 In case of a spill or release of hazardous materials or waste, Contractor shall immediately notify the Lockheed Martin Project Lead and if the severity of the spill warrants, notify the local fire department (Call 9-1-1). The Contractor shall be liable for the costs of any spill resulting from Contractor's actions, including, but not limited to, costs of containment, cleanup, and disposal.

4.2 NON-HAZARDOUS WASTE DISPOSAL

4.2.1 Contractor shall develop a Waste Management Plan in accordance with the requirements outlined in the LMC Remediation Waste Management Procedure in Appendix B. This plan must be approved by the Lockheed Martin Project Lead.

4.3 WORK INVOLVING AIR EMISSIONS

4.3.1 Contractor shall work with the Lockheed Martin Project Lead to identify applicable Federal, state, and/or local permit application requirements for air emission sources (i.e., stationary point source, fugitive emissions, etc.) associated with the anticipated project.

4.3.2 Contractor shall submit permit applications and/or notifications to the Lockheed Martin Project Lead for review prior to submittal to the applicable regulatory agency.

4.3.3 Contractor shall abide by the requirements of the permit(s) and gather emissions data (as applicable) to document compliance. This data shall be electronically submitted to the Lockheed Martin Project Lead.

4.3.4 Contractor shall immediately contact the Lockheed Martin Project Lead in the event permit conditions are not met.

4.3.5 Ensure permits are posted on permitted equipment (or in close proximity) as required by the respective permit.

4.4 WORK INVOLVING WATER DISCHARGES

4.4.1 At no time is an unauthorized, unpermitted release allowed. Contractor shall notify the Lockheed Martin Project Lead in the event of a release and obtain the approval of Lockheed Martin before discharging any material into storm drains or sewers.

4.4.2 Contractor shall work with the Lockheed Martin Project Lead to identify applicable National Pollutant Discharge Elimination System (NPDES), Stormwater Pollution Prevention Plans (SWPPP), and POTW requirements associated with the anticipated project.

4.4.3 Contractor shall submit permit applications and/or Notice of Intent forms to the Lockheed Martin Project Lead for review prior to submittal to the applicable regulatory agency.

4.4.4 Contractor shall abide by the requirements of the discharge permit(s) and maintain discharge monitoring information and inspection data to document compliance. This documentation shall be electronically provided to the Lockheed Martin Project Lead.

4.4.5 Contractor shall immediately contact the Lockheed Martin Project Lead in the event permit conditions are not met.

4.4.6 Ensure discharge permits and/or SWPPP plans (as applicable) are available at the project job site.

5 HOUSEKEEPING / CLEANUP

5.1 Contractor shall continuously clean up its respective work area(s). Contractor shall maintain its work areas free from all slip, trip, and fall hazards at all times.

5.2 Debris shall be kept cleared from work areas, passageways, stairs, and in and around buildings or other structures. The work area must be left free from accumulation of waste and rubbish at the end of each work shift.

5.3 Combustible scrap and debris shall be removed at regular intervals during the course of work performed by Contractor. Safe means shall be provided to facilitate such removal.

5.4 At the end of each working day and/or the conclusion of work being performed, Contractor shall restore the work area to the same degree of neatness as when work commenced.

5.5 Contractor shall furnish necessary equipment and/or receptacles to remove waste and rubbish from the job site unless otherwise specified by the Lockheed Martin.

5.6 A 6S (Sort, Straighten, Shine, Standardize, Safety and Sustain) or similar program shall be implemented at each site where work is being performed. Refer to Appendix C for the 6S Checklist.

6 CHANGE MANAGEMENT

If deviations are encountered from the field work plan, the contractor shall A) notify to the Lockheed Martin Project Lead and B) suspend work to assess changes to the work plan(s) and the HASP. Changes to the work plan(s) and the HASP shall be reviewed by the PL.

7 REQUIREMENT TO PERFORM & DOCUMENT SELF-AUDITS

7.1 Contractor agrees to perform periodic work area/project field inspections to monitor compliance with project environmental, safety and health (ESH) requirements. The name of Contractor's jobsite ESH representative will be provided to Lockheed Martin prior to the Contractor starting work at the jobsite.

7.2 For jobs that are ongoing, an annual ESH audit shall be conducted and for jobs with a duration of less than one year at least one audit shall occur. A competent ESH representative designated by the Contractor shall perform the audit. Unsafe acts and/or non-compliance conditions noted during inspections shall be corrected immediately.

7.3 The documentation related to the audits and inspections shall be submitted electronically to the Lockheed Martin Project Lead.

8 ACCIDENT, INJURY, ILLNESS, INCIDENT and SPILL REPORTING

8.1 Contractor shall immediately contact the Lockheed Martin Project Lead and/or Lockheed Martin Safety & Health Manager in the event of a fatality, injury, environmental release (spill), near-miss incident, or any ESH incident that is likely to generate significant publicity. A written report of the incident/injury/spill/near miss and corrective action(s) taken shall be submitted to the Lockheed Martin Project Lead within one (1) day of the incident. Representatives from Lockheed Martin may conduct joint investigations with the contractor if deemed necessary.

8.2 In case of a spill or release of hazardous chemicals, Contractor shall immediately notify the Lockheed Martin Project Lead, and/or if the severity of the spill warrants, the local fire department by calling 9-1-1. Contractor shall take all necessary steps to control the spread of the release and to provide site control to prevent unauthorized personnel from entering the affected area. The Contractor shall be liable for the costs of any spill resulting from Contractor's actions, including, but not limited to, costs of containment, cleanup, and disposal.

9 FINES, PENALTIES AND COSTS

9.1 Contractor shall indemnify and hold Lockheed Martin harmless from any and all liability (including but not limited to fines and penalties), loss, cost, damage, or expense (including attorney's fees) suffered or incurred by Lockheed Martin by reason of Contractor's failure to comply with Federal, State, municipal, local or other laws, rules, regulations, ordinances and requirements, or failure to comply with generally accepted environmental safety and health practices.

10 LOCKHEED MARTIN ESH MANAGER

10.1 The Lockheed Martin ESH Manager is Jimmy Yeager. Contact Jimmy regarding any questions or concerns at (301) 873-1444 or via email at james.l.yeager@lmco.com.

Appendix A – LMC Requirements for Invasive Fieldwork



LMC Minimum Requirements for Inv

Appendix B – LMC Waste Management Procedure



LMC Waste Mgmt Procedure Rev 4

Appendix C – LMC 6S Checklist



6S Checklist Contractor Handbook

Appendix D – LMC ORR Process Documents



ORR Agenda .docx



ORR Checklist Hanbook.xlsx

LOCKHEED MARTIN

CONTRACTOR'S ESH HANDBOOK

COMPLIANCE AGREEMENT

The Key National Contractor Program Manager has read and understands the contents of the *Contractor's ESH Handbook*. Contractor agrees while performing work on Lockheed Martin-owned or Lockheed Martin-controlled premises, that the Contractor shall require its employees and subcontractors at any tier to comply with the contents of this *Contractor's ESH Handbook* and the job specific HASP. A copy of the HASP shall be maintained at the job site and made readily available to contractor and subcontractor employees for their information. All contractor employees and subcontractors shall read and certify that they have read and understand the job specific health and safety plan (HASP). The certification forms shall be electronically sent to the Lockheed Martin Project Lead.

I further understand that this handbook and the rules and regulations it contains do not in any way relieve the Contractor (employer) of its responsibility to comply with the applicable environmental safety and health (ESH) regulations and its obligation to implement and enforce its own written ESH programs while working on this project.

Company: _____

Name: _____

Signature: _____

Title: _____

Date: _____

COMPLETE, SIGN AND RETURN THIS CERTIFICATE TO THE LOCKHEED MARTIN ESH MANAGER.

Appendix A

Lockheed Martin Minimum Requirements for Intrusive Fieldwork

Lockheed Martin Minimum Requirements for Intrusive Fieldwork Work Plans

PURPOSE

The purpose of this requirements document is to prevent damage to subsurface and overhead utilities and structures and unexpected chemical releases during ground disturbance activities such as drilling, augering, direct-push technologies, excavation, trenching, chemical injection, grading or other similar operations.

SCOPE

This document provides minimum requirements for subsurface clearance activities, which must be followed prior to and during ground disturbance activities at any Lockheed Martin remediation project sites. Even after completing the subsurface clearance activities identified in this procedure, all ground disturbance activities shall proceed with caution.

This document also provides requirements on implementing in situ chemical injection programs, on managing significant field changes in field work plans and worksite housekeeping.

The Lockheed Martin Project Lead (PL), the managing contractor, and the performing contractor will be responsible for fulfilling the objectives of this document by ensuring that these requirements are carried out by the performing contractor's employees, sub-contractors and their employees and any other persons involved in the intrusive activity. The work requirements outlined below shall be incorporated into the work plan.

WORK REQUIREMENTS

General

The performing contractor's project manager and the supervisor of the intrusive field work subcontractor must review and sign the Risk Handling Checklist and complete Dig Permit found within the Corporate Staff Procedure EO-28, Digging Projects. Requirements and questions within the Risk Handling Checklist including identification of potential failure modes and hazards, traffic control, and excavation requirements shall be addressed in the work plan. In addition to the provisions of CS-28, relevant state, local and facility requirements must be identified in the work plan and in place before initiating any work. CS-28, the Risk Handling Checklist and the Dig Permit are included in Appendix A of this document.

The permit and the checklist shall be completed and approved by the PL before initiating any ground disturbance activities. The PL shall forward these items to the Environment, Safety and Health (ESH) professional, the performing contractor responsible for oversight, and the facility manager, as necessary, for their review.

Utility and Underground Structure Clearance

A utility and underground structure location survey which includes, but is not limited to records research, consultation with site facilities personnel, site inspection to locate physical evidence of underground or overhead utilities or structures and geophysical or other appropriate remote sensing techniques must be performed by a qualified utility location firm at least two weeks prior to initiating any intrusive activities. The survey shall include the appropriate equipment necessary to detect buried foundations and slabs, piping, direct-bury cables and other buried conduits and structures using the technologies appropriate to the anticipated utilities such as electromagnetic detector; ground penetrating radar; acoustic plastic pipe locator; probe, beacon, or trace wire; or cesium magnetometer. A table summarizing applicability of technologies for detecting various utilities is presented in Appendix B.

Because undocumented or inactive utilities can result in problems as severe as or more severe than documented utilities, utility location work must include, at minimum, ground penetrating radar as a screening tool to identify objects that may not be documented on utility record plans and other records.

The utility location/survey firm operators shall have at least 2 years of experience on industrial sites and preferably direct experience on the site under review. The utility survey firm shall be approved by the Lockheed Martin PL.

In addition to the utility survey, the state or other legally-mandated utility clearing organization ("Dig Safe," "U-Dig" or other such organization) having jurisdiction over the region in which the work is to occur, shall be notified within the time period required by that organization, state and local regulations. Even if all of the work is conducted entirely on Lockheed Martin or other private property, the utility clearing organization shall be contacted.

All aboveground indicators of subsurface and overhead utilities/services that may be leading to or from buildings and structures within the planned intrusive work area must be located and marked out in the field. Locations of utilities and structures detected by remote sensing equipment shall also be marked out in the field. Public utility mark-outs by for all exterior locations must be identified within required time period. Physical evidence of underground or overhead utilities may include, but is not limited to lights, signs, telephone systems, drains, electrical junction boxes, manhole covers, valve boxes, hand holes, pavement patching or other evidence of prior excavations, and natural gas meters.

The contractor shall make all efforts to avoid known or observed utilities in planning the work. If, however, subsurface structures are known or observed by geophysical survey within five feet of the work area and the work area cannot be moved, the performing contractor and/or its subcontractor shall carefully excavate to within two vertical feet of the expected top of the utility, then hand dig, air lance or otherwise gently remove the remaining soil to expose the utility. Additional precautions shall be described in the work plan if the intrusive work is to be performed in frozen soils.

The performing contractor must witness the utility clearance work to verify that the expected scope is performed and be available to work with the utility location contractor to answer questions and facilitate additional research or discussions with site facilities personnel.

The utility clearance contractor's report must include details concerning the methods used to locate utilities and documentation of how specific utilities were located in plan and depth, including a copy of instrument output when instruments producing output are used. It is not sufficient for the report to merely state that the utilities on the site plan were verified or that no utilities were found without providing supporting documentation.

Pre-Planning for Soil Fracturing and In Situ Injection Work

If subsurface disturbance activities such as soil fracturing or geophysical techniques that significantly alter the natural soil conditions are to be employed, the utility location survey shall be conducted at least one month prior to any chemical injection. Attention must be given not only to the locations of utilities and underground structures but also to the fact that utilities, structures and earth bedding can provide short-circuit pathways for the injected substance to travel significant distance to be intercepted by other utilities (sewers and drains), to be accumulated in undesirable locations (manholes or handholes) or to be discharged to surface waters.

Additionally, an aquifer assessment should be conducted to determine the nature of the aquifer receiving the chemical injections before and after any subsurface disturbance is conducted. Calculations and chemical injection volumes shall be determined as to what volume of chemical would be expected to fill the opened up pore space. An evaluation must be made of the quality and quantity of the data and assumptions that form the basis for design. Examples of typical data requirements that form the basis for design include aquifer

transmissivity, soil type, effective porosity, contaminated thickness, presence of confining layers, potentiometric surface configuration, and ambient groundwater flow velocity.

Upon completion of soil fracturing, the field data collected shall be thoroughly reviewed and assessed relative to the types and sizes of the resultant fractures and potential connection of fractures to short circuit migration pathways. Injection can proceed only after this review is completed and appropriate monitoring and contingency measures are in place to detect and prevent unwanted migration of injected medium.

A technical expert in the injection technique shall be employed and fully integrated in the project team. The PL will have responsibility for engaging the technical expert. This expert will be part of the managing contractor staff and shall have responsibilities including reviewing and approving the technical and functional requirements, the design, the work plan, and the injection procedures. This expert will engage with the PL to ensure that all potential failure modes and effects have been identified and mitigation strategies employed as necessary. The failure modes and mitigation strategies shall be documented and submitted to the PL for records retention.

Field Implementation Activities

All field personnel must review the approved work plan, subsurface utility location survey data, and related information prior to becoming involved in subsurface disturbance/intrusive activities. The field personnel must sign the authorization form in Appendix C indicating their review. This form shall be scanned and electronically submitted to the PL once all personnel have signed the form.

Change Management

Significant changes made during the field implementation should be avoided as much as possible. If such changes are required to the field work plan, the program should be temporarily suspended as long as is necessary so that effectiveness and unintended consequences can be thoroughly evaluated by the project manager, PL and performing contractors (including specialty subcontractors) and the necessary equipment and procedural changes can be developed, communicated, approved and implemented. The PL should be contacted immediately and the performing contractor overseeing the work shall be included in any decisions to modify the approved work plan.

In Situ Injection Implementation

If soil fracturing is required before chemical injection, injection can proceed only after review of the fracture patterns is completed, as stipulated in the "Pre-Planning" section and appropriate monitoring and contingency measures are in place to detect and prevent unwanted migration of injected medium. The contingency measure shall be outlined in the work plan. If monitoring shows that the injected compound is detected in unwanted locations (such as a storm drain or sewer), injection shall be halted and measures taken to prevent further unwanted migration.

The chemical injection method should be thoroughly defined in the work plan and followed during the field implementation program. If chemical daylighting (surface leaks from subsurface injections) or seeps are observed the injection should be immediately stopped. The surface leaks should then be properly contained to prevent runoff and allowed, if feasible, to percolate back into the subsurface. As a result of this condition, subsequent injection rates should be reduced by at least 20% or until chemical daylighting is no longer observed.

In most cases, low pressure methods should be employed whereby gravity or low flow recirculation systems are established to let the chemical slowly percolate into the subsurface. In no case should the injection pressures at or near the surface be greater than the available water table elevation distance to the ground surface unless approved by the PL or the PL's designated representative. Water table elevation changes as a result of chemical injections must be monitored and kept to a minimum as much as practicable.

Spill Prevention, Containment, Cleanup and Reporting

Chemicals stored onsite, including oil and fuels, reagents, injection medium, shall be placed in vessels within 110% volume secondary containment. Good housekeeping procedures must be practiced. Even benign reagents are contaminants if they migrate to a sensitive receptor. In no case should incidental spills or transfer leaks be tolerated on the site. All spills must be contained, cleaned and reported immediately to the site's spill response coordinator and the Lockheed Martin PL. Local storm drains should be temporarily plugged or booms or berms be placed to divert storm water flow from the storage area away from active storm drains.

DEVIATIONS

All deviations from this procedure must have prior approval by the Director of Environmental Remediation. The approval shall be documented and uploaded to the Lockheed Martin Document Management System.

APPENDIX A


EO-28


Dig Permit


Risk Handling Checklist

APPENDIX B


Utility / Underground Structure Clearance T

APPENDIX C


Invasive Fieldwork Authorization

Appendix A

Enterprise Operations Procedure EO-28

Dig Permit - Form EO-28-01

Risk Handling Checklist – Form EO-28-2

Enterprise Operations Procedure EO-28
Revision No: Original
Effective: January 26, 2009
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Current policies and procedures are on the Lockheed Martin Intranet

Digging Projects

Form EO-28-1, Dig Permit | Form EO-28-2, Risk Handling Checklist

1.0 Applicability

This procedure applies to digging projects at facilities operated by Corporate Headquarters or Enterprise Business Services (collectively, "Enterprise Operations"). A "digging project" or "dig" is any subsurface excavation, including trenching. Small areas of hand excavation (less than four inches deep), where the excavated material is put back in the same location, are not considered digs and are excluded from this procedure.

2.0 Purpose

To prevent facility damage, minimize disruptions to operations, provide for the proper handling of environmental issues, and ensure that digs are properly coordinated and safely performed.

3.0 Implementation

3.1 The Project Manager (the Lockheed Martin employee responsible for the dig) will complete the activities below before the dig begins:

- Coordinate with Enterprise Operations Environment, Safety & Health (ESH), who will review the project plans for environmental risk and develop handling plans as required, obtain any environmental permits required by law or regulation, and determine the method of soil disposal when part of the project.
- Have the local utility identification service and Lockheed Martin organizations such as Telecommunications identify and mark underground utilities/obstacles within 10 feet of the dig area.
- Prepare and sign form EO-28-1, Dig Permit. Obtain signatures from the Building/Facility Manager, local internal customers, Telecommunications, and ESH.
- Review and sign form EO-28-2, Risk Handling Checklist.
- Meet with the contractor or Lockheed Martin organization that will perform the dig to communicate the location of underground utilities/obstacles; ensure that appropriate safety precautions such as those in EO-20, Contractor Requirements, have been taken; and identify any state or local requirements, customer direction such as launch lock-down periods, or other conditions that will affect the dig.
- Inform Industrial Security of the dig and support requirements such as traffic control.
- Put barricades around the excavation site to prevent unauthorized persons from approaching. Put warning lights around the site if the excavation will remain uncovered at night, unless the dig location does not warrant warning lights.

3.2 Lockheed Martin employees must not dig or enter any excavation that is more than four feet deep.

3.3 As applicable, ESH will monitor the dig for environmental compliance, and oversee the implementation of risk handling plans, and disposal of soil.

3.4 When the dig is complete, the Project Manager will inform the individuals who signed the Dig Permit.

4.0 Responsibilities

Building/Facility Manager

4.1 Have overall approval authority and responsibility for dig projects.

Project Manager

4.2 Ensure that the dig complies with this procedure.

4.3 Retain the Dig Permit and Risk Handling Checklist until the project is complete. Any other permits related to the dig must be retained in accordance with RM-001, Corporate Records Retention Schedule.

Contractors

4.4 Are responsible for ensuring that their work complies with OSHA regulations.

5.0 Deviation

Any deviation from this procedure requires the prior approval of the Vice President Human Resources Enterprise Operations or designee.

//s// Kimberly S. Adams
Vice President Human Resources Enterprise Operations

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Dig Permit

See Enterprise Operations Procedure EO-28, Digging Projects, for instructions.

Date	Project Manager
Building/Location	
Purpose of excavation	
Company/LM organization performing dig	

Planned dig date	Duration	Start time
Expected depth	Width	Length

Underground utilities identified?	Overhead utilities?	Electrical lines?	Gas lines?
☐ Yes ☐ No	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	☐ Yes ☐ No
Sewer?	Water?	Telecommunications?	Other? Specify:
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Site-specific or customer utility locating requirements completed?

☐ Yes ☐ No ☐ N/A

Sketch of dig project (or attach drawing)

Project Manager	Date	Customer	Date
Telecommunications	Date	Customer	Date
ESH	Date	Customer	Date
Building/Facility Manager			Date

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Risk Handling Checklist

Project Manager: Use this checklist to develop risk handling plans before the dig starts. You must also review Enterprise Operations Procedure EO-28, Digging Projects.

General Questions	☐ What Lockheed Martin processes could be affected by the dig?
	☐ What are the safety hazards?
	☐ What could fail?
	☐ How could it fail?
	☐ Does the area need to be returned to its normal state when the work is complete?
	☐ How could the dig affect operations/test/production?
	☐ Have potential risks been addressed with area management?
	☐ Am I comfortable with any risk handling plans, understanding the potential impact?
Traffic Control	☐ Ensure proper signage and communication.
	☐ Coordinate road or access closures through Industrial Security before starting the dig.
	☐ Ensure the work area is isolated from foot traffic by placing barriers and warning lights as required by EO-28.
	☐ Ensure that vehicle traffic will be safe.
	☐ Ensure that product transport will be safe.
Excavation	☐ Review facility drawings to identify utilities. Research old drawings as necessary.
	☐ Discuss the project with Facility Engineering/Maintenance staff who may have unique knowledge about the construction area not documented in facility drawings.
	☐ Process form EO-28-1, Dig Permit. Use this opportunity to explain the process and relate expectations to the contractor/LM organization that will perform the dig.
	☐ Have LM Telecommunications and the local utility identification service locate and mark utilities/underground obstacles.
	☐ Coordinate with other ongoing projects in the affected area.
	☐ Make every effort not to excavate around live utilities in service. Schedule an outage in advance or have Maintenance temporarily shut down and isolate the utilities while excavating.
	☐ If live utilities cannot be shut down while excavating, know where to isolate or shut them down if they are damaged while excavating.
	☐ Have a spotter(s) work with the equipment operator. Hand dig when necessary.
	☐ Excavate along the side of the utility; not on top.
	☐ Weather may affect the dig. Ensure water pipes are protected during freezing weather, especially if the trench will be left open over night. Rain may cause the side of the trench to slough, which can undermine and break pipes/conduit.
	☐ Ensure care when moving trench boxes in and out of trenches so pipes/conduit aren't damaged by the boxes.
	☐ Ensure surface drainage is controlled so that water doesn't get into the excavation and undermine soil supporting utilities.
	☐ Ensure stocked material is kept far enough back (minimum 2 feet) so that material and rocks don't fall on utilities in the open hole.
	☐ Ensure backfilling is done carefully: Re-bed utilities with proper material, filling all voids below. Keep inappropriate material from falling on or being placed in the trench. Be careful when compacting backfill in the two feet directly above the utility.
	☐ Keep the as-built utility drawing in the field while the excavation site is open. Take pictures if possible (horizontal alignment and elevations), if known utilities deviate from facility drawings or if utilities are found that are not on facility drawings. Give the modified as-built drawings to the Building/Facility Manager, who will update the drawing database.
	☐ Ensure that the equipment operator digs slowly and remains in control.
Personal Safety	☐ Ensure that trenching and shoring methods comply with the applicable OSHA regulations and are overseen by a "Competent Person," as defined in those regulations.
	☐ Regularly inspect methods to prevent violations.
	☐ Ensure LM employees do not dig or enter any excavation that is more than four feet deep.

Project Manager signature indicating completion of checklist review	Date

Appendix B

Utility/Underground Structure Clearance Chart

NOTE: Each project may have unique conditions, therefore do not use this chart as the sole decision criteria for technology selection. Use the chart as a starting point to assess available technology(s) applicable.

KEY	Description
Green	Generally and applicable technology
Yellow	May or may not be applicable
Red	Not generally applicable
*	Indicates best technology for given object. Site structures, rebar in concrete, etc. can significantly affect performance and reliability of any electromagnetic method.
□	Metallic lines that have power running through them or can be connected to a tracer signal generator.
♦	Natural gas pipeline locating technicians must be trained/certified. US requires DOT, Office of Pipeline Safety Standards.
∇	Most sensitive to interpretation; the skill, training, and experience of the operator are critical.
≡	Emerging technology with limited availability.
+	Access: induce unique electronic signature, apply acoustical impulse, or insert probe/beacon/sonde.

Subsurface Mark-out Technology Application Chart

Technology → / Object ↓	Electro-Magnetic Detector	Ground Pentrating Radar (GPR) ∇	Acoustic Plastic Pile Locator	Probe, Beacon Sonde, or Trace Wire	Cesium Magnetometer ≡
Power/Instrument Line (Energized/Signaled □)	* G	Y	R	R	Y
Power Line (Non-energized)	Y	* Y	R	R	Y
Sewer/Water Line (Metalllic)	* G	> 12" diameter G < 12" diameter Y	Y	G	Y
Sewer/Water Line (Non-metallic)	R	> 12" diameter G < 12" diameter Y	G	* G	Y
Instrument/Telecomm Lines (non-energized)	R	R	R	R	R
Natural Gas Line (Pipeline) ♦	* G	> 12" diameter G < 12" diameter Y	R	R	G
Metallic/Non-metallic Line (w/ Tracer Wire)	* G	> 12" diameter G < 12" diameter Y	Y	Y	Y
Metallic/Non-metallic Line (w/o Tracer Wire)	R	> 12" * diameter G < 12" * diameter Y	Y	Y	R
Metal UST	* G	* G	R	R	G
Fiberglass UST	R	* G	R	R	Y

Additional Considerations

Technology → / Variable ↓	Electro-Magnetic Detector	Ground Pentrating Radar (GPR) ∇	Acoustic Plastic Pile Locator	Probe, Beacon Sonde, or Trace Wire	Cesium Magnetometer ≡
Moist Soil	G	Y	G	G	Y
Dry Soil	Y	G	Y	G	G
Clay	Y	R	G	G	Y
Concrete w/Rebar	R	Y	G	G	R
Long Horizontal Profile	G	G	G	G	G
Short Horizontal but Deep Vertical Profile	Y	G	R	R	G
Access to Line +	G	N/A	G	G	N/A
No Access to Line +	Y	G	R	R	G
Ferrous Metal	G	G	G	G	G
Non-Ferrous Metal	Y	G	G	G	Y

Appendix C

Lockheed Martin Invasive Fieldwork Authorization Form

Lockheed Martin Invasive Fieldwork

Project: _____
Fieldwork Description:
_____

By signing this form, you are indicting that you have reviewed the field work plan, utility location survey data, and Health and Safety Plan relevant to the project listed above.

Name:	Date:
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____
8. _____	_____
9. _____	_____
10. _____	_____
11. _____	_____
12. _____	_____
13. _____	_____
14. _____	_____
15. _____	_____
16. _____	_____

This form shall be scanned and electronically submitted to the Lockheed Martin Project Lead.

Appendix B

EESH Remediation Operating Procedure No:

EROP-03, (also included in the Middle River Complex Waste Management Plan in Appendix F)

Subject: EESH Remediation Waste Management

Ref:
1. Code of Federal Regulations, Title 40, Parts 260, 261, 262, 264, 265, 268, 761, and 763
2. Code Federal Regulations, Title 49, Parts 100 through 180
3. Corporate Functional Procedure No: ESH-06
4. Corporate Functional Procedure No: ESH-08
4. Corporate Policy Statement 527

1.0 Purpose

This procedure establishes practices for management and transportation of solid and hazardous waste (waste in this context also refers to DOT hazardous materials) generated at remediation project sites in a manner that complies with Subtitle C of the. Resource Conservation and Recovery Act (RCRA), Department of Transportation (DOT) regulations, and similar state and/or host country waste regulations. Additionally, this procedure ensures waste disposal is managed in accordance with Corporate Functional Procedure ESH-06 and ESH-08, and records retained in accordance with Corporate Policy Statement 527.

2.0 Applicability

This procedure applies to the Energy, Environment, Safety and Health (EESH) Remediation Organization (the Organization) and to the remediation projects for which the Organization has waste management responsibility. Each member of the Organization, including IWTA, contractor staff and, where applicable, support organizations (e.g. Global Supply Chain Management), is responsible for execution of this procedure.

The materials to which this practice applies are solid wastes generated as a result of remediation project activities, including such things as investigation derived waste, environmental sampling, treatment of contaminated media, and routine operations and maintenance, unless such solid waste is exempt under applicable regulations.

3.0 Key National Agreement

Waste management requirements shall be included within the EESH Key National Agreements (KNA). The KNA establishes the requirements under which Remediation Contractors perform work for Lockheed Martin.

The KNA will stipulate that the Remediation Contractor shall comply with Lockheed Martin waste management, transportation, and disposal requirements and all applicable state, federal, and/or host country laws and regulations.

4.0 Statement of Work Requirements

4.1 Waste Management Plan

All remediation project statements of work that include the generation of solid waste, excluding office trash (e.g. food wastes, consumer packaging) that may be disposed of at a municipal solid waste facility, shall include a requirement for the waste management contractors (i.e. Remediation Contractors and/or Corporate Approved Waste Management Vendors) to submit a waste management plan to Lockheed Martin. A site specific waste management plan shall be prepared that identifies all potential solid waste streams that may reasonably be expected to be generated or discovered during project activities. The plan will address the required elements listed below; however, if the waste is determined to be non-hazardous following completion of Element A, then only the additions of Elements D and E are required.

Element A) Hazardous Waste Determination

i) Listing assessment (See Attachment #1 – Waste Listing Assessment Form)
ii) Characteristic determination

Hazardous waste determinations shall be made in accordance with 40 CFR 262.11 using a combination of process knowledge and/or analytical evaluation of waste sampling. Hazardous waste determinations shall be reevaluated whenever any of the following circumstances occur:

- A change in the process that produces the waste (e.g. a new chemical constituent is discovered, the treatment process changes);
- A change in the treatment media is made (e.g. new media vendor or media type);
- A waste was tainted by inadvertent mixing with another waste; or
- A change occurred to the hazardous waste regulations that apply to that waste.

Characteristic waste determinations based on analytical sampling shall be reevaluated at some reasonable frequency to verify the accuracy of the initial waste determination. <u>The waste determination reevaluation frequency for ongoing remediation or treatment operations should be specified in the waste management plan and be profiled at least once a year.</u>

Element B) Responsibilities and Training Requirements

i) Contractor staff responsibilities with regard to waste management and training requirements necessary to comply with Section 6.0 and all state, federal, and/or host country laws and regulations. Contractor training certifications shall be provided electronically to the Lockheed Martin Project Lead.

Element C) Pre-Shipment Requirements

i) Material identification and classification per DOT requirements
ii) Packaging, storage, segregation, marking, labeling, and accumulation of waste
iii) Waste shipment documentation
    (1) Hazardous Waste Generator Identification Number

iv) Hazardous Material Transportation Plan
    (1) Hazardous material transportation risk identification, prioritization, and mitigation plan
    (2) Emergency Response (material information to be provided with shipments, actions to be taken in the event of an incident, staffing the emergency response phone number)
    (3) Hazmat Security Plan (as required based on thresholds outlined in 49 CFR §172.800)
    (4) Transportation and disposal logistics

Lockheed Martin Project Leads shall ensure the use of the Lockheed Martin Corporate Purchasing Agreements and the associated Corporate Approved Waste Management Vendors (WMV) for hazardous waste management and ensure that waste is transported to a treatment, storage, and disposal (TSD) facility on the Lockheed Martin Corporate Hazardous Waste Approved Vendors List as outlined in the ESH-06. Remediation contractors can contract directly with the WMV.

Additionally, hazardous waste manifests shall be signed only by a DOT trained and qualified Lockheed Martin employee or authorized designee (See Attachment #2 – Hazardous Waste Manifest Authorization Form). In addition to completing the Authorization Form, Project Leads shall verify that the designee is DOT trained and qualified to sign manifests and has adequate DOT experience. It is preferable to have contractors designated to sign that are involved in the waste characterization and oversight. For contractor personnel handling hazardous waste, appropriate hazardous waste handling training shall be provided by the contractor as outlined in Section 6.0 and complying with all state, federal, and/or host country laws and regulations.

Non-hazardous waste is not required to be managed by Corporate Approved Waste Management Vendors but shall be transported to an approved industrial waste disposal facility as outlined in ESH-06.

Within the United States, waste shall be characterized and disposed in accordance with the state regulations where it was generated unless the state requirements are less stringent than the federal requirements. For instance, California non-RCRA hazardous waste cannot be disposed of in a non-hazardous waste facility. Within a host country, waste shall be managed in accordance with the host country regulations; however, if the host country standards are less stringent than those of the US Environmental Protection Agency (EPA), than the EPA standards shall apply.

Element D) Shipping Requirements

i) Manifest certification and accuracy verification of physical waste shipment against manifested waste shipment (for non-hazardous waste this may not be applicable)
    (1) For hazardous waste, the contractor responsible for waste shipment shall utilize the Lockheed Martin Hazardous Material/Waste Shipment Checklist (see Attachment #3) during the preparation and pre-transport review of waste shipments and submit a completed electronic copy to the Lockheed Martin Project Lead with the shipping documentation.

ii) For non-specification bulk containers (e.g. dump trucks and roll-offs), the contractor responsible for waste shipment shall adhere to the Lockheed Martin requirements for packing and closing (see Attachment #4). These requirements are meant to supplement the applicable regulations.

Element E) Post Shipment Requirements - Records

i) Waste characterization, chain of custody, transportation, and destruction records shall be scanned and electronically submitted to the Lockheed Martin Project Lead for records retention. This shall include profile sheets, the Hazardous Material/Waste Checklist, the generator copy of the waste manifest, a copy of the TSD signed waste manifest, Land Disposal Restriction forms, and certificates of waste destruction where applicable. For finite-duration remediation projects, waste transportation and disposal records shall be submitted to the project lead at the completion of the project unless submittals are required by regulatory agencies on a more frequent basis. For recurring remediation project activities such as annual groundwater monitoring or groundwater treatment, these records shall be submitted for each year's waste generation activities in the first quarter of the following year or per the Project Lead's direction.

The waste management plan shall be submitted in a phased approach. The first section of the waste management plan will provide the hazardous listing assessment and the characteristic determination methodology (addressing Element A). This section of the plan shall be submitted in a timeframe that allows for Lockheed Martin's review prior to waste generation. Upon approval to proceed, the second section will document the waste profiling results and must be signed off on by a Lockheed Martin Project Lead. Additionally, it shall outline the logistics for waste handling, transportation and disposal (addressing Elements B through E). This section of the plan shall specify a reevaluation frequency for waste generated as a result of ongoing remediation or treatment operations.

Following the approval of the second section by the Lockheed Martin Project Lead, the waste management contractor shall implement the waste management plan. This plan shall be updated when the remedial treatment system process, waste stream, media, or regulations change.

4.2 Health and Safety Plan

For remediation sites managing waste, a section shall be included in the site Safety and Health Plan to address the safety and health requirements for managing the site specific waste.

4.3 Electronics and Scrap Metal Recycling

Where applicable and feasible, electronics and scrap metals shall be recycled or refurbished to the extent possible in accordance with ESH-06.

5.0 Responsibilities

5.1 Project Lead

The Project Lead shall:

- Ensure that all remediation projects for which they have responsibility have a waste management plan as outlined in Section 4.0. Review and ensure updates are completed as necessary. Plans must also be submitted to the Records Manager for upload to the Document Management System (DMS).

- Consult with Corporate EESH Legal as needed to verify the listing determination.

- Ensure that the Contractor has outlined the applicable training requirements and provided a training plan or statement of completion within the waste management plan.

- Verify that the site has a Hazardous Waste Generator Identification Number prior to hazardous waste shipments, where applicable.

- Ensure that all hazardous waste manifests are signed and certified by a Lockheed Martin employee or authorized designee. For non-hazardous waste, there are no signatory requirements for waste manifests.

- Ensure that non-hazardous or hazardous waste is shipped to an approved facility per ESH-06 and that the Corporate Approved Waste Management Vendors are being used for hazardous waste transportation, storage, and/or disposal services.

- Ensure receipt of the waste characterization, chain of custody, transportation, and destruction records, where applicable, and submit them to the Records Manager for upload to the DMS.

- Ensure that the required regulatory and state hazardous waste reports are submitted (e.g. biennial waste reports).

5.2 Remediation Global Supply Chain Management Representative

The Global Supply Chain Representative shall:

- Ensure that the KNA includes the requirements defined in Section 3.0.

- Send the Remediation Contractors an updated version of the approved non-hazardous facility list quarterly.

- Send the Corporate Approved Waste Management Vendors an updated version of the Lockheed Martin Corporate Hazardous Waste Approved Vendors List quarterly.

5.3 Corporate EESH Legal

The Corporate EESH Legal Counsel shall:

- Provide the Project Lead with support when making listed waste determinations.
- Notify the Project Leads of regulation changes that would affect prior listing determinations.

6.0 Training Requirements

The EESH remediation staff training requirements are summarized in Table 1.

6.1 RCRA Hazardous Waste Handling and Emergency Procedures

RCRA Generator Status Facilities
Generators who generate more than 1,000 kg/month of hazardous waste (or more than 1 kg/month of acutely hazardous waste) must comply with the emergency preparedness and personnel training requirements outlined in 40 CFR §265.16 (see 40 CFR §262.34(a)(4)). This training is intended for all facility personnel including the generator's contractors and includes training by a qualified person on hazardous waste management and emergency response procedures. Personnel shall receive an annual refresher. Project Leads are responsible for ensuring this training is provided to contractor staff on remediation projects that meet this generator criterion. Contractor personnel training records must also be maintained by the Project Lead.

"Small quantity generators" who generate greater than 100 kg but less than 1000 kg/month of hazardous waste, must comply with the emergency preparedness and personnel training requirements at 40 CFR §262.34(d)(5). These generators "must ensure that all employees are thoroughly familiar with proper waste handling and emergency procedures, relevant to their responsibilities during normal facility operations and emergencies" (40 CFR §262.34 (d)(5)(iii)). Project Leads shall ensure that all contractor staff has had the appropriate hazardous waste handling and emergency procedure training on remediation projects that meet this generator criterion.

Federal training requirements do not apply to remediation projects that generate less than 100 kg/month of hazardous waste. However, Project Leads shall ensure that the contractor staff is familiar with hazardous waste handling and emergency procedure training appropriate for waste management.

RCRA Permitted or Interim Status Facilities
Permitted or interim status facilities must follow training requirements in accordance with 40 CFR §264.16 and 40 CFR §265.16, respectively (the same requirements apply as outlined in the first paragraph under Section 6.1).

Additional training may be required by state and/or host country hazardous waste regulations. Any such additional training shall be verified and implemented by the Project Lead.

6.2 Department of Transportation Training

Department of Transportation (DOT) Hazmat Employee training is required for a person involved in shipment preparation, offering for transport and transportation of hazardous waste, including signing of hazardous waste manifests (see 49 CFR 172, Subpart H). All Lockheed Martin Remediation representatives, designees, and/or waste management contractors shall complete the hazmat employee training and renew the training as necessary to meet DOT requirements for hazardous waste transportation.

6.3 OSHA HAZWOPER Training

All contractors working on Lockheed Martin remediation sites shall complete the appropriate OSHA hazardous waste operations (HAZWOPER) training and annual refresher training specified in 29 CFR §1910.120. Lockheed Martin employees managing projects where hazardous waste is generated shall complete the 24 hour OSHA HAZWOPER training and annual refresher training.

7.0 Deviations

All deviations from this procedure must have prior approval by the Director of Environmental Remediation. The approval shall be documented and uploaded to the DMS.

Table 1

EESH Remediation Staff Waste Management Training Matrix			
Function	Task	Training Required	Requirements
EESH Remediation Employees (including IWTA and managing contractor staff (where the task description matches responsibilities))	Completing / Approving Waste Determinations	RCRA Generator Training	Refresher every 5 years
	Managing Remediation Sites where Hazardous Waste is Generated	OSHA HAZWOPER 24 HR	8 hr refresher annually
	Managing Hazardous Waste Shipments	DOT HazMat Certification (see Table 2)	Refresher every 3 years

The Lockheed Martin Project Lead shall update the Remediation Waste Management Training Matrix located on the Remediation Process Asset Library once training has occurred. All training and certification documentation will reside on the Remediation DMS under Training Records.

Table 2

EESH Remediation Staff DOT Requirements for Hazmat Employees	
Requirement	**Completion Method**
General Awareness [49 CFR 172.704(a)(1)]	• Vendor (e.g. Lions) provided Hazardous Materials Transportation Workshop • DOT OJT (taught by EESH DOT SME)
Function-Specific [49 CFR 172.704(a)(2)]	• Vendor (e.g. Lions) provided Hazardous Materials Transportation Workshop • DOT OJT (taught by EESH DOT SME)
Safety [49 CFR 172.704(a)(3)]	• Vendor (e.g. Lions) provided Hazardous Materials Transportation Workshop • DOT OJT (taught by EESH DOT SME) • Hazwoper 24 Hour Training • Site specific safety training [NOTE: This element of safety training may be fulfilled through completing any one (1) of the following three (3) options which provides the required site specific safety information: 1) Site Safety Plan Review, 2) Site HazCom/ General Employee Training or 3) Site Visitor Safety Briefing/Training. The source of the training must be entered as part of the information on the test which is administered for site specific safety training.]
Security Awareness [49 CFR 172.704(a)(4)]	• Vendor (e.g. Lions) provided Hazardous Materials Transportation Workshop • DOT OJT (taught by EESH DOT SME) • Site specific security awareness training [NOTE: This element of security awareness training may be fulfilled through completing any one (1) of the following three (3) options which provides the required site specific security information: 1) Site Security Plan Review, 2) Site HazCom/General Employee Training or 3) Site Visitor Security Briefing/Training. The source of the training must be entered as part of the information on the test which is administered for site specific security training.]
In-Depth Security (Hazmat Security Plan) Only applicable when haz material/waste meets certain class and volume thresholds (reference Section 4.1, Element C, iv, 4) [49 CFR 172.704(a)(5)]	• Site Hazmat Transportation Security Plan Training

The EESH DOT SME will certify EESH Remediation staff members as DOT Hazmat Employees on behalf of Lockheed Martin once training and safety and security tests have been completed.

Attachment #1

Waste Listing Assessment Form



Waste Listing
Assessment Form

Attachment #2

Hazardous Waste Manifest Signature Authorization Form



Designee
Authorization Form

Attachment #3

Hazardous Material/Waste Shipment Checklist



Hazardous Material/
Waste Shipment Chec

Attachment #4

Non-Specification Bulk Container Packing and Closing Instructions



Non-Specification
Bulk Container Packin

Attachment #1

Waste Listing Assessment Form

Waste Listing Assessment Form

LMC Remediation Project		**State Generated**	
Description of Waste			
Generic Name		**Solid, Liquid, Gas**	
		Additional Info.	
Date of Waste Generation		**Ongoing (Y/N)?**	

Description of Process Generating Waste

Listed Waste ? (Y/N)		**F,K, P or U Codes**	

Justification for Waste Classification (attached supporting documentation)

Completed by	
Company	
Date	

Attachment #2

Hazardous Waste Manifest Signature Authorization Form

Lockheed Martin Hazardous Waste Manifest Signatory Authorization

This Authorization Agreement, effective for the remediation site and period of performance written below, is entered into by and between:

LOCKHEED MARTIN CORPORATION (hereinafter "Lockheed Martin"), having a business office at 6801 Rockledge Drive, Bethesda, Maryland 20817 USA, and incorporated in the State of Maryland, and

_____

(hereinafter "_____")

having a business office at_____

_____.

WHEREAS, _____ (company representative) of _____ (company) will sign Hazardous Waste Manifests on behalf of Lockheed Martin for the project and hazardous waste, as defined at 40 CFR Pt. 261 *et seq.* indicated below.

Remediation Site: _____
Site Address: _____
Period of Performance: _____
Hazardous Waste Description:
_____
_____
Hazardous Waste Disposal Facility and Location: _____
_____
_____

This Authorization Agreement certifies that the representative signing on behalf of Lockheed Martin has taken the appropriate Department of Transportation training, as delineated at 49 CFR Part 172 *t seq.* to sign Hazardous Waste Manifests and is in compliance with all state and federal requirements for hazardous waste manifesting.

Lockheed Martin shall remain responsible and liable for the hazardous waste being disposed regardless of the Signatory Authorization provided herein.

LOCKHEED MARTIN CORPORATION	_____
By:_____	By:_____
Name:_____	Name:_____
Title:_____	Title:_____
Date:_____	Date:_____

Attachment #3

Hazardous Material/Waste Shipment Checklist

Lockheed Martin Hazardous Material/Waste Shipment Checklist

Date:
Project Site Name:
Shipping Document No.:

A. DESCRIPTION

A1._____ UN/NA Identification Number, Proper Shipping Name, Hazard Class/Division Number, Packing Group
A2._____ Subsidiary hazard class(es) or division number(s), if any, in parenthesis
A3._____ Total Quantity of Material
A4._____ 24-Hour Emergency Phone Number and Response Information ERG No.: _____
A5._____ Page of Pages, *for multiple shipping papers/EPA Manifest/Air Decs.*
A6._____ Shipper's Certification, *as applicable*
A7._____ Small Quantity Exception/Dangerous Goods In Excepted Quantities/Diagnostic Specimen/Sample

B. ADDITIONAL DESCRIPTIONS - GENERAL

B1._____ Exemptions "DOT-E-*ex.#"*
B2._____ "Limited Quantity" (*not to exceed 66 lb gross weight*)
B3._____ "X" or "RQ" (if RQ, Hazardous Substance Contact @ 1-800-424-8802)
B4._____ "Waste" for RCRA regulated material
B5._____"Mixture" or "Solution" - as appropriate.
B6._____ *(technical names), for poisons/mixtures/n.o.s./generic proper shipping names*
B7._____ "Marine Pollutant" and constituent in ( ), *for bulk shipments only*
B8._____ *(hazardous substance names) per 172.101 appendix if not contained in proper shipping name*
B9._____ *(EPA waste identification numbers)- used to identify the hazardous substance*
B10._____ "Poison" - *if not identified in proper shipping name or hazard class*
B11._____ "Poison-Inhalation Hazard" & Zone A, Zone B, Zone C, or Zone D, as appropriate*****
(*******Note Special Provisions 1-6 and 13 in Column 7 of 172.101)*

C. MARKING FOR NON-BULK PACKAGINGS

C1._____ Proper Shipping Name, UN/NA Identification Number
C2._____ (*technical name)*
C3._____ (*EPA waste identification number)*
C4._____ "RQ"
C5._____ Exemption Packagings "DOT-E-*ex.#*"
C6._____ Consignee's Name & Address
C7._____ Net or Gross quantity for non-rad Dangerous Goods (adjacent to PSN & UN#)
C8._____ Ltd. Qty - PSN only *per 172.301(a)(1) or* UN ID# placed in square-on-point border *per 172.315*
C9._____ Package Orientation Arrows, *for liquids in inner packagings*
C10._____ "Inhalation Hazard", unless these words appear on the label prescribed in *172.416* or *172.429*
C11._____ "Overpack" adjacent to proper shipping name marking [*see 173.25(a)(4)*]
C12._____ TSCA PCB Marking (*for actual or source concentration greater than or equal to 50 ppm **)
(* Note Potential Vehicle Marking Requirements in *40 CFR 761.40*)

D. MARKING FOR BULK PACKAGINGS (DUMP TRUCKS OR ROLL-OFFS)

D1._____ UN/NA Identification Number on orange panel or placard or white square-on-point display configuration as prescribed by 172.302 and 172.332

E. LABELING

E1._____ Primary Hazard Label(s): _____
E2._____ Subsidiary Hazard Label(s) with class/division: _____
E3._____ Hazardous Wastes Label(s)

F. PLACARDING

F1. 172.504 Table 1 Materials - Any Amount
F1.1._____ Dangerous When Wet (4.3)
F1.2._____ Poison (6.1, Inhalation Hazard, Zone A or B)***** (Primary or Subsidiary _____
*(*****Materials subject to the "Poison-Inhalation Hazard" notation must be placarded with a POISON INHALATION HAZARD or POISON GAS placard , as appropriate, and also placarded for any other hazard class required for that material in 172.504)*
F1.3._____ Radioactive (7, LSA/SCO Exclusive Use Shipments)

F2. 172.504 Table 2 Materials - 1,001 lb:

G. PACKAGING

G1._____ Container Type: (Inner Pkg)_____

G2._____ Container Type: (Outer Pkg)_____
G3._____ Container Type: (Bulk Pkg)_____
G4._____ Loaded and Closed As Required_____

H. PAPERWORK AND MISCELLANEOUS ITEMS

H1._____ Shipping Paper/Hazardous Waste Manifest/Bill of Lading/Airway Bill/Shipper's Declaration
H2._____ Instructions for Maintenance of Exclusive Use Shipments
H3._____ Small Quantity/Excepted Quantity Statement on Package, *for 173.4 shipments* / **DGEQ** statement per *2.7.7.2* noted on Airway Bill
H4._____ Photograph, *if applicable*
H5._____ Vehicle Inspection
H6._____ Check Driver's Qualifications
H7._____ Emergency Telephone Number Notification, if required, see 172.604(b)
H8._____ LMC Notification Instructions

I. ADDITIONAL REQUREMENTS FOR RADIOACTIVE MATERIAL SHIPMENTS

I1. SHIPPING PAPER DESCRIPTIONS
- I1.1._____ Radionuclide Symbol(s), *per 173.435*
- I1.2._____ Physical & Chemical Form, *if not special form*
- I1.3._____ Activity per Package
- I1.4 _____ Radioactive Labels
- I1.5._____ Fissile Excepted, *if applicable*
- I1.6._____ "Exclusive Use Shipment"

I2. MARKING FOR NON-BULK PACKAGINGS
- I2.1._____Gross Weight, *for radioactive material packages in excess of 110 lb*
- I2.2._____ "Radioactive"; "Radioactive – LSA" ; "Radioactive – SCO"
- I2.3._____ Package Certification Number, *for radioactive material packages, as appropriate*
- I2.4._____ IP-1, IP-2, IP-3 markings
- I2.5._____ "USA" on all IP and Type A packagings
- I2.6._____ Packaging manufacturer marking on Type A

I3. LABELING
- I3.1._____ Radioactive Labels
- I3.2._____ "EMPTY" Label
- I3.3._____ "Radioactive Material, Excepted Package" handling label

I4. PLACARDING (172.504 TABLE 1 MATERIALS - ANY AMOUNT)
- I4.1._____ Radioactive (7, LSA/SCO Exclusive Use Shipments)

I5. PAPERWORK AND MISCELLANEOUS ITEMS
- H1._____ Instructions for Maintenance of Exclusive Use Shipments
- H2._____ Radioactive Excepted Package statement per *10.8.8.3.3* on Airway Bill
- H3._____Limited Quantity Radioactive Material *for multiple hazard limited quantity Class 7*.
- H4._____Health Physics Information
- H5._____NRC Manifest #540 for radioactive waste shipment for land disposal.

Completed By: **Company:** **Date:**

Attachment #4

Non-Specification Bulk Container Packing and Closing Instructions

PACKING AND CLOSING INSTRUCTIONS FOR
NON-SPECIFICATION BULK CONTAINERS
(DUMP TRUCKS AND ROLL-OFFS)
04/10/2009

PRELIMINARY TASKS

- Select the transport container based on the Department of Transportation hazard classification and the packaging requirements specified in the Hazardous Materials Table.
- Perform moisture evaluation of waste material to be loaded into transport containers to determine the potential for releasing liquid.

PREPARATION OF BULK CONTAINERS FOR LOADING

- Transport containers must be inspected for any condition that may affect their safety or performance prior to each use.
- Dump trucks and roll-offs with doors must have gaskets installed at the tailgate or doors that when the tailgate or doors are closed the gasket is compressed sealing the tailgate or doors to assure package integrity and containment of materials. The gasket must be inspected prior to each use for overall integrity including positioning, damage such as holes or tears or debris which could prevent tight closure. Any deficiencies shall require replacement prior to use.
- An absorption pad shall be placed in the truck or roll-off bed. The pad specification shall be determined utilizing the data determined in the waste material moisture evaluation and must be capable of absorbing the liquid which could be released.
- An absorption log at the rear of the transport container along the bottom of the tailgate or rear doors.
- A minimum 6 mil poly liner shall be placed over the absorption pad and absorption log prior to loading.
- Determine the amount of waste that can be loaded into the transport container. (Subtract the unladen weight of the transport vehicle from the maximum licensed weight of the transport vehicle. NOTE: Do not load the maximum permissible load determined in the mathematical calculation to allow for variance in scales that may be utilized to weigh the loaded vehicle.)

LOADING AND CLOSING BULK CONTAINERS

- Waste material shall be loaded into the transport container in such a manner that does not compromise either the liner or container integrity.
- Do not load material above the height of the sides of the transport container.
- Close the poly liner over of the waste material prior to tarping the load.
- Close the transport container by putting a heavy roll tarp over the top of the transport container and secure the tarp by utilizing tie downs on all four sides.

Appendix C

LMC 6S Checklist

6S Checklist

LOCKHEED MARTIN

Area: Remediation Area 6S Lead: Location: __

Date	Reviewer	Grade (RYG) Green: All areas meet checklist standards Yellow: No more then 2 issues Red: Greater then 2 issues

Office –

- Are all the unnecessary items in aisle ways, corners, walls, etc. removed from area (offices and cubicles)?
  Yes No
- Are the desks or general areas orderly and straightened?
  Yes No
- Are the floors and walls tidy?
  Yes No
- Are all equipment, cabinets, and desks tidy?
  Yes No
- Are all tripping and falling hazards eliminated?
  Yes No
- Are storage of boxes, containers and supplies neat and orderly?
  Yes No
- Have safety issues been reported or corrected? (e.g. trip hazards, electrical, clear aisles, etc)
  Yes No
- Storage of documents and binders are neat and orderly?
  Yes No
- Only necessary work documents stored on desks?
  Yes No

If No was marked for any of the above, what will be the corrective actions?

Purpose of Form: The 6S Checklist documents the inspection of the specified work area. Inspection insures that work area complies with the basic 6S requirements.

Safety and Health –Construction/O&M

Hazardous Materials

- Have all expired chemicals been properly disposed of?
  Yes No
- Are all chemicals labeled appropriately (including warnings)?
  Yes No
- Is there appropriate ventilation?
  Yes No
- Is the storage cabinet/container for hazardous materials labeled (including warnings)?
  Yes No
- Is there an appropriate container for disposal of these materials?
  Yes No
- Are chemicals stored properly?
  Yes No

Machines & Material Handling

- Are all lockout points labeled?
  Yes No
- Are lockout procedures posted?
  Yes No
- Is material handling equipment in good condition and working properly?
  Yes No
- Are powered industrial trucks (forklifts) inspected daily?
  Yes No
- Do machines and equipment appear to be adequately guarded?
  Yes No
- Have any machine guards been removed or modified?
  Yes No
- Are sharp edges padded?
  Yes No

Exits

- Are all exits marked properly?
  Yes No

- Are emergency evacuation routes mapped and displayed?
  Yes No
- Do emergency lights work properly?
  Yes No

Obstructed passageways

- Are all walkways free from obstructions (cords, hoses, pallets, garbage, etc)?
  Yes No
- Are all exits free from obstructions?
  Yes No

Protection/Emergency

- Are emergency phone numbers clearly visible?
  Yes No
- Are junction boxes / electrical panels covered - Main on/off switches accessible?
  Yes No
- Is the area free of frayed and piggy backed extension cords / wires?
  Yes No
- Are fire extinguishers accessible; is other emergency equipment conveniently located?
  Yes No
- Is there a First Aid kit located in the area?
  Yes No

If No was marked for any of the above, what will be the corrective actions?

Appendix D

LMC ORR Process Documents

Including:

- ORR Agenda
- ORR Compliance Checklist

ORR Agenda

A. For planning purposes, the CONTRACTOR shall assume that each readiness review session will take a minimum of 2 hours. The session shall be attended by the following CONTRACTOR and subcontractor staff:

1. CONTRACTOR: The CONTRACTOR shall have the following staff in attendance:

    a. Project Manager
    b. Superintendent
    c. Field ENGINEERs
    d. Quality Control personnel
    e. H&S personnel
    f. Plant operators

2. Subcontractors: All Subcontractors that will be involved in that particular phase of work. Each subcontractor shall have the following staff in attendance:

    a. Project Manager
    b. Superintendent
    c. Working Foreman

B. The following is the agenda for each readiness review session:

1. Introductions (sign-in sheet)

2. Purpose (to confirm and document the readiness of project team)

3. Roles and Responsibilities

4. Communication Protocol
    a. OWNER and CONTRACTOR (primary points of contact)
    b. Weekly Progress Updates at Weekly Job Meetings
    c. Communication with Regulatory and Public Agencies
    d. Communication with the Public/Community

5. Weather Protocols
    a. Earth Quake Procedures
    b. Flood & Evacuation Procedures

6. Lockheed Martin Rules
    a. Lockheed Martin Required Site Safety Orientation
    b. Site Access Control
    c. Health and Safety
    d. No tobacco use onsite, professional attire and behavior

e. Minimum PPE requirements (reflective vest, steel toe boots, safety glasses, long pants, hard hat, hearing protection when near noisy machinery)
f. Daily Tailgate Safety Meetings
g. Permitted Work Hours and Days
h. Noise and Traffic Requirements
i. Deliveries (including MSDS pre-approval for all chemicals)
j. Equipment and Material Storage Requirements

7. Review Scope of Construction Work/Operations (discuss in detail sequence of work, Subcontractors involved, equipment, materials, etc.)

    a. Site Preparation Activities (temporary offices/facilities, erosion control and temporary stormwater controls, site access and haul routes, material and equipment staging areas, test labs in place, surveying, etc.)
    b. Construction Activities
    c. Startup and Testing
    d. Operations
    e. QA/QC
    f. Health and Safety
    g. Special Environmental Requirements (transportation and disposal procedures, air monitoring, soil disposal, water disposal, waste management, sampling & analysis, storage of fuel onsite, etc.)
    h. Interfacing with Existing Facilities and Contractors
    i. Cleanup and Demobilization
    j. Record Keeping
    k. Inspections

8. Documentation Readiness

    a. OM&M Manual
    b. Work Plans
    c. Permits and Notices
    d. Test Reports
    e. Calibration Records
    f. Product Data/Cut Sheets
    g. Photographs/Videos
    h. Well Logs & Other Construction Reports
    i. Operator Exams
    j. Maintenance Tool Inventory
    k. Startup and Testing Procedures
    l. Other Pre-Work or Startup and Operations Procedures
    m. Certificates (OSHA Hazwoper, state licenses, certificates of disposal, etc.)
    n. Bill of Materials
    o. As-Built Drawings

9. Equipment Readiness

    a. Review Checklist

b. Physical Inspection and Positive Verification that Installed Equipment Meets Project Requirements
c. Check As-Builts
d. Testing and Acceptance of Piping, Equipment, and Systems (check inspection records, test results, local/state agency certificates in place to occupy or operate, etc.)
e. Construction Equipment Readiness (no leaking hoses, etc.)
f. Inspect Systems (electrical, mechanical, HVAC, I&C, and structural)

10. Material Readiness

    a. Positive Verification that Materials Received Onsite Match Project Requirements
    b. Type and Quantity of Materials Onsite
    c. Materials Laydown and Storage
    d. Security

11. Construction/Operation Worker Readiness (are workers qualified and ready to perform their duties?)

    a. Walkthrough of Equipment, Systems, and Controls
    b. Mimic SOPs and DOPs in the Field
    c. Review Regular System Checks

Lockheed Martin Corporation

Operations Readiness Review Compliance Checklist

	Location/Project Name:				
	Type of Work:				
	Date:				
	Completed by:				
No.	**Item**	**Yes**	**No**	**N/A**	**Comments**
	Permits and Notifications				
1	Verify all regulatory permits are in hand and copies are at the site				
	Safety Systems				
2	Do all workers have the required PPE available? Review the required PPE.				
3	Are any special PPE required for hazardous conditions at the site (carbon/chemical handling, electrical arc flash, etc.)				
4	Has an arc flash study been performed, and are arc flash labels present on ALL electrical panels?				
5	Is a current, complete and signed HASP readily available to all working at the site?				
6	Hazardous Material Summary Correct and up to date?				
7	Are MSDSs available and have they been reviewed for all on-site chemicals? Verify location of MSDS's.				
8	Has a joint Lockheed Martin and contractor safety walkthrough been performed?				
9	Are obstacles such as low overheads, step-ups, and step-downs clearly marked?				
10	Is work area lighting adequate?				
11	Are escape routes/emergency exits provided and identified?				
12	Have signs requiring hearing protection, no smoking, warning for presence of any hazards, load rating of elevated walkways, exclusion zones, emergency contact numbers, etc. been prominently displayed?				
13	Do the workers know who to call in the case of a life or death emergency?				
14	Do the workers know who to call in the case of a chemical spill greater than 5 gallons?				
15	Are fire extinguishers present?				
16	Have all workers been trained on the use of the fire extinguishers?				
17	Are personal injury hazards (e.g. protruding bolts, sharp edges) identified and mitigated?				

No.	Item	Yes	No	N/A	Comments
18	Have site tripping hazards or “head knockers” been identified and addressed?				
19	Have emergency shutdown devices been verified to be operating properly?				
	Building/Facility/Grounds				
20	Are all applicable utilities in working order (water, sewer, power, phone, internet, compressed air)				
21	Verify the work area is in a neat condition and clear of all obstructions and debris. Verify the floors are swept clean and work areas are neat and organized.				
22	Has Lockheed Martin conducted a housekeeping inspection of all working areas including offices?				
23	Verify that all hoses and electrical cords are rolled up and stored appropriately (not left out for trip hazard).				
24	Is all waste being stored and labeled per regulatory requirements?				
25	Will wastes generated be disposed of at a facility on the Lockheed Martin approved list?				
26	Are secondary containment structures and drum pads in place?				
27	Are trash and recycling receptacles in place?				
28	Are restroom facilities available to workers?				
29	Is all equipment properly grounded?				
30	Have all interior and exterior facility lighting systems been checked and functioning properly?				
	Workers				
31	Have all onsite personnel received site-specific safety orientation?				
32	Are all on-site personnel properly trained by individual equipment vendors to operate specific pieces of equipment?				
33	Verify that the workers know their chain of command and who to call in the case of an emergency.				
34	Do workers know what to do in the event of a chemical spill?				
35	Do workers know what to do in the event of a severe weather event (tornado, flood, hurricane)?				

Appendix B—IDW Tracking Form

IDW Tracking Form
Martin State Airport
Middle River, Maryland

Drum	Contents	Project	First generation date	Waste characterization sample collected (date)	Profile (nonhaz or haz)	Date removed from the site	75 day deadline for removal	90 day deadline for removal (only applies to haz waste)	Field Inspection Date	Field Inspector	Action/Repairs from inspection

Appendix C—Waste Listing Assessment Form

Waste Listing Assessment Form

LMC Remediation Project		**State Generated**	
Description of Waste			
Generic Name		**Solid, Liquid, Gas**	
		Additional Info.	
Date of Waste Generation		**Ongoing (Y/N)?**	

Description of Process Generating Waste

Listed Waste ? (Y/N)		**F,K, P or U Codes**	

Justification for Waste Classification (attached supporting documentation)

Completed by	
Company	
Date	

Appendix D—Hazardous Waste Manifest Signature Authorization Form

Lockheed Martin Hazardous Waste Manifest Signatory Authorization

This Authorization Agreement, effective for the remediation site and period of performance written below, is entered into by and between:

LOCKHEED MARTIN CORPORATION (hereinafter "Lockheed Martin"), having a business office at 6801 Rockledge Drive, Bethesda, Maryland 20817 USA, and incorporated in the State of Maryland, and

_____

(hereinafter "_____")

having a business office at_____

_____.

WHEREAS, _____ (company representative) of _____ (company) will sign Hazardous Waste Manifests on behalf of Lockheed Martin for the project and hazardous waste, as defined at 40 CFR Pt. 261 *et seq.* indicated below.

Remediation Site: _____
Site Address: _____
Period of Performance: _____
Hazardous Waste Description:
_____
_____
Hazardous Waste Disposal Facility and Location: _____
_____
_____

This Authorization Agreement certifies that the representative signing on behalf of Lockheed Martin has taken the appropriate Department of Transportation training, as delineated at 49 CFR Part 172 *t seq.* to sign Hazardous Waste Manifests and is in compliance with all state and federal requirements for hazardous waste manifesting.

Lockheed Martin shall remain responsible and liable for the hazardous waste being disposed regardless of the Signatory Authorization provided herein.

LOCKHEED MARTIN CORPORATION	_____
By:_____	By:_____
Name:_____	Name:_____
Title:_____	Title:_____
Date:_____	Date:_____

Appendix E—Hazardous Material/Waste Shipment Checklist

Lockheed Martin Hazardous Material/Waste Shipment Checklist

Date:
Project Site Name:
Shipping Document No.:

A. DESCRIPTION

A1._____ UN/NA Identification Number, Proper Shipping Name, Hazard Class/Division Number, Packing Group
A2._____ Subsidiary hazard class(es) or division number(s), if any, in parenthesis
A3._____ Total Quantity of Material
A4._____ 24-Hour Emergency Phone Number and Response Information ERG No.: _____
A5._____ Page of Pages, *for multiple shipping papers/EPA Manifest/Air Decs.*
A6._____ Shipper's Certification, *as applicable*
A7._____ Small Quantity Exception/Dangerous Goods In Excepted Quantities/Diagnostic Specimen/Sample

B. ADDITIONAL DESCRIPTIONS - GENERAL

B1._____ Exemptions "DOT-E-*ex.#*"
B2._____ "Limited Quantity" (*not to exceed 66 lb gross weight*)
B3._____ "X" or "RQ" (if RQ, Hazardous Substance Contact @ 1-800-424-8802)
B4._____ "Waste" for RCRA regulated material
B5._____ "Mixture" or "Solution" - as appropriate.
B6._____ *(technical names), for poisons/mixtures/n.o.s./generic proper shipping names*
B7._____ "Marine Pollutant" and constituent in ( ), *for bulk shipments only*
B8._____ *(hazardous substance names) per 172.101 appendix if not contained in proper shipping name*
B9._____ *(EPA waste identification numbers)- used to identify the hazardous substance*
B10._____ "Poison" - *if not identified in proper shipping name or hazard class*
B11._____ "Poison-Inhalation Hazard" & Zone A, Zone B, Zone C, or Zone D, as appropriate*
(**Note Special Provisions 1-6 and 13 in Column 7 of 172.101)*

C. MARKING FOR NON-BULK PACKAGINGS

C1._____ Proper Shipping Name, UN/NA Identification Number
C2._____ (*technical name)*
C3._____ (*EPA waste identification number)*
C4._____ "RQ"
C5._____ Exemption Packagings "DOT-E-*ex.#*"
C6._____ Consignee's Name & Address
C7._____ Net or Gross quantity for non-rad Dangerous Goods (adjacent to PSN & UN#)
C8._____ Ltd. Qty - PSN only *per 172.301(a)(1) or* UN ID# placed in square-on-point border *per 172.315*
C9._____ Package Orientation Arrows, *for liquids in inner packagings*
C10._____ "Inhalation Hazard", unless these words appear on the label prescribed in *172.416* or *172.429*
C11._____ "Overpack" adjacent to proper shipping name marking [*see 173.25(a)(4)*]
C12._____ TSCA PCB Marking (*for actual or source concentration greater than or equal to 50 ppm **)
(* Note Potential Vehicle Marking Requirements in *40 CFR 761.40*)

D. MARKING FOR BULK PACKAGINGS (DUMP TRUCKS OR ROLL-OFFS)

D1._____ UN/NA Identification Number on orange panel or placard or white square-on-point display configuration as prescribed by 172.302 and 172.332

E. LABELING

E1._____ Primary Hazard Label(s): _____
E2._____ Subsidiary Hazard Label(s) with class/division: _____
E3._____ Hazardous Wastes Label(s)

F. PLACARDING

F1. 172.504 Table 1 Materials - Any Amount
F1.1._____ Dangerous When Wet (4.3)
F1.2._____ Poison (6.1, Inhalation Hazard, Zone A or B)* (Primary or Subsidiary _____
*(*Materials subject to the "Poison-Inhalation Hazard" notation must be placarded with a POISON INHALATION HAZARD or POISON GAS placard , as appropriate, and also placarded for any other hazard class required for that material in 172.504)*
F1.3._____ Radioactive (7, LSA/SCO Exclusive Use Shipments)

F2. 172.504 Table 2 Materials - 1,001 lb:

G. PACKAGING

G1._____ Container Type: (Inner Pkg)_____
G2._____ Container Type: (Outer Pkg)_____
G3._____ Container Type: (Bulk Pkg)_____
G4._____ Loaded and Closed As Required_____

H. PAPERWORK AND MISCELLANEOUS ITEMS

H1._____ Shipping Paper/Hazardous Waste Manifest/Bill of Lading/Airway Bill/Shipper's Declaration
H2._____ Instructions for Maintenance of Exclusive Use Shipments
H3._____ Small Quantity/Excepted Quantity Statement on Package, *for 173.4 shipments /* **DGEQ** statement per *2.7.7.2* noted on Airway Bill
H4._____ Photograph, *if applicable*
H5._____ Vehicle Inspection
H6._____ Check Driver's Qualifications
H7._____ Emergency Telephone Number Notification, if required, see 172.604(b)
H8._____ LMC Notification Instructions

I. ADDITIONAL REQUREMENTS FOR RADIOACTIVE MATERIAL SHIPMENTS

I1. SHIPPING PAPER DESCRIPTIONS
- I1.1.____ Radionuclide Symbol(s), *per 173.435*
- I1.2.____ Physical & Chemical Form, *if not special form*
- I1.3.____ Activity per Package
- I1.4 ____ Radioactive Labels
- I1.5.____ Fissile Excepted, *if applicable*
- I1.6.____ "Exclusive Use Shipment"

I2. MARKING FOR NON-BULK PACKAGINGS
- I2.1.____Gross Weight, *for radioactive material packages in excess of 110 lb*
- I2.2.____ "Radioactive"; "Radioactive – LSA" ; "Radioactive – SCO"
- I2.3.____ Package Certification Number, *for radioactive material packages, as appropriate*
- I2.4.____ IP-1, IP-2, IP-3 markings
- I2.5.____ "USA" on all IP and Type A packagings
- I2.6.____ Packaging manufacturer marking on Type A

I3. LABELING
- I3.1.____ Radioactive Labels
- I3.2.____ "EMPTY" Label
- I3.3.____ "Radioactive Material, Excepted Package" handling label

I4. PLACARDING (172.504 TABLE 1 MATERIALS - ANY AMOUNT)
- I4.1.____ Radioactive (7, LSA/SCO Exclusive Use Shipments)

I5. PAPERWORK AND MISCELLANEOUS ITEMS
- H1._____ Instructions for Maintenance of Exclusive Use Shipments
- H2._____ Radioactive Excepted Package statement per *10.8.8.3.3* on Airway Bill
- H3._____Limited Quantity Radioactive Material *for multiple hazard limited quantity Class 7.*
- H4._____Health Physics Information
- H5._____NRC Manifest #540 for radioactive waste shipment for land disposal.

Completed By: **Company:** **Date:**

Appendix F—Site Contact Sheet

SITE CONTACT SHEET

Lockheed Martin Project Lead	Charles Trione
Cell Number	(240) 328-0905
Email	charles.trione@lmco.com
Lockheed Martin Project Lead	Paul Calligan
Cell Number	(240) 687-1813
Email	paul.e.calligan@lmco.com
LMCPI ESH/Projects	Mike Musheno
Office Telephone	484-875-2819
Cell Number	610-656-4012
Email	mike.musheno@lmco.com
LMCPI ESH/Projects	Chris Keller
Office Telephone	410-682-1304
Cell Number	410-459-4862
Email	christopher.s1.keller@lmco.com
Lockheed Martin Remediation Safety Manager	James Yeager
Cell Number	301-873-1444
Lockheed Martin Communications Lead	Meghan Macdonald
Office Number	301-897-6934
Email	meghan.o.macdonald@lmco.com
Remediation Technical Operations Coordinator	CDM Smith: Peter Shilland
Cell Number	617.780.0290
Email	shillandpj@cdmsmith.com
Performing Contractor Program Manager	Tetra Tech: Mike Martin
Office Telephone	301-528-3022
Cell Number	410-707-5259
Email	michael.martin@tetratech.com
Performing Contractor Project Manager	Tetra Tech: Tony Apanavage
Office Telephone	301-528-3021
Cell Number	301-233-8230
Email	tony.apanavage@tetratech.com
Martin State Airport Operations Manager	Charlie Baublitz
Office Telephone	410-682-8831
Martin State Airport Operations Engineer	Thomas Thompson
Office Telephone	410-682-8856

Martin State Airport Director	Al Pollard
Office Telephone	410-682-8800
MDANG Site Supervisor	Capt DeJuan Saunders
Office Telephone	410-918-6486
Emergency Response	
A&A Environmental/Spill Response	1-800-404-8037
Baltimore County Police & Fire Department	911
State of Maryland Emergency Response Center	410-974-3551

APPENDIX G—PROCESS WATER SAMPLING LOCATIONS, TREATMENT PLANT

Plant Influent Sampling Location
SP-PLANT-INF
Sept 2019, June 2020

Individual Extraction Well
Sampling Port Manifold
SP-2I, SP-3S, SP-13I,
SP-15S, SP-16S
June 2020

PLANT RECYCLE ONLY DURING START UP → PFD-2

DIRTY BACKWASH

VENT TO GAC CANISTER

15% SODIUM HYPOCHLORITE

50% CAUSTIC

POLYMER FEED

93% SULFURIC ACID

STARTUP RECYCLE

7 SHALLOW WELLS

5 INTERMEDIATE WELLS

4 DEEP WELLS

EQUALIZATION TANK T–100
7,050 GALLON

P–100 A/B

RAPID MIX TANK T–110
1375 GALLON
pH ADJUSTMENT & OXIDATION

FLOC TANK T–120
1375 GALLON
FLOCCULATION

INCLINED PLATE CLARIFIER T–130

P–130 A/B

pH NEUTRALIZATION TANK T–135
1050 GALLON
pH NEUTRAL–IZATION

CLARIFIER EFFLUENT TANK T–140
1050 GALLON TANK

P–140 A/B

MULTI–MEDIA FILTER

MMF 210

MMF 220

DIRTY BACKWASH TANK T–700
11,000 GALLON

P–700 A/B

30% HYDROGEN PEROXIDE

STATIC MIXER SM–300

PFD-2

FILTER PRESS (20CF)
FP–790

ROLL–OFF

SOLIDS TO OFFSITE DISPOSAL

FILTRATE

VENT TO GAC CANISTER

DECANT

DECANT TANK
3,820 GAL.
T–720

DECANT TRANSFER PUMP
T–720 A/B

FP FEED PUMP
P–710 A/B

SLUDGE HOLDING TANK
9,400 GAL.
T–710

BUILDING SUMP
P–960 A/B
1525 GALLONS

SLUDGE DEWATERING

VENT TO ATMOSPHERE

VENT FROM TANKS

GAC CANISTER V–530

GAC CANISTER V–540

CAUTION: IF SHEET IS NOT 24"x36" USE GRAPHIC SCALE

NO.	DESCRIPTION	DATE	BY	CHECKED
5	-	-	-	-
4	-	-	-	-
3	-	-	-	-
2	-	-	-	-
1	-	-	-	-
0	-	-	-	-

REVISIONS

LOCKHEED MARTIN

TETRA TECH

STATE OF MARYLAND
SUJIVA KUMAR
PROFESSIONAL ENGINEER

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 25855, Expiration Date: 02/06/2015

LOCKHEED MARTIN
MARTIN STATE AIRPORT DUMP ROAD AREA
GROUNDWATER INTERIM REMEDIAL ACTION

FLOW DIAGRAM

PROCESS

PROJECT NO.:	103P257109
FILE:	SEE PLOT STAMP
DESIGN BY:	SK
DRAWN BY:	SNL
DEPT. CHECK:	HKM
PROJ CHECK:	SK
DATE:	12.16.2014
SCALE:	- - NA

PFD-1
SHEET OF

S:\GS-Projects\Commercial\LMC\103P257101-ERA-SDE design Phase-2013\CAD drawings\Process\103P257101-PFD.dwg 12/15/2014 10:02

HEATER
E-400
17
TO ATMOSPHERE
V510
V520
18
VGAC
PFD-1
PLANT RECYCLE TO EQ TANK
ONLY DURING STARTUP
PFD-1
DIRTY BACKWASH
14
Air Stripper Effluent Sampling Location
SP-AST400-EFF
Sept 2019, June 2020
4A
AOP 310
AOP 320
AIR STRIPPER
AS-400
B-400
P-400 A/B
5
LGAC
610
LGAC
620
LGAC
630
LGAC-630 Effluent Sampling Location
SP-LGAC630-EFF
Sept 2019, June 2020
PFD-1
4
3x30kW
3x30kW
14
1 UNIT
PEROXCARB
LGAC
LIQUID PHASE GAC
2 UNITS IN SERIES
TREATED
WATER TANK
T-800
11,000 GALLON
PFD-1
13
BACKWASH SUPPLY
P
BACKWASH
PUMP
P-820 A/B
P-810 A/B
7
TO OUTFALL
LGAC-610 Effluent Sampling Location
SP-LGAC610-EFF
June 2020
LGAC-620 Effluent Sampling Location
SP-LGAC620-EFF
June 2020

CAUTION: IF SHEET IS NOT 24"x36" USE GRAPHIC SCALE

NO.	DATE	BY	CHECKED	DESCRIPTION
5	-	-	-	-
4	-	-	-	-
3	-	-	-	-
2	-	-	-	-
1	-	-	-	-
0	-	-	-	-

REVISIONS

LOCKHEED MARTIN

TETRA TECH

STATE OF MARYLAND
SHIVAKUMAR
PROFESSIONAL ENGINEER

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 25855, Expiration Date: 02/06/2015

LOCKHEED MARTIN
MARTIN STATE AIRPORT DUMP ROAD AREA
GROUNDWATER INTERIM REMEDIAL ACTION

FLOW DIAGRAM

PROCESS

PROJECT NO.:	103P2571091
FILE:	SEE PLOT STAMP
DESIGN BY:	SK
DRAWN BY:	SNL
DEPT CHECK:	HKM
PROJ CHECK:	SK
DATE:	12.16.2014
SCALE:	- = NA

PFD-2

SHEET OF

S:\03-Projects\Commercial\LMC\103P2571101-DRA- 30% design Phase-2013\CAD drawings\Process\103P2571101-PFD.dwg 12/15/2014 10:03