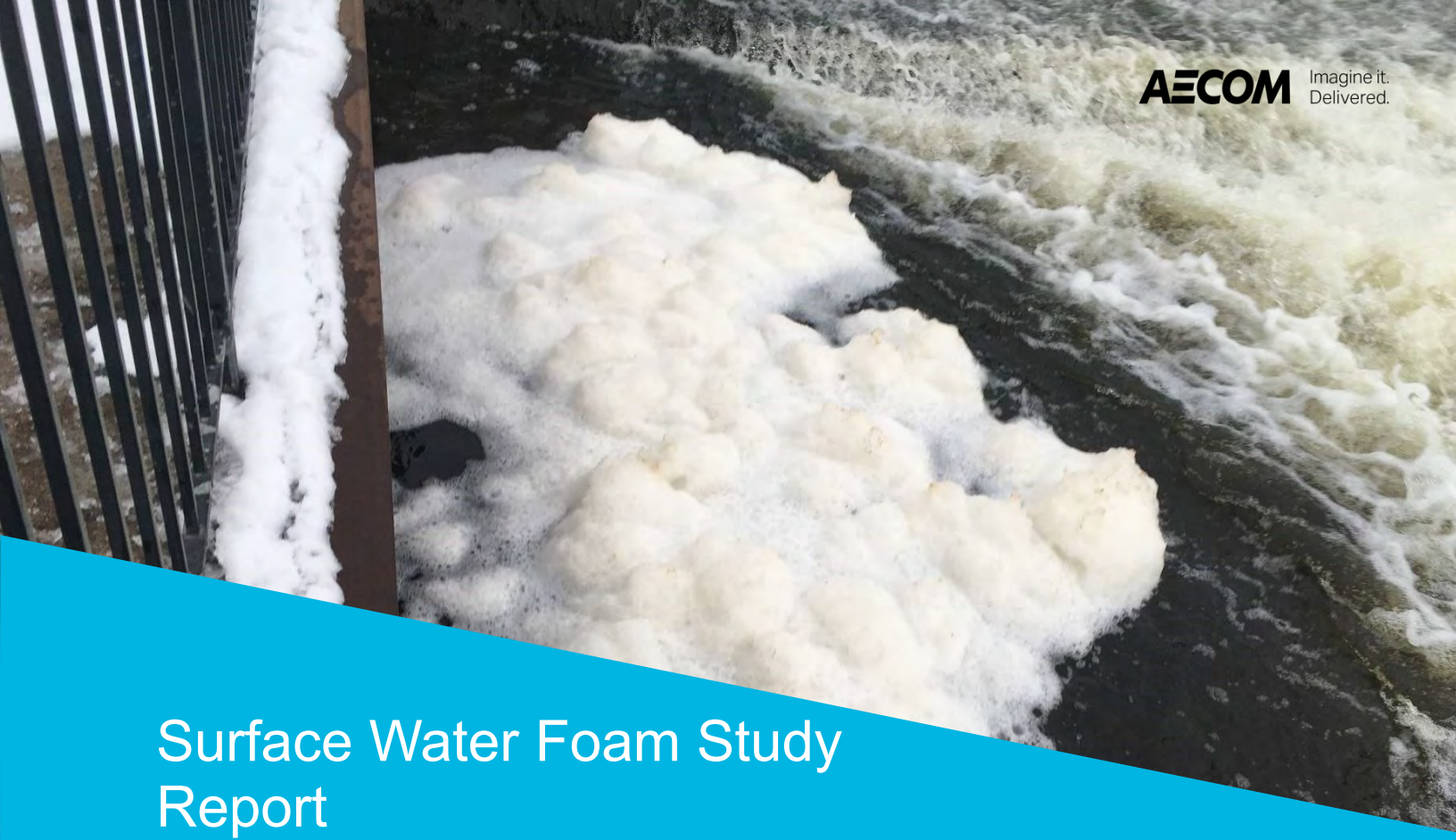

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Surface Water Foam Study Report

Michigan Department of Environment, Great Lakes, and Energy

January 07, 2021

Prepared for:

Michigan Department of Environment, Great Lakes, and Energy
Saginaw Bay District Office
401 Ketchum St. Bay City, Michigan 48708

Prepared by:

AECOM
3950 Sparks Drive Southeast
Grand Rapids, MI 49546
aecom.com

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1. Introduction

In 2018, Michigan Department of Environment, Great Lakes, and Energy (EGLE) outreached to US Environmental Protection Agency (USEPA) for support related to guidance and protocols for sampling and analysis of surface water foam (SWF), which are the frothy, positively buoyant, air-containing masses sometimes encountered on open waters, not to be confused with Aqueous Film Forming Foam, or AFFF. USEPA, in response to EGLE's request, commissioned two studies developed by Battelle, Columbus, Ohio:

- Technical Directive 2-11a, Current State of the Science for Quantitative Methods to Collect Foam Samples from Water and Solids (May 2018),
- Technical Directive 2-11b, Current State of the Science for Quantitative Methods to Collect Surface Microlayer Samples Formed on Water Surfaces of Water Bodies (May 2018).

These Battelle documents also referred to various historical publications that serve as a basis for sampling SWF. Technical Directive 2-11a also noted that there is a paucity of information available regarding SWF sampling.

This study and report intend to establish effective and cost-practical means to sample SWF, refine written protocols for SWF sampling, and evaluate behavior of per- and polyfluoroalkyl substances (PFAS) in surface water bodies through development of a Conceptual Site Model (CSM). Existing SWF and surface water sampling guidelines and standard operating procedures (SOPs) can be viewed online at https://www.michigan.gov/pfasresponse/0,9038,7-365-88059_91297---,00.html.

Six sites across Michigan were selected based on proximity to known releases of PFAS and common reports of foam accumulation or historical samples of foam collected on behalf of ongoing PFAS investigations. Foam investigation and collection sites include locations in Michigan along the Rogue River in Rockford, Thornapple River in Cascade, Huron River in Brighton, Van Etten Lake and Cedar Lake in Oscoda; and Lake Margrethe in Grayling, as depicted in **Figure 1**.

2. PFAS History and Use

PFAS have been classified by the USEPA as emerging contaminants. PFAS are a complex family of more than 5,000 human-made fluorinated organic chemicals. Due to their unique chemical properties, PFAS have been used in many industries and consumer products since the late 1950s. The Interstate Technology Regulatory Council (ITRC) has identified four major sources of PFAS: fire training/fire response sites that use AFFF, industrial sites, landfills, and wastewater treatment plants/biosolids. Other point and diffuse sources of PFAS exist and may be significant locally, but generally, are expected to be small by comparison to these main sources. PFAS have been identified in several environmental media including soil, groundwater, surface water, surface water foams, biosolids, industrial and commercial wastewaters and effluents, and biota, including humans.

Various PFAS sources have been identified throughout the State of Michigan adjacent to or nearby surface water bodies including but not limited to; Rogue River (Rockford, Michigan), Thornapple River (Cascade, Michigan), Huron River (Brighton, Michigan), Van Etten Lake and Cedar Lake (Oscoda, Michigan), and Lake Margrethe (Grayling, Michigan).

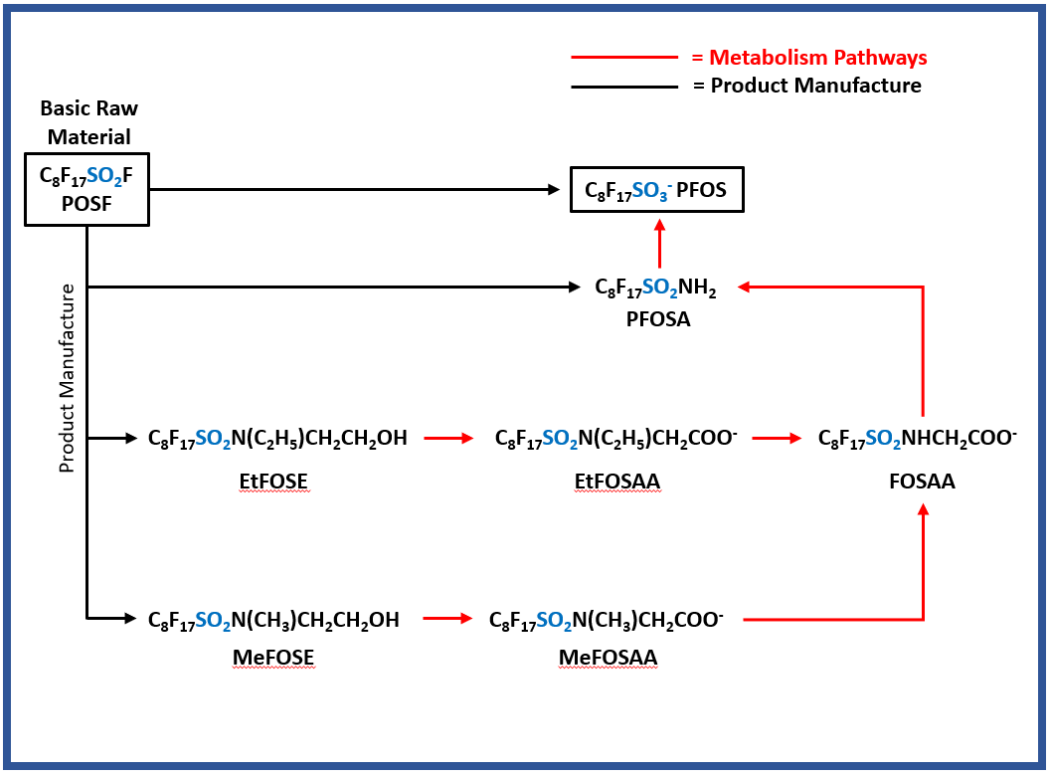
On August 3rd, 2020 the new maximum contaminant levels (MCLs) for seven PFAS compounds, announced by Michigan EGLE, went into effect. On December 21st, 2020 the MCLs became generic cleanup criteria. These criteria, as well as existing groundwater/surface water interface (GSI) criteria, provide a framework for establishing SWF advisories for affected surface water. The table below provides the new generic cleanup criteria and existing GSI criteria applicable in the State of Michigan.

PFAS Analyte	Generic Cleanup Criteria (ppt)	GSI Criteria (ppt)
Perfluorooctanoic acid (PFOA)	8	12,000
Perfluorooctane sulfonate (PFOS)	16	12
Perfluorononanoic acid (PFNA)	6	NA
Perfluorohexane sulfonate (PFHxS)	51	NA
Perfluorobutanesulfonic acid (PFBS)	420	NA
hexafluoropropylene oxide dimer acid (HFPO-DA)	370	NA
Perfluorohexanoic acid (PFHxA)	400,000	NA

3. PFAS Composition and Manufacture

Two main manufacturing processes, electrochemical fluorination (ECF) and telomerization, are used for the production of PFAS. ECF was used to mass produce fluorosurfactants and fluorinated polymers from the late 1940s (Banks, Smart, and Tatlow 1994). Many PFAS families were produced using ECF, with the majority of PFAS based on perfluorooctane sulfonyl fluoride (POSF) and POSF-related derivatives (3M, 1999; Buck, 2011). POSF was the basic building block of sulfonyl based fluorochemicals commercially available since 1947. Various chemical intermediates of N-Alkyl perfluorooctane sulfonamido ethanol (FOSE), a family of chemicals derived from POSF which includes N-Ethyl perfluorooctane sulfonamido ethanol (EtFOSE) and N-Methyl perfluorooctane sulfonamido ethanol (MeFOSE), have historically been used for oil and water repellency in the pulp and paper industry and soil, oil, and water repellency in the textile industry, including apparel and leather products (OECD, 2002). Various chemicals derived from FOSE have been used in commercially available products and have been shown to be precursors to N-Ethyl perfluorooctane sulfonamindo acetic acid (EtFOSAA), N-Methyl perfluorooctane sulfonamide (MeFOSAA), and perfluorooctane sulfonamide (PFOSA) (Buck, 2011; Lee, 2013).

The ECF process leads to carbon chain rearrangement and breakage, resulting in a mixture of linear, branched, and cyclic isomers, while the telomerization process used for PFAS manufacturing results in linear isomers only (Buck et al., 2011, OECD, 2018). As presented below, EtFOSE, MeFOSE, EtFOSAA, MeFOSAA, and PFOSA can be degraded in the environment by biotic and abiotic methods. PFAS that could partially degrade are referred to as “precursors”. Precursors have been detected in the environment and identified as being intermediary environmental transformation products (OECD, 2002; Buck, 2011). The body of literature on biotic PFAS transformation is rapidly evolving and growing as more peer-reviewed studies are performed, including recent discovery of bacteria-mediated defluorination of PFOA and PFOS (Huang and Jaffe, 2019).



Transformation pathways for perfluoroalkane sulfonamide. Adapted from Buck et al. 2011.

4. Surface Water Foam Sampling Techniques

For this study, two direct scoop SWF sample collection techniques were utilized, by surface skimmer and by hand collection. Other methods of sampling were considered, however, the methods that were originally developed with EGLE still are appropriate today for the purposes of this study. The technique utilized for any given sample was dependent upon a number of factors including location of foam on the water body, volume of foam, weather, and safety. Each SWF sample was collected in accordance to the *Surface Water Foam PFAS Sampling Guidance* document (EGLE, 2019) available online [https://www.michigan.gov/documents/pfasresponse/Surface_Water_Foam_PFAS_Sampling_Guidance_+_Quick_Reference_Field_Guide_662168_7.pdf]. Immediately after SWF collection, surface water samples were collected from the same or adjacent locations.

Sampling supplies including Ziploc bags and Ace Hardware brand cheese cloth have been sampled for PFAS prior to this investigation and determined to be PFAS free.

This study did not attempt to sample or evaluate the surface water microlayer. Research on the microlayer is being conducted by others, including Dr. Jennifer Field of Oregon State University.

4.1 Surface Skimmer (modified pool skimmer)

The surface skimmer used for SWF sample collection is a standard pool skimmer modified with single use 100% cotton cheesecloth instead of the standard nylon netting. The cheesecloth is stretched taught across the frame and mounted with stainless-steel clips to provide a stable collection surface that is quick and easy to apply. The surface skimmer was optimal for collecting SWF samples from rivers where foam accumulates away from the bank, on debris or at the base of a steep banks, both for safety and accessibility. Additionally, where foam accumulation was thin along the surface of the water (as is often also the case on lakes), the skimmer is able to collect sufficient volume of SWF without dilution from inadvertent carry over of surface water during sample collection.

In order to minimize the potential for cross contamination, it was advantageous to operate with two sampling personnel with each team member having distinct responsibilities. One sampler used the skimmer to load the cloth with foam, while the second prepared a 1 to 2-gallon Ziploc bag and carefully transferred the foam with a powderless nitrile gloved hand from the skimmer and into the bag, preventing surface water from inadvertently dripping into the sample bag off the skimmer. In the case of this study, the surface skimmer method was used to collect all SWF samples on the Rogue River and one sample on the Thornapple River.

Use of the foam skimmer for collection of SWF on sandy shores can be problematic due to the increased likelihood of scraping the surface of the ground with the frame causing sediments to comingle with the SWF sample, possibly resulting in skewed results due to the introduction of PFAS contamination residing within the sediment.

Foam accumulation on Thornapple River [1/16/20].

SWF collection at the Rockford Dam on Rogue River [12/3/19].

4.2 Discrete Hand Collection

The second method of SWF collection used during this study was hand collection, during which the sampling personnel were able to reach and collect SWF from the shore or near bank area of accumulation with powderless nitrile gloved hand. The SWF samples were carefully lifted and deposited directly into a 1 to 2-gallon Ziploc bag, labeled, and recorded on a chain of custody (COC). Each sample in the study represented the entire thickness of SWF encountered in the field to avoid any unexpected bias resulting from PFAS partitioning within the foam column. In the case of this study, the hand collection method was used to collect all SWF samples on the Huron River, Van Etten Lake, Cedar Lake, and Lake Margrethe, and three of the samples on the Thornapple River.

Foam accumulation on Van Etten Lake Beach [3/31/20].

Foam accumulation on Van Etten Lake Beach [3/31/20].

4.3 Sample Preparation

Each SWF sample was carefully sealed, double bagged, and placed in a cooler on wet ice or sample fridge for 24-hours, until the foam condensed to a liquid. SWF volumes were recorded as fresh foam volumes and condensed foam volumes to better understand the dynamics of foam collapse and density. Condensed foam was poured through a strainer made of 100% cotton cheese cloth into a 250 milliliter (mL) high density polyethylene (HDPE) bottle. A 45 mL HDPE vial was prepared with 20 mL of 2xShield

RNA/DNA preservative, and 20 mL of the condensed SWF was poured into the vial, labeled, and prepared for shipment to Zymo Research Corporation in Irvine California for microbiome analyses further discussed in **Section 7**. The remaining volume was prepared for shipment to Vista Analytical Laboratories in El Dorado, California for PFAS analysis further discussed in **Section 5**. A minimum of 20mL condensed SWF is required per sample to analyze for PFAS concentrations. Analysis of PFAS compounds was prioritized in the case of this investigation, so in the event that less than 40mL of condensed SWF was collected, only PFAS analysis was run.

4.4 Surface Water Sample Collection

Surface water samples were collected within the same vicinity and timeframe of each SWF sample to compare relative concentrations of PFAS within the water column to the concentrations of PFAS within the SWF. Two methods of surface water sample collection were used during this investigation, direct sample bottle collection and stainless-steel dipper cup collection. The method used was based primarily on safety and accessibility.

Direct sample bottle collection was used along lake shorelines and riverbanks where the water could be safely approached, and footing was secure. This method of sampling involved inverting an open sample, wearing a nitrile gloved hand, and lowering it into the water until approximately mid water column (generally 2-6 inches below the surface during this investigation). The bottle was slowly rotated past horizontal to allow water to fill the container. Rotation continued until the bottle was vertical, then removed straight up from the water, and secured with the bottle cap. This process was repeated in rapid succession for the second bottle. Bottles were wiped down with a clean rag to remove the excess moisture from the outside of the bottle and then labeled with a sample ID, location ID, date, time, and samplers initials. The COC was then filled out and bottles were double bagged together in quart size Ziploc bags and placed in a cooler on bagged wet ice.

When utilizing stainless-steel dipper cup (300mL) with an extension rod, the cup was inverted as it entered the surface of the water until approximately mid water column, then slowly rotated past horizontal to allow water to fill the cup. Rotation continued until vertical, then removed straight up from the water. The second sampler prepared and held the sample bottles with nitrile gloved hands, while the sample collector carefully transferred the surface water sample from the dipper cup into the sample bottles, filling each approximately half full. This process was repeated a second time at which time both bottles were filled to the 250mL mark, securely capped, and then gently inverted several times to ensure the contents were homogenized. Bottles were wiped down with a clean rag to remove the excess moisture from the outside of the bottle and then labeled with a sample ID, location ID, date, time, and samplers initials. The COC was then filled out and both bottles were doubled bagged together in quart sized Ziploc bags and placed in a cooler on bagged wet ice.

4.5 Atmospheric Evaluation

The atmospheric conditions during SWF reconnaissance and sampling events were recorded to assist in identifying what role, if any, the weather plays in the generation and stability of SWFs. **Table 1** and **Table 2** depict atmospheric data from each event including the presence, absence, and brief description of SWF. Our current understanding of SWF occurrence on rivers is that presence and accumulation of SWF has a strong correlation to recent rain precipitation and accumulation.

The flux in water level due to increased runoff and recharge into the rivers generally results in increased agitation leading to the formation of SWF. We suspect that the overland flow or sheet discharge during a storm event also contributes to surface water turbulence. This is particularly evident at dams when floodgates are opened to control the rising waters, resulting in significant agitation, foam generation, and accumulation in eddies. Additionally, the overland flow may contribute to an influx of natural terrestrial-derived surfactants in surface water, including ligands, humic substances and plant or fungal biosurfactants. The concepts are further explored in more detailed in subsequent sections of this report.

SWF occurrence on lakes, however, seems to be more nuanced. Although windspeed and direction have been identified as driving factors for foam accumulation, our observations during sampling and reconnaissance suggest that there are other possible atmospheric influences. As observed in **Table 2**, stronger winds were recorded during two site visits when no SWF accumulation was observed on Lake Margrethe. The barometric pressure and humidity levels were considerably higher during the site visit when SWF was observed and collected, leading us to question whether barometric pressure and humidity may play a role in the occurrence, accumulation, and stability of SWF, particularly on lakes. More data is required to develop and test a hypothesis. Additional thoughts on SWF transport are elaborated in **Section 10**.

Rogue River at the Rockford Dam on 12/3/2019.

5. PFAS Evaluation

Due to prevalence of PFAS in the groundwater identified during ongoing Remedial Investigations proximal to each site, analysis of PFAS compounds was recommended to determine the potential contributing fluorinated components of the surface water foams. Similarly, surface water samples were collected at the same time and in the immediate vicinity as the SWF samples to determine the relationship between the foam and surface water.

A total of 16 SWF samples, 2 duplicate SWF, and 12 surface water samples were collected from Michigan water bodies and analyzed using Modified Environmental Protection Agency's (EPA) Method 537 Rev. 1.1 with isotope dilution, including perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), and other fluorinated substances. SWF samples 01 through 04 on the Rogue River do not have accompanying surface water samples. Additional explanation of the PFAS analysis is presented in forthcoming text. The sample locations are presented in **Figure 1**. The samples are summarized in the table below.

Surface Water Foam and Surface Water Samples used for PFAS-41 Isotope Dilution Analysis

Site ID	Surface Water Body	Site Location	Sample Date	Sample ID
A2	Rogue River-SWF	Rockford, MI	November 4, 2019	FM1911041310-01
A1.1	Rogue River-SWF	Rockford, MI	November 4, 2019	FM1911041355-02
A3	Rogue River-SWF	Rockford, MI	November 4, 2019	FM1911041455-03
A4	Rogue River-SWF	Rockford, MI	November 4, 2019	FM1911041530-04
A1.3	Rogue River-SWF	Rockford, MI	December 3, 2019	FM1912031430-06
A1.3	Rogue River-SW	Rockford, MI	December 3, 2019	SW1912031435-06
A1.2	Rogue River-SWF	Rockford, MI	December 3, 2019	FM1912031510-07
A1.2	Rogue River-SW	Rockford, MI	December 3, 2019	SW1912031515-07
B1.1	Thornapple River-SWF	Cascade, MI	December 4, 2019	FM1912040935-08
B1.1	Thornapple River-SW	Cascade, MI	December 4, 2019	SW1912040940-08

Site ID	Surface Water Body	Site Location	Sample Date	Sample ID
B1.2	Thornapple River-SWF	Cascade, MI	January 3, 2020	FM2001030800-09
B1.2	Thornapple River-SW	Cascade, MI	January 3, 2020	SW2001030805-09
B1.3	Thornapple River-SWF	Cascade, MI	January 16, 2020	FM2001161320-10
B1.3	Thornapple River-SW	Cascade, MI	January 16, 2020	SW2001161325-10
B2	Thornapple River-SWF	Cascade, MI	January 16, 2020	FM2001161435-11
B2	Thornapple River-SW	Cascade, MI	January 16, 2020	SW2001161450-11
C1	Huron River-SWF	Wixom, MI	November 22, 2019	FM1911221315-05
C1	Huron River-SW	Wixom, MI	November 22, 2019	SW1911221320-05
D1	Van Etten Lake-SWF	Oscoda, MI	March 31, 2020	FM2003311545-12
D1	Van Etten Lake-SW	Oscoda, MI	March 31, 2020	SW2003311530-12
D2	Van Etten Lake-SWF	Oscoda, MI	March 31, 2020	FM2003311645-13
D2	Van Etten Lake-SW	Oscoda, MI	March 31, 2020	SW2003311630-13
D3	Van Etten Lake-SWF	Oscoda, MI	March 31, 2020	FM2003311725-14
D3	Van Etten Lake-SW	Oscoda, MI	March 31, 2020	SW2003311710-14
E1	Lake Margrethe-SWF	Grayling, MI	April 1, 2020	FM2004011210-15
E1	Lake Margrethe-SW	Grayling, MI	April 1, 2020	SW2004011215-15
F1	Cedar Lake-SWF	Oscoda, MI	April 8, 2020	FM2004081320-16
F1	Cedar Lake-SW	Oscoda, MI	April 8, 2020	SW2004081325-16

5.1 Laboratory Methodology

Vista Analytical Laboratory (Vista) in El Dorado Hills, California conducted the PFAS analysis. Currently, a published USEPA reference method is not available for the analysis of PFAS in SWF. In 2009, USEPA published reference Method 537.1 for finished drinking water, but this method is not appropriate for more complex solid and aqueous matrices. The Method 537.1 is an internal standard method. Internal standardization is a determinative technique where a chemical substance similar to the analytes of interest is added to sample extracts to quantify the target analytes.

EGLE is using an isotope dilution method for analysis of 41 PFAS compounds (41-PFAS). The isotope dilution method is widely accepted as a better technique for quantification where matrix interference may be present and/or analyte loss may occur during the sample preparation process. The Department of Defense's accreditation program using DoD QSM Version 5.3 recognizes that isotope dilution is a better technique for quantifying PFAS at low concentrations, especially in complex environmental matrices due to matrix effects, and requires isotope dilution quantification where the isotopically labeled analytes of interest are available, and the target compound concentration is not so high that serial dilution or direct injection is appropriate.

A laboratory non-detection in the foam samples cannot infer a specific compound is not present in the foam. Laboratory detection limits were higher for foam samples analyzed compared to other sampled media because specific constituents (PFOS, PFOA) were present at elevated concentrations and resulted in laboratory dilution of the samples.

5.2 Work Plan Deviations

Originally a total of 20 SWF samples and five duplicate samples were proposed for PFAS analysis, including multiple samples from Lake Margarethe, Van Etten Lake, and the Huron River, located in northern and eastern counties of Michigan's lower peninsula. Only one SWF was collected from Lake

Margrethe and the Huron River, and only three samples yielded sufficient volume for analysis from Van Etten Lake. Additionally, one SWF sample was collected from Cedar Lake, Oscoda County, not originally proposed in the work plan.

Collection of surface water samples was not originally proposed in the work plan, rather, it was recommended after collection and review of the results of the first four SWF samples collected from the Rogue River in Rockford, Michigan. Challenges with SWF collection include the unpredictable generation, stability, and disappearance of foams on open surface water bodies. SWF tend to appear and disappear within durations measured in hours.

Surface water foams found in fluvial systems, specifically near riffles, and in turbulent stretches below dams, weirs and spillways are more persistent due to constant agitation of the water. As a result, the SWF study contains considerably more river samples than inland lake samples. AECOM's observations on SWF occurrences and transport mechanisms are discussed in **Section 10**.

6. PFAS Reporting

Vista completed the final laboratory analytical report for 41 PFAS compounds on May 8, 2020. A total of 16 SWF samples, plus 2 duplicate samples, and 12 surface water samples were analyzed using the methods described in **Section 5.1**. SWF samples 01 through 04 collected from the Rogue River do not have associated surface water samples for data comparison as discussed in **Section 5.2**. Data were accessed from files provided as electronic deliverable by Vista. Vista Report Summaries are included in **Appendix A**.

6.1 41-PFAS Isotope Dilution Results

Total PFAS concentrations, as a sum of the 41 compounds analyzed, for each SWF sample ranged from less than 5,000 nanograms per liter (ppt), observed in Lake Margrethe, to nearly 250,000 ppt observed in Van Etten Lake. Of the 41 compounds analyzed, 28 of the compounds were detected in at least one of the SWF samples collected during this investigation. Total PFAS concentrations for each surface water sample ranged from less than 5 ppt in the Thornapple River to 251 ppt observed in the Huron River. A total of 14 different PFAS were detected in surface water samples collected during this investigation. The total PFAS concentrations observed in each SWF and surface water sample are summarized in the bar chart presented in **Figure 2**.

The relative percentages of the five most frequently detected PFAS and three PFOS precursors observed in the SWF is presented in the stacked bar chart depicted in **Figure 3**.

The relative percentages of the five most frequently detected PFAS and three PFOS precursors observed in the surface water is presented in the stacked bar chart depicted in **Figure 4**.

As part of the PFAS assessment, the branched and linear isomers of five PFAS analytes with available standards (PFOA, PFHxS, PFOS, EtFOSAA, and MeFOSAA) were quantified and reported by Vista. Due to the concentrations detected and occurrence in samples that were analyzed, AECOM focused primarily on PFOS for comparison of SWF and surface water samples.

Scientific research and knowledge regarding the fate and transport of these chemicals in the environment continues to develop. Based on what is currently understood about PFAS chemistry and the historical use of PFAS in industrial and commercial products, and the fate and transport of these chemicals, AECOM designed this study to evaluate the chemical composition based on the selected PFAS sampling sites, the relationship of various PFAS compounds observed in SWF and surface water on various inland water bodies, along with the following information:

- The concentrations of various PFAS detections represented as percentages of the total PFAS (with regard to the 41 compounds analyzed) content measured in SWF and surface water, on a site by site basis, as depicted in the bar charts above.

- The relative concentrations PFOA, PFOS, and PFOSA detected in samples collected from collocated SWF and surface water samples.
- A comparison of the ratio of branched isomers to linear isomers (the "B/L ratio") of PFOS in SWF and surface water measured during laboratory analyses. The ratio of branched to linear isomers formed during the ECF process can vary depending on how the process is controlled; however, ECF PFOS reportedly had a consistent isomer concentration of 20% to 30% branched and 70% to 80% linear isomers (3M Company 1999; Reagen et al. 2007; Buck et al. 2011). Similarly, a 30% branched to 70% linear isomer ratio was identified in eight lots of PFOS produced by 3M using ECF over a 10-year period (Reagen et al. 2007). A similar B/L ratio is expected to be present at source locations where PFAS waste was disposed or otherwise released to the environment. Evaluating the B/L ratio in samples collected during environmental assessments may also aid in evaluating the relative proximity to a PFAS release or source area because research indicates that branched isomers are more likely to be mobile in the environment, whereas linear isomers are likely to be less mobile and adsorb to soil (Chen, 2015). This can result in the B/L ratio increasing with distance from a source area.

The PFOS concentrations for each SWF and surface water sample are presented in a scatter plot and discussed in more detail in **Section 6.2.** The PFOS B/L ratios are shown as pie charts in **Appendix B** for each SWF and surface water sample and discussed in more detail in **Section 6.3**. PFAS results are shown in **Table 3** and discussed in the sections below.

6.1.1 Rogue River (Site A)

Six SWF and two surface water samples were collected from the Rogue River in Rockford, Michigan, below the Rockford dam and downstream of the former Wolverine Worldwide Tannery (a known source of PFAS contamination). **Figure 5*** shows the location and Total PFAS concentrations of each SWF sample, as well as accompanying bar charts depicting concentrations of the individual PFAS compound detected on a logarithmic scale. PFOS was the most significantly detected PFAS compound in each SWF sample as well as in both surface water samples. PFOS concentrations in the SWF samples range from 55,3000 to 124,000 nanograms/Liter (ppt) (**Table 3**). Additionally, notable concentrations of PFOS precursors, PFOSA, EtFOSAA, and MeFOSAA were detected in each of the SWF samples. In particular, two samples located further downstream of the Rockford Dam (A3 & A4), contained 86,500 ppt and 22,900 ppt EtFOSAA (respectively). Surface water samples contained concentrations of PFOS measuring at 29.8 ppt and 18.5 ppt in locations A1.3 and A1.2, respectively. The PFOS B/L Ratio observed in SWF samples ranged from 38% to 43% branched isomers and 62% to 57% linear isomers. The PFOS B/L Ratio observed in the surface water samples were 35% branched and 65% linear at location A1.3 and 29% branched and 71% linear at location A1.2.

6.1.2 Thornapple River (Site B)

Four SWF and four surface water samples were collected from the Thornapple River in Cascade, Michigan. Three sample sets of SWF and surface water were collected directly below the Cascade Dam and one sample set was collected downstream of Ada Dam, prior to the Grand River confluence. All samples were collected downstream of the Grand Rapids Airport. **Figure 6*** shows the location and Total PFAS concentrations of each SWF sample, as well as accompanying bar charts depicting concentrations of the individual PFAS compounds detected on a logarithmic scale. PFOS was the most significantly detected PFAS compound in each SWF sample, while PFOSA was the most significantly detected PFAS compound in each surface water sample. PFOS concentrations in the SWF samples range from 7,250 to 27,300 ppt (**Table 3**). Additionally, notable concentrations of perfluorononanoic acid (PFNA) and perfluoroethylcyclohexane sulfonate (PFecHS) were detected in each of the SWF samples. PFNA concentrations ranged from 1,010 to 5,510 ppt and PFecHS concentrations ranged from 18.1 to 798 ppt. Surface water samples contained concentrations of PFOS ranging from 0.695 to 2.82 ppt and concentrations of PFOSA ranging from 2.67 to 12.4 ppt. The PFOS B/L Ratio observed in SWF samples ranged from 52% to 63% branched isomers and 37% to 46% linear isomers. Due to low concentrations of PFOS detected in the surface water, the B/L Ratio observed in the surface water samples could only be assessed at location B1.1 which contained 29% branched isomers and 71%linear isomers.

6.1.3 Huron River (Site C)

One SWF and one surface water sample were collected from the Huron River in Brighton, Michigan. The sample set was collected directly below the dam at the Island Lake Picnic Grounds. This sample was collected downstream of a former chrome plating facility, wastewater treatment plant, and several other industrial facilities along this section of the Huron River. **Figure 7*** shows the location and Total PFAS concentration of this SWF sample, as well as the accompanying bar chart depicting the concentrations of the individual PFAS compounds detected on a logarithmic scale. PFOS was the most significantly detected PFAS compound in SWF sample, while 6:2 FTS was observed with the highest concentration in the surface water sample. The PFOS concentration in the SWF sample at this location was 121,000 ppt (**Table 3**). Additionally, notable concentrations of PFDA and 6:2 FTS were detected in the SWF sample. PFDA was detected at a concentration of 6,560 ppt and 6:2 FTS was detected at a concentration of 7,890 ppt. The surface water samples contained a concentration of PFOS measuring at 78.4 ppt and a concentration of 6:2 FTS measuring at 103 ppt. The PFOS B/L Ratio observed in the SWF sample was 30% branched isomers and 70% linear isomers. The PFOS B/L Ratio observed in the surface water sample was 25% branched isomers and 75% linear isomers.

6.1.4 Van Etten Lake (Site D)

Three SWF and three surface water samples were collected from Van Etten Lake in Oscoda, Michigan. Each sample set was collected along the southwest bank of the lake during this study. Van Etten Lake resides due east of the Former Wurthsmith Air Force Base (a known source of PFAS contamination in the area). **Figure 8*** shows the location of each SWF sample, as well as an accompanying bar chart depicting the concentrations of the individual PFAS compounds detected on a logarithmic scale. PFOS was the most significantly detected PFAS compound in each SWF sample, while PFHxS was observed with the highest concentrations in the surface water samples. PFOS concentrations in the SWF samples range from 31,500 to 220,000 ppt (**Table 3**). Additionally, notable concentrations of PFHxS, 6:2 FTS, and 8:2FTS were detected in the SWF samples. PFHxS concentrations ranged from 1,190 to 2,550 ppt, 6:2 FTS concentrations ranged from 354 to 2,650 ppt, and 8:2 FTS concentrations ranged from 126 to 1,030 ppt. Surface water samples contained concentrations of PFOS measuring from 4.43 ppt and 18.8 ppt and concentrations of PFHxS measuring from 5.53 to 37.3 ppt. The PFOS B/L Ratio observed in SWF samples ranged from 43% to 52% branched isomers and 48% to 57% linear isomers. The PFOS B/L Ratio observed in the surface water samples could only be assessed at two locations, D1 and D2, which contained 43% to 53% branched isomers and 57% to 47% linear isomers.

6.1.5 Lake Margrethe (Site E)

One SWF and one surface water sample were collected from Lake Margrethe in Grayling, Michigan. The sample set was collected on the eastern bank of the lake at the confluence of a small creek flowing into the lake. This sample was collected at a location southwest of Grayling Army Airfield. **Figure 9*** shows the location and Total PFAS concentration of this SWF sample, as well as the accompanying bar chart depicting the concentrations of the individual PFAS compounds detected on a logarithmic scale. PFOS was the most significantly detected PFAS compound in SWF sample, while PFOSA was the only PFAS compound detected the surface water sample. The PFOS concentration in the SWF sample at this location was 3,420 ppt (**Table 3**). Additionally, a notable concentration of PFNA was detected in the SWF sample. PFNA was detected at a concentration of 1,010 ppt. The surface water sample contained a concentration of PFOSA measuring at 7.82 ppt. The PFOS B/L Ratio observed in the SWF sample was 65% branched isomers and 35% linear isomers. The PFOS B/L Ratio observed in the surface water sample could not be evaluated since PFOS was not detected in the location from which the sample was collected.

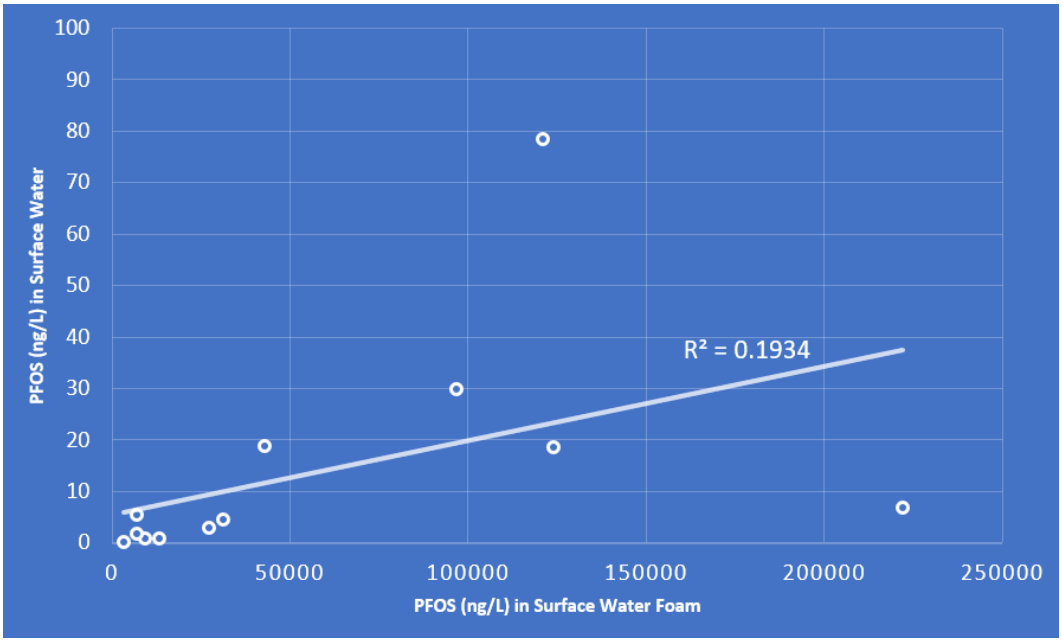
6.1.6 Cedar Lake (Site F)

One SWF and one surface water sample were collected from Cedar Lake in Oscoda, Michigan. The sample set was collected from the causeway in the middle of the lake. Currently there is no potential source of PFAS contamination that has been identified upstream or adjacent to this body of water. **Figure 10*** shows the location and Total PFAS concentration of this SWF sample, as well as the accompanying bar chart depicting the concentrations of the individual PFAS compounds detected on a logarithmic scale. PFOS was the most significantly detected PFAS compound in the SWF sample, while PFOSA was the most abundant PFAS compound detected in the surface water sample. The PFOS concentration in the SWF sample at this location was 7,260 ppt (**Table 3**). Additionally, notable concentrations of PFUnA and PFDA were detected in the SWF sample. PFUnA was detected at a concentration of 4,700 ppt and PFDA was detected at a concentration of 3,100 ppt. The surface water sample contained a concentration of PFOSA measuring at 6.02 ppt, and 5.43 ppt PFOS. The PFOS B/L Ratio observed in the SWF sample was 51% branched isomers and 49% linear isomers. The PFOS B/L Ratio observed in the surface water sample was 52% branched isomers and 48% linear isomers.

*For discussion purposes, locations depicted in Figures 5 through 10 were labeled such that the number following the site letter (A through F), indicates the relative distance downstream and/or distance from the suspected source area. i.e. Sample location A1 is farther upstream and closer to a known source than sample location A4.

6.2 Surface Water-to-SWF PFOS Occurrence

PFOS was the most frequently detected compound in both the surface water and SWF samples from all the sampling locations. PFOS was detected in 16 SWF samples and in 11 surface water samples. The general concentration of PFOS in the surface water foam is approximately 3-4 orders of magnitude higher than PFOS concentrations found in the surface water (example: 50,000 ppt vs. 50 ppt). However, the correlation between surface water concentration and SWF concentration does not appear to be linear and the correlation is poor (R^2 = 0.1934), suggesting that other PFOS fractionation processes are at play and not necessarily based on surface water concentration.



Linear regression graph showing lack of correlation between PFOS concentrations in surface water and surface water foam.

6.3 PFAS Discussion

The total PFAS concentrations presented in the chart shown in **Figure 2** indicates a correlation between the magnitude of total PFAS concentrations and sample type. In each case where surface water samples were collected along with SWF samples, the concentration of total PFAS in SWF samples is orders of magnitude higher than in the corresponding surface water samples. This correlation indicates that an enrichment process is occurring during the development of SWF; however, further sampling and analysis is necessary to substantiate this. Additional sampling will be performed during a forthcoming Phase II study. Additionally, further evaluation of relationships, if any, that may exist between the magnitude in differences between total PFAS concentrations in the two sample types and the PFAS groups (e.g., perfluorinated carboxylates, perfuoroalkane sulfonates, etc.), source types (e.g., mist suppressant, AFFF, Scotchgard™, etc.), and water body type are necessary. These evaluations will aid in the development of enrichment factors for SWF.

A comparison of the stacked bar charts depicting relative PFAS concentrations of SWF and surface water displays observable differences between the PFAS compounds present in SWF vs surface water samples. In the case of PFOS, the most frequently detected compound in both surface water and SWF samples, the data do not indicate as causal relationship (i.e., PFOS is present in high concentrations within the SWF because the concentrations are also high within the surface water media). This lack of correlation suggests that other processes are at play and that chemical fractionation into the SWF is not a function of concentration. For instance, PFOS concentration less than 10 ppt in surface water yielded the highest reported PFOS concentrations in SWF (approximately 225,000 ppt). The exact mechanisms influencing PFAS fractionation into the SWF are not understood based on this limited data set. Future work should segregate processes into abiotic and biotic mechanisms.

As observed in the bar charts included in **Figures 5** through **10**, the PFAS compounds detected appear to be dependent upon the source of PFAS contamination (e.g. AFFF, 3M ScotchgardTM, Chrome plating mist suppressant, etc.). These distinct PFAS profiles suggest that there is a site-specific nature of SWF chemical composition. Further refinement of these profiles and forensic finger printing would require additional contaminant source data and product standards.

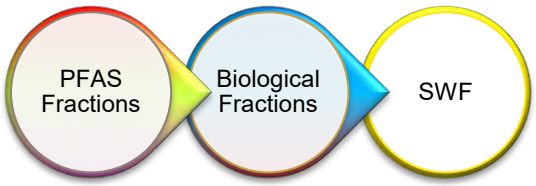
Presence and ratios of observed branched isomers in each sample suggests that ECF is likely the primary PFAS manufacturing process used in the products which resulted in the contamination observed within the surface water bodies investigated during this study. The alternative manufacturing process, telemorization, produces only linear isomers.

While conditions of foam accumulation may be transient, every effort was made to collect a surface water sample within the same vicinity and timeframe of the SWF sample.

The resulting PFOS B/L ratios observed in SWF and surface water samples are within 10% of one another (with the exception of Thornapple River-08), suggesting that the PFOS observed in the SWF and surface water samples collected are from the same source within each study area. While the B/L ratios are similar, the ratio of branched isomers is generally greater in the SWF samples. This may suggest that the branched isomers tend to fractionate more readily into the foam than linear isomers. Additional data is necessary for developing statistical trends and a more in-depth analysis of isomer behavior.

7. Microbiome Analyses

Because SWF occurrences can be both chemical and biological in nature, AECOM recommended in addition to PFAS analyses, performing genetic sequencing to determine the potentially contributing biological components of the surface water foams. The later was accomplished by performing ZymoBIOMICS® Shotgun Metagenomic Sequencing Service for Microbiome Analysis, using 16S, for prokaryotes and 18S Ribosomal RNA, for eukaryotes (Zymo Research Corporation, Irvine, CA).



Chemical and biological profiling of PFAS-laden surface water foams.

The approach allows identification of organism DNA down to a species level for most eukaryotes, and strain level for bacteria and viruses (Staden, 1979; Anderson, 1981; Tammi, 2003). The benefit of the shotgun method is that several genomes reads usually cover the same region on both DNA strands and the sought-after *consensus sequence* can be quickly calculated – i.e., a lot of genetic territory is mapped for the buck (Tammi, 2003).

A total of 13 surface water foam (SWF) samples and one duplicate SWF were collected from Michigan surface waters and analyzed using illumina sequencing for microbiome analyses, including archaea, bacteria, fungi, and some other lower-level eukaryotes. Additional explanation of the microbiome analyses is presented in forthcoming text. The sample locations are presented in **Figure 1**. The samples are summarized in the table below.

Surface Water Foam Samples used for Microbiome Analyses

Site ID	Surface Water Body	Site Location	Sample Date	Sample ID
A2	Rogue River	Rockford, MI	November 4, 2019	FM.RNA.01
A1.1	Rogue River	Rockford, MI	November 4, 2019	FM.RNA.02
A3	Rogue River	Rockford, MI	November 4, 2019	FM.RNA.03
A4	Rogue River	Rockford, MI	November 4, 2019	FM.RNA.04
A1.3	Rogue River	Rockford, MI	December 3, 2019	FM.RNA.06
A1.2	Rogue River	Rockford, MI	December 3, 2019	FM.RNA.07
B1.1	Thornapple River	Cascade, MI	December 4, 2019	FM.RNA.08
B1.2	Thornapple River	Cascade, MI	January 3, 2020	FM.RNA.09
B1.2	Thornapple River	Cascade, MI	January 3, 2020	FM.RNA.09D
B1.3	Thornapple River	Cascade, MI	January 16, 2020	FM.RNA.10
B2	Thornapple River	Cascade, MI	January 16, 2020	FM.RNA.11
C1	Huron River	Wixom, MI	November 22, 2019	FM.RNA.05
D1	Van Etten Lake	Oscoda, MI	SWF SAMPLE VOLUME NOT OBTAINABLE	
D2	Van Etten Lake	Oscoda, MI	SWF SAMPLE VOLUME NOT OBTAINABLE	
D3	Van Etten Lake	Oscoda, MI	SWF SAMPLE VOLUME NOT OBTAINABLE	

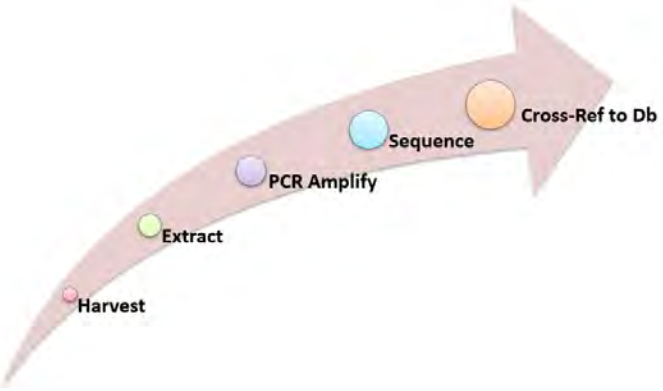
Site ID	Surface Water Body	Site Location	Sample Date	Sample ID
E1	Lake Margarethe	Grayling, MI	April 1, 2020	FM.RNA.13
F1	Cedar Lake	Oscoda, MI	April 8, 2020	FM.RNA.14

SWF samples were collected using methods previously discussed in this technical report and preserved in the field using Zymo Research 2x DNA/RNA Shield® (a nucleic acid preservation buffer (NAP)). Preservation of microbiomes is discussed in a recent paper comparing various methodologies (Menke, et al., 2017). The ratio of preservative to sample was approximately 1:1. The preserved samples were placed in sealed 40 ml conical serum vials and shipped to under chain-of-custody documentation to Zymo Research, Irvine, CA, for respective analyses. Once preserved, the samples did not require refrigeration or shipment on ice.

In some instances, the required aliquot volume (20 ml for microbiome analyses) of collapsed SWF was not attainable for both the PFAS-41 list and the genetic sequencing. This includes SWF from Van Etten Lake, where the PFAS-41 analyses were prioritized over the genetic sequencing data. Thus, at some sample localities shown in **Figure 1**, only PFAS-41 analyses were performed.

7.1 Laboratory Methodology and Limitations

ZymoBIOMICS® shotgun metagenomic sequencing service for microbiome analysis consists of four primary steps after the sample is collected (harvested) and preserved in the field. Within the laboratory, the samples are extracted, amplified using the polymer chain reaction (PCR), sequenced, and then the genetic code cross-referenced to an extensive microbiotics database on identified organisms.



Process flow schematic for metagenomic sequencing

The “shotgun” approach for metagenome sequencing is performed for taxonomic profiling, diversity and abundance assessments, as well as functional analysis (Tammi, 2003). The technique accommodates parallel sequencing of environmental DNA (eDNA) from multiple groups of organisms within a community, with high coverage for genus and species-level detection. This allows for more advanced reporting and genome assemblies. For the Michigan Surface Water Foam (SWF) Study, the shotgun sequencing included archaea, bacteria, and some eukaryotes, including fungi, yeasts and slime molds.

Shotgun sequencing does have limitations (Alkan et al., 2011; S. Tang, 2020). Older, dated criticisms include “algorithmic challenges” associated with genome assemblies and the fact that less efficient computer computational prowess had not yet caught up with the science of genomics (Staden, 1979; Alkan, et al., 2011). Limitations associated with assembly algorithms, sequence and fragment assembly, and erroneous sequences are presented in depth by Tammi (2003). Per discussion with Zymo Research, shotgun sequencing results are completely dependent on the reference database, and challenges associated with the Michigan SWF Study were largely related to cross-referencing genetic sequences to the Zymo microbiomics databases of organisms and generation of false positives (Tang, 2020).

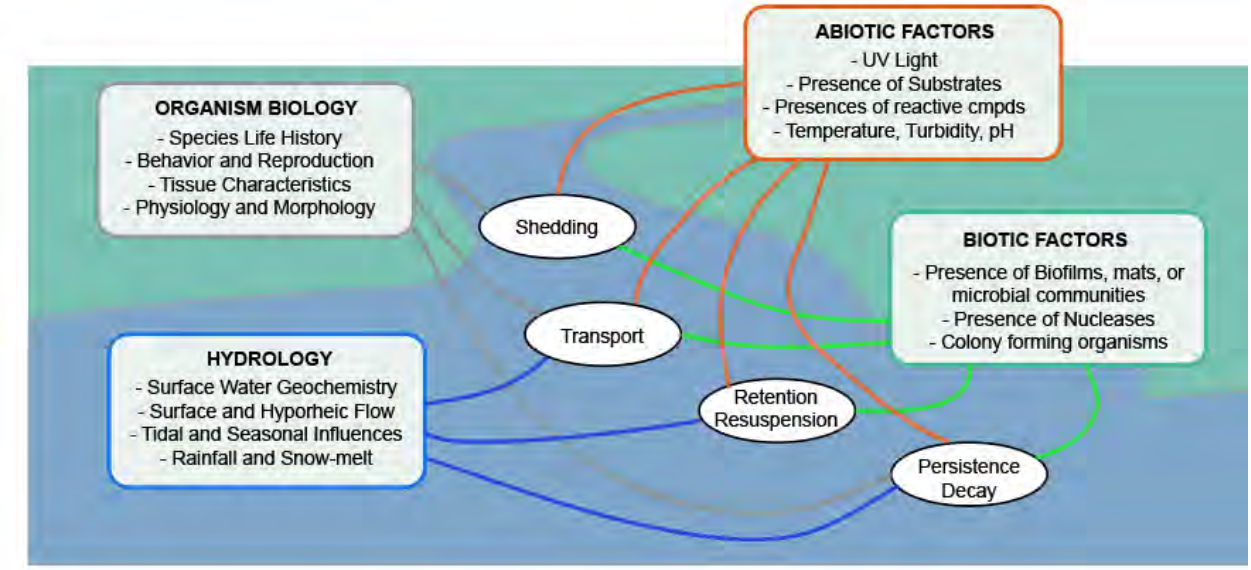
Ideally, confirmation of microorganisms existing in a SWF sample is through laboratory culturing, which was deemed to be beyond the scope of this study. The use of 16S/18S rRNA next-gen sequencing served as a fast economically efficient way to screen for microbiota.

An example false-positive, or misidentification of an organism, was identification of *Salmo salar* (Atlantic salmon) in the original Rogue River samples collected for the study. Atlantic salmon do not exist in the

Rogue River; however, a phylogenetically related species, *Salmo trutta* (Brown trout) is a common species found at the Rockford spillway, in the Rogue River, where SWF samples were collected. In the final microbiomics report, consisting of over 900 files, Zymo's recent 2020 database is more comprehensive than the older one, and their newer pipeline also applied stricter criteria and algorithm to control false positives. Zymo laboratory methods are included in **Appendix C.**

7.2 Approach Efficacy

Microbiomic results reported in this document are derived from genetic material sampled from aqueous environments. The DNA can undergo alteration due to weathering, washing, decay, exposure to ultra-violet radiation (sunlight), and other processes in both fluvial and lacustrine environments (Harrison, et al., 2019; De Souza, et al., 2016). As such, genetic material sequenced in this study have been potentially altered and likely influence what organisms are ultimately identified in this study (further discussed in **Section 8)**. A generalized schematic is presented below showing the fate of eDNA in aquatic systems.



Mechanisms influencing the concentration and fate of eDNA in aquatic systems.
Modified from Harrison, et al., 2019.

However, modern next-gen sequencing methods, such as those deployed in this study, have been sufficiently peer reviewed by the scientific community. Case examples include uses for aquatic invasive species management. Under the Daubert [legal] standard of submittal of scientific evidence, use of eDNA has been deemed to be sufficiently mature and reliable (Sepulveda, et al., 2020).

Identification of an organism's DNA in the SWF samples means that the DNA was found in the media and not necessarily that the organism was found in the media. An obvious example would be presence of a trout species DNA in SWF does not imply that a fish is swimming in the foam. However, presence of DNA signatures of certain bacteria (size between 0.2 and 2.0 micrometer) strongly suggests that the bacteria are in the SWF or nearby surface water. An additional line of scrutiny considers the identified organism with the habitat. Does it make sense that a particular organism might appear in Michigan water? In some instances, "odd-ball" species were identified (e.g. *Massilia oculi* – a potentially pathogenic organism found in infected human eye-balls) and are further discussed under the sampling locations of **Section 8.**

7.3 Workplan Deviations

Originally a total of 20 SWF samples were proposed for genetic sequencing, including multiple samples from Lake Margarethe and Van Etten Lake, located in northern counties of Michigan's lower peninsula. Only one SWF was collected from Lake Margarethe, and no sample was obtainable from Van Etten Lake.

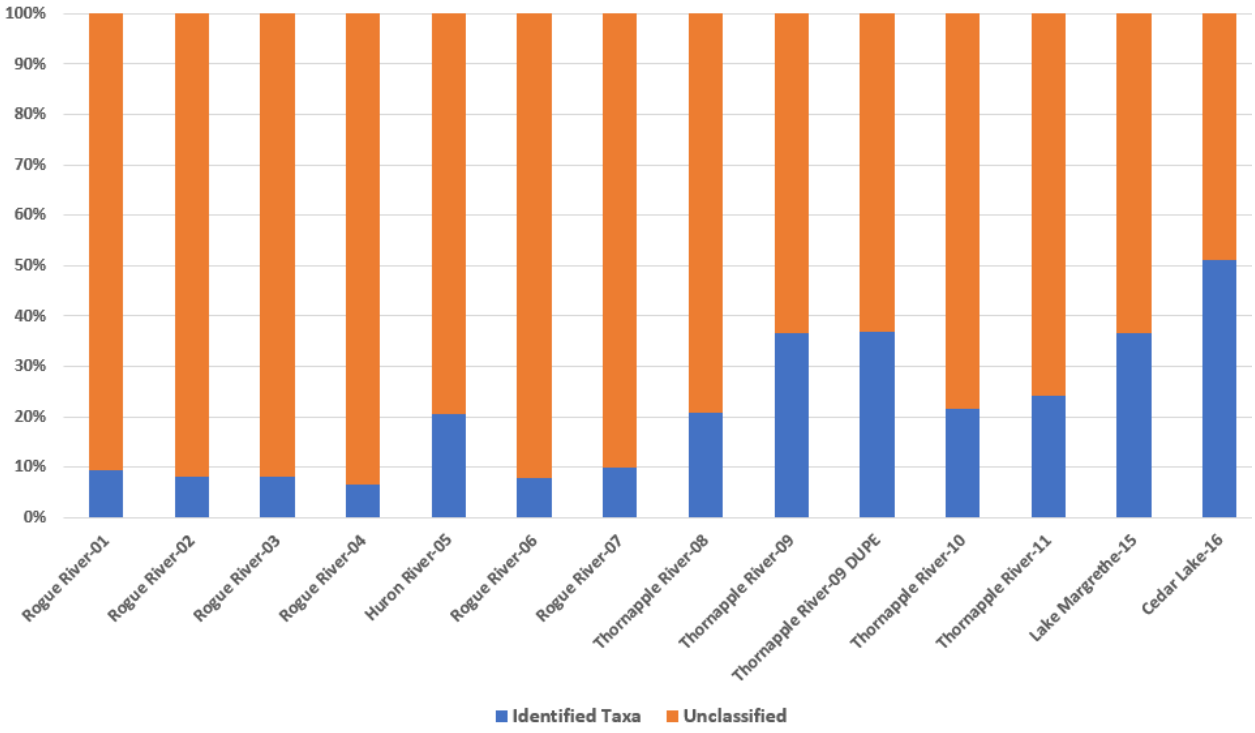
Additionally, one SWF sample was collected from Cedar Lake, Oscoda County, not originally proposed in the work plan.

8. Shotgun Metagenomic Sequencing Reporting

Zymo completed the final "ZymoBIOMICS® Service Report for Shotgun Metagenomic Sequencing" on August 12, 2020. The completed deliverable is 105 megabites (mb) of data, and consisted of nine directories, 254 folders, and 929 files. A total of 13 samples, plus 1 duplicate sample were analyzed using the methods described in **Section 8.1**. Data were accessed both from an on-line portal and from files provided as electronic deliverable by Zymo.

8.1 Shotgun Metagenomic Sequencing Results

A breakdown of "sequencing reads" assigned to the project data indicates that identified taxa for each sample ranged from less than 10% for the river samples to nearly 50% for one of the lake samples. This is not an indication that the data are unreliable but suggests that the bulk of organisms within the foam are unclassified, or more specifically not correlatable to Zymo's current reference organism database. Some of the unclassified sequences may fall under the broad umbrella term *incertae sedis* (phylogeny is problematic), which refers to organisms that are not well mapped. The relative percentage of identified taxa in the SWF is presented in stacked bar chart below.

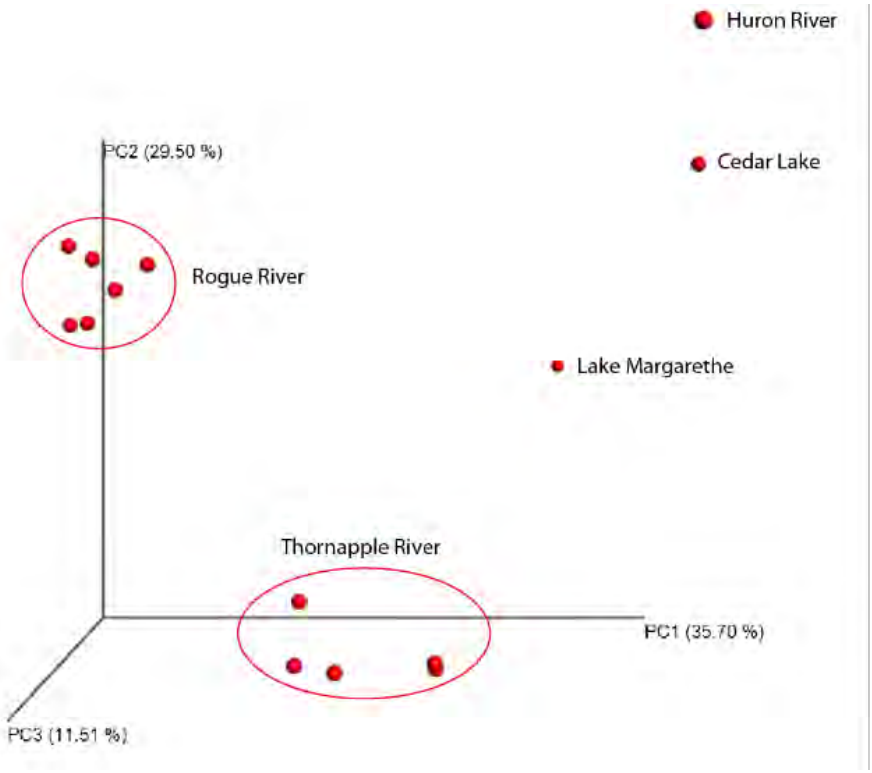


Stacked bar chart showing relative percentages of identified and unclassified taxa in surface water foams from various inland surface waters in Michigan.

As part of the genetic sequencing assessment, AECOM looked at how the different sampling populations may exhibit varying taxonomic signatures. The genetic signature comprised primarily of bacteria and fungi, of each of the five geographically distinct sample locations, show five genetically similar groupings, shown as the Beta-Diversity (**Beta-diversity plot below**). Beta-diversity is a measurement of microbial diversity differences between samples. The graph is the 3-dimensional principle coordinate analysis (PCoA) plot created using the matrix of paired-wise distance between samples calculated by the Bray-

Curtis dissimilarity at a species level. Each dot on the beta diversity plot represents the whole microbial composition profile. Samples with similar microbial composition profiles are closer to each other, while samples with different profiles are farther away from each other.

Variances (depicted as spread out red dots) within the Rogue River and Thornapple River groups are due to different biota occurring in different river sampling locations and other ambient factors such as temporal drift (not all samples were collected at the same time)(De Souza, et al., 2016). Samples from the Rogue River were collected in November and December 2019, and samples from the Thornapple River were collected in December 2019 and January 2020. Sample population of bacteria and other organisms may vary due to seasonality (Lee, et al., 2012; Bêche, et al, 2006; Samad & Bertilsson, 2007).



Bray-Curtis, β-Diversity Plot, showing five sample groupings on a 3D principal coordinate axis. The five samples groups also correlate to five geographically distinct sampling localities.

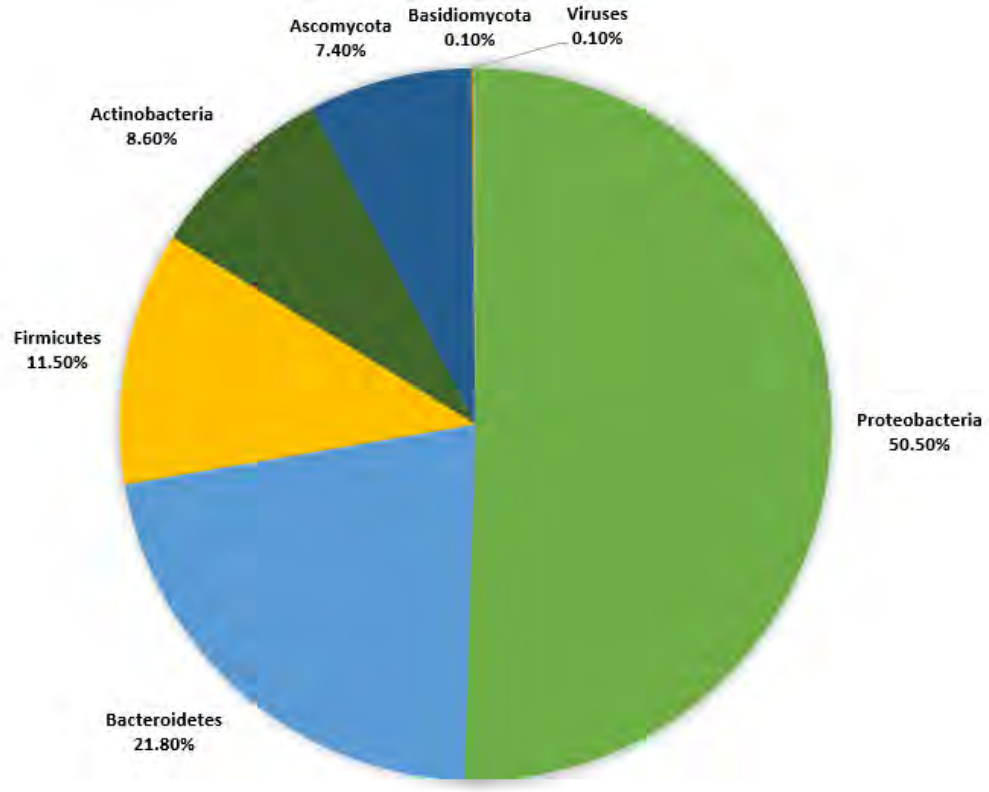
Looking at a total aggregate of all 13 samples, six groups were identified at a phyla-level, including Proteobacteria (50.50%), Bacteroidetes (21.80%), Firmicutes (11.50%), Actinobacteria (8.60%), and the Eukaryotes (Fungi), including Ascomycota (7.40%) and Basidiomycota (0.10%). Viruses were so infrequently detected (<0.10%) and limited to a few of the samples that they are not discussed further in the report. The single reported virus strain was *Invertebrate Iridescent Virus 31* found in some of the river samples and known to be associated with various aquatic and terrestrial isopod crustaceans and various dipterans (Williams, 2008; UniProt, 2020).

Proteobacteria represent the largest and phenotypically diverse phylogenetic lineage of bacteria on the planet and are named after the Greek god *Proteus*, who could assume many different morphologies which is also reflected in the bacteria functional capabilities (Kersters, et al., 2006). They are the most commonly detected bacteria found in SWF samples collected as part of Michigan study. Proteobacteria constitute a significant proportion of the traditional Gram-negative bacteria and display extreme metabolic diversity. They are of biological importance, as they include many known Gram-negatives of medical, veterinary, industrial and agricultural significance. Many of these bacteria are of interest to environmental remediation practitioners, including genus *Geobacter*, which has the ability to reduce metals, respire on organic compounds, and generate an electrical current, and the large diverse genus

Pseudomonas, which demonstrate a great deal of metabolic diversity and consequently are able to colonize a wide range of niches (Lovely, et al., 2011; Palleroni, 2011; Preston, 2003).

The later are represented by 63 species found in the SWF (the most frequent bacteria group found in the SWF samples) with *Pseudomonas lurida* found in all samples, and *P. baetica* and *P. panacis* found in thirteen of the SWF samples. The pseudomonad *P. lurida* is an interesting group of plant-inhabiting bacteria that include fluorescent strains isolated from the phyllosphere (above ground portions) of native grasses (Behrendt, 2007). Their presence in SWF suggests that bacteria were washed into the surface waters possibly from decaying plant matter. Additional discussion of the occurrence of certain bacteria and fungi in the aquatic systems is furthered explored in the discussion section.

The second most frequently identified bacteria were from the phylum Bacteroidetes and accounted for 21.80% of the bacteria identified in the SWF samples. This is another large diverse group which colonizes virtually all types of habitats on Earth, including sediments, soil, and freshwater and marine environments, and the human gastrointestinal tract. Bacteroidetes are increasingly regarded as specialists in the degradation of high molecular weight organic matter, including proteins and carbohydrates (Thomas, et al., 2011). Oddly, the ratio of identified Firmicutes (11.5%) to Bacteroidetes (21.8%) in the SWF samples (a ratio of 0.53) is comparable to the ratio of the same bacteria in the human gut biome (Mariat, et al., 2009).



Pie chart showing predominant phyla-level groups identified in surface water foams. Ascomycota and Basidiomycota represent eukaryote groups identified in the SWF. Viruses constitute less than 0.10% of the total genetic signature of the combined samples.

A pie-chart summary of the average top 10 general found in each surface water body is included in **Appendix D**. *Tables 2 - 12* in **Appendix E** show a breakdown of the common species found in each of the SWF samples. The microbiota identified for each of the surface water foam samples is discussed below.

8.1.1 Lake Margrethe

Bacteria and eukaryotes identified in Lake Margrethe are presented in *Tables 4* and *5*, **Appendix E**, respectively. The most frequently detected bacteria type was *Flavobacterium hydatis*, occurring as median percentage of 7.85%. This is an economically significant pathogenic species of bacteria associated with decline of fish populations (Bernardet, et al., 1996; Loch & Faisal, 2015). The most common eukaryote was *Saccharomyces cerevisiae* ("brewers yeast"), occurring as a median percentage of 30.62%. Yeasts and yeast-like organisms are well documented in freshwater aquatic systems (Slávikova & Vadkertová, 1997). They can be transported from terrestrial environments into aquatic systems through overland transport, groundwater to surface water venting, and aerial dispersal of spores.

8.1.2 Cedar Lake

Bacteria and eukaryotes identified in Cedar Lake are presented in *Tables 4* and *5*, **Appendix E**, respectively. The most frequently detected bacteria type was *Flavobacterium aquatile*, occurring as median percentage of 9.21%. This is also an economically significant pathogenic species of bacteria associated with decline of fish populations (Loch & Faisal, 2015). Flavobacteria are aerobic and have a strict respiratory type of metabolism and most are chemo-organotrophic. They are widely found in aquatic ecosystems. The most common eukaryote was *Saccharomyces cerevisiae* ("brewers yeast"), occurring as a median percentage of 38.41%. Another yeast *Pichia kudriavzevii* occurred at a median percentage of 24.05%. It is a fermentative yeast and a telemorph of the pathogen *Candida krusei.*

8.1.3 Huron River

Bacteria and eukaryotes identified in the Huron River are presented in *Tables 6* and *7*, **Appendix E** respectively. The most common bacteria identified was *Massilia oculi*, occurring as median percentage of 8.83%. One strain of *M. oculi* (CCUG 43427A(T)) was historically identified using 16S rRNA gene sequence analysis as a pathogen first isolated from a human eyeball and patient suffering from endophthalmitis (Kämpfer, et al., 2012). The occurrence of *M. oculi* in surface water foam is unusual.

The most common eukaryote was *Scytaladium lignicola* occurring as a median percentage of 58.61%. This is a common fungus found in wood and in soils.

8.1.4 Rogue River

Bacteria and eukaryotes identified in the Rogue River are presented in *Tables 8* and *9*, **Appendix E**, respectively. The most common bacteria identified by a large margin was *Candidatus rickettsiella isopodorum*, occurring as a median percentage of 21.27%. C. rickettsiella isopodorum is an intracellular arthropod pathogen bacterium originally isolated from terrestrial isopod crustaceans ("pill-bugs") (Leclerque, 2008; Wang & Chandler, 2016). It is interesting to note that the lone virus identified *IIV-31* is also associated with isopods.

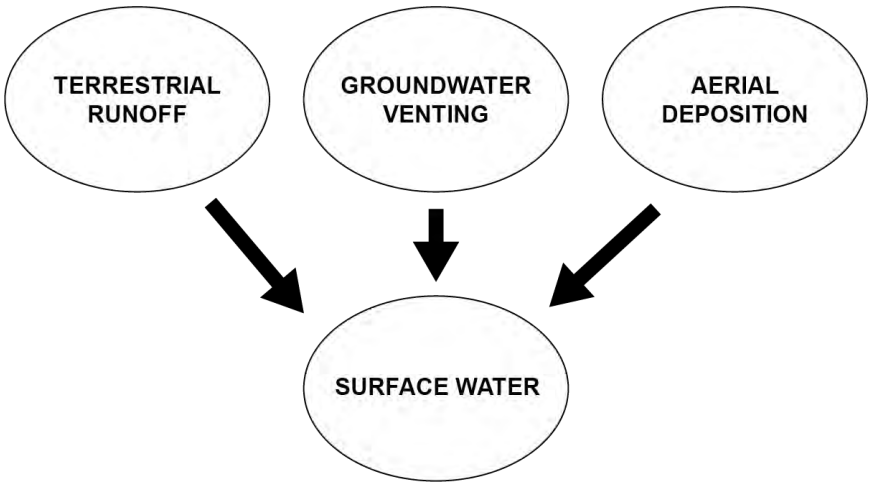
The most common identified eukaryotes in the Rogue River are fungi of the genus *Scytalidium* occurring as a medium percentage of 27.54%.

8.1.5 Thornapple River

Bacteria and eukaryotes identified in the Thornapple River are presented in *Tables 10* and *11*, **Appendix E**, respectively. The most common bacteria identified was *Bacillus thuringiensis* (Bt), occurring as a median percentage of 4.29%. This is a common, soil-dwelling bacteria that is significant due to its insecticidal properties which kill some insects through sporation (NPIC, 2020). *Candidatus rickettsiella isopodorum*, occurred as a median percentage of 4.17% in the Thornapple River samples. The most common eukaryotes identified were *Fusarium avenaceum and Colletotrichium gramicola* occurring as a median percentage of 41.23% and 30.32%, respectively. These are temperate-climate pathogens of grains and legumes. *Colletotrichium* is also known as maize anthracnose fungus which is a wide-spread and problematic agricultural blight or parasitism (Sukno, et al., 2008).

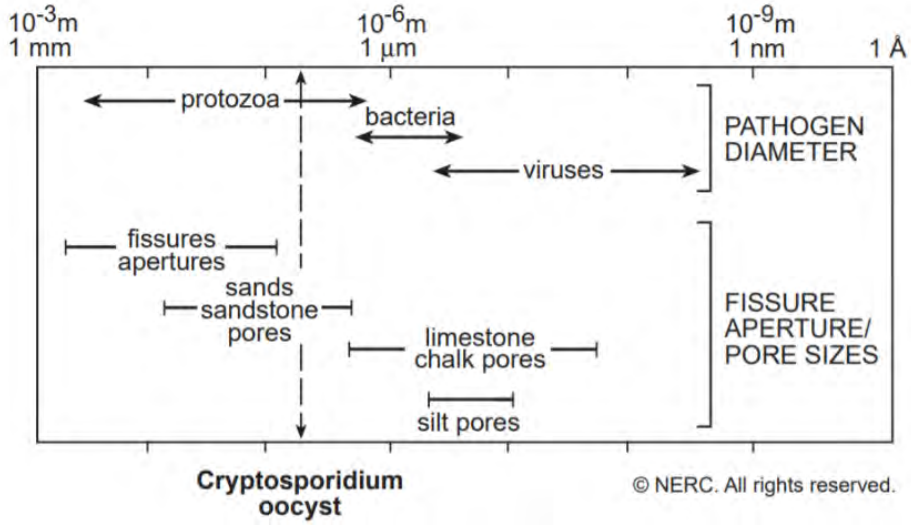
8.2 Microbiomics Discussion

All the SWF samples show a distinct fungal signature and presence of *Pseudomonas* bacteria (*Table 12*, **Appendix E**). The occurrence of various ascomycetes fungi, yeasts and some (spore-producing) bacteria residing in the SWF can be explained through terrestrial to surface water transport mechanisms, including overland flow, groundwater to surface water transport, and aerial deposition of spores to the neuston capillary layer of surface water bodies (Pandey, et al., 2014; Morris, 2020). A generalized diagram showing these transport pathways is presented below. Consider this simplified diagram also in context with the eDNA fate schematic in **Section 7.2**.



Potential transport pathways of Fungal and Bacterial DNA to Surface Water and Surface Water Foams.

Some of the bacteria identified reside in aquatic ecosystems (e.g. *Flavobacteria*) and are likely present in the SWF as a result of being present in the surface water. Likewise, terrestrial fungi such as *Scytaladium*, or more precisely, the genetic information or DNA is present in surface water foams from being transported overland, through groundwater, or as aerial spores. Morris (2020) and others have suggested transport of protozoans, bacteria and some large viruses through the interstitial pore spaces of aquifer sediment, shown below.



Pathogen diameters compared to aquifer pore spaces.
Source: Morrison, 2020. Derived from a Natural Environmental Research Council (NERC) diagram.

The presence of fungal DNA in the PFAS-laden SWF is interesting due to the surfactant nature of fungal exudates. Some identified naturally occurring surfactants found in fungi include glycolipids, sophorolipids, lipopeptides, and complex carbohydrates/proteins and other lipids (Da Silva, et al., 2017). Malpinins, a family of amphiphilic acetylated hexapeptide emulsifiers was recently reported in a filamentous and fermentative zygomycete mushroom *Mortierella alpina* (Baldeweg, et al., 2019). The occurrence of fungal surfactants may also provide a natural explanation for the formation of SWFs. AECOM conducted a simple bench-scale test using Shiitake fungi and determined that a stable foam could be generated using a combination of municipal water and a single mushroom cap (**Appendix F**).

Minute-stable foam derived from agitation of distilled water and humic acid from Leonardite mineral in a 20-ml reaction vessel.

The State of Michigan has allocated additional funding under MPART to collect and analyze additional surface water and SWF samples. As part of that forthcoming Phase II study, AECOM will delve into other foaming mechanisms, including determining presence of various fungal surfactants (enzymes) and whether there might be a co-solvent effect occurring with PFAS and naturally occurring surfactants.

Likewise, humic substances can also form SWFs as evidenced in tannic-rich waters such as at the falls on the Tahquamenon River in Michigan's Upper Peninsula, and limited bench-scale work performed by AECOM.

9. Linear Alkyl Sulfonates (LAS) Evaluation

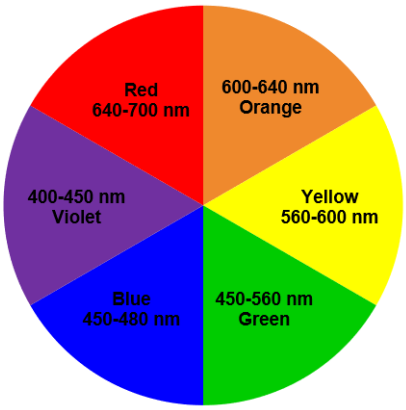
In order to help determine the provenance of SWF, based on premise that other surfactants or detergents besides PFAS such as Linear Alkyl Sulfonates (LAS) may be present in aquatic systems, AECOM recommended evaluation of LAS with the use of an Anionic Surfactants Portable Photometer. LAS may be transported into aquatic systems through discharge of untreated wastewaters from private residents with septic systems living along the lakes and rivers where foam has been observed. LAS have been used excessively as ingredients in care products (e.g., shampoos, body wash) and house-hold cleaning products (e.g., dishwashing detergents, laundry detergents, hard-surface cleaners) which can make their way into septic fields and potentially recharge into aquatic systems. Additional sources of LAS found in aquatic system may be from car washes, laundromats, waste-water treatment plants, sludge amended soils, and agricultural herbicides in which LAS are used as an emulsifier (Modler, 1996).

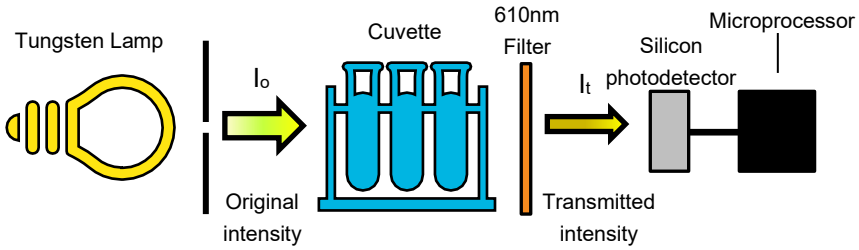
9.1 Methodology

Hannah Instruments Anionic Surfactants Portable Photometer was selected for this evaluation of LAS in surface water foams. Concentrations of anionic surfactants with this device can be accurately determined as sodium dodecylbenzene sulfonate (SDBS) within a range of 0.00 to 3.50 mg/L (Hannah, 2018).

The Anionic Surfactant portable kit uses an adaptation of the USEPA method 425.1 and the anionic surfactant as methylene blue active substances (MBAS) method per Standard Methods for the examination of water and wastewater to measure anionic surfactant concentrations of less than 3.50 mg/L (as SDBS). When the methylene blue reagent is added to samples containing anionic surfactants, the sample will turn a blue hue; the greater the concentration, the deeper the color. The associated color change is then colorimetrically analyzed according to the Beer-Lambert Law. This principle states that light is absorbed by a complementary color and the emitted radiation is dependent upon concentration. For anionic surfactant determination, a narrow band interference filter at 610 nm (orange) allows only

orange light to be detected by the silicon photodetector and omits all other visible light emitted from the tungsten lamp. As the change in color of the reacted sample increases, transmittance ($\%T = \left(\frac{It}{Io}\right) \times 100$) decreases, while the absorbance (A = –log(%T/100)) of the specific wavelength of light increases (Hannah, 2018).

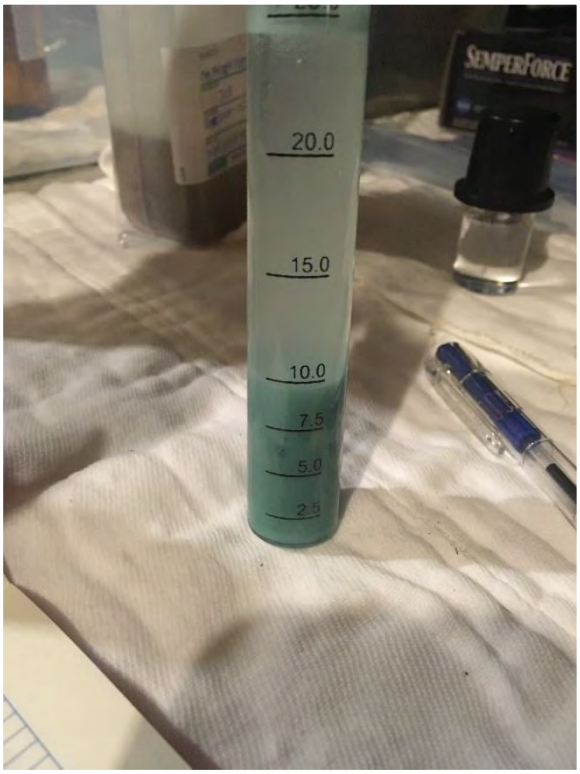




9.2 Results

The resulting solutions, prepared from aliquots of two different collapsed SWF samples, both became emulsified during the sample preparation process. Due to the emulsification, light emitted through the sample from the photometer could not pass through the sample to the photodetector resulting in reading errors.

Rogue River SWF sample combined with MBAS suspended on top of chloroform reagent. [11/5/19]



Sample after shaking vial to combine the SWF with the chloroform reagent – Emulsified. [11/5/19]

The results of this process could potentially indicate following information about SWFs:

- The SDBS present in the samples were much greater than 3.50 mg/L.
- The solution became emulsified due to matrix interference by organic material and debris that were not removed by the cheese cloth strainer during sample preparation.

9.3 Use of LAS for Field-Screening

The approach of utilizing a photometer to field-screen the anionic surfactant content in SWF was tested to evaluate if this equipment could provide useful results in the field and help in identifying correlations between anionic surfactant content and the generation of SWF. However, due to matrix interference resulting in emulsification of the reacted sample, this approach was not suitable as a field analysis of the SWF during this study. An evaluation of how to further clarify the aliquot is necessary to assess whether this equipment could be a viable and reliable means of conducting field screening during future SWF sampling events.

Alternatively, if it can be confirmed that emulsification of SWF following the mixing of the chloroform reagent and collapsed SWF aliquot is indicative of the presence of significant anionic surfactant, the sample preparation portion of this field screening test could be useful. This “shake” test would be an inexpensive, qualitative approach to support decisions about which SWF samples to submit for laboratory analysis of LAS, if laboratory analysis is desired, in the absence of field LAS data.

10. Surface Water Foam Transport Model

AECOM developed a CSM for SWF transport and is shown as **Figure 11**. The CSM depicts two separate scenarios for transport of SWF: (1) In a lacustrine open-water environment, and (2) in a fluvial environment, below a spillway or dam which serves as a conceptualized depiction of SWF transport at the Rockford Spillway, on the Rogue River, Michigan.

Based on key findings of this study, the graphical transport model assumes that the SWFs contain both synthetic surfactants (e.g. PFAS or LAS), but also natural-occurring surfactants derived from biological sources. The model does not delve into groundwater-to-surface water interface interactions which were beyond the scope of this study. In addition to those CSM components noted on **Figure 11**, AECOM believes that a PFAS-containing plume, venting to the hyporheic zone at the sediment-water interface within a surface water body, could render near-shore SWFs. This is an alternative hypothesis to consider in context with the open-water genesis depicted in the CSM.

This graphic serves the following purposes:

1. It depicts likely locations where SWFs may develop and accumulate. As such it can be used as a guide for PFAS practitioners, regulators, academics, consultants and the public where PFAS-laden SWFs may be present.
2. It provides a reasonable scientific explanation how SWFs may be transported on lakes and in rivers.
3. The model does <u>not</u> explain nor claim why certain PFAS isomers are present in SWF and not in surface water, and vice-versa. Additional exploration on that matter are proposed in the forthcoming Phase II study.

11. Key Findings

As follows are key finding from the 2019-2020 Surface Water Foam Study:

1. On inland lakes, SWF are apt to accumulate down-wind in the littoral zone and along the shorelines. Windspeed and wind direction have been identified as driving factors for foam accumulation;

however, our observations during sampling and reconnaissance suggest that there are other possible atmospheric influences.

2. During this assessment, stronger winds were recorded during two site visits when no SWF accumulation was observed on Lake Margrethe. The barometric pressure and humidity levels were considerably higher during the site visit when SWF was observed and collected, leading us to question whether barometric pressure and humidity may play a role in the occurrence, accumulation, and stability of SWF, particularly on lakes. The SWF sampling dataset, from inland lakes was small and the forthcoming Phase II study will focus on Michigan inland lakes.
3. On rivers, SWF are generated in turbulent areas, especially below spillways, near hydro-electric turbines, and areas where riffles occur. River substrates (gravel bottoms) likely play a role in generation of SWFs in fluvial systems.
4. Use of NOAA's Shoreline Cleanup and Assessment Technique (SCAT) Manual which refers to shoreline features which might entrap oil, might serve as helpful proxy guide for assessing and characterizing SWFs (not discussed in main body of the report).
5. SWF sampling can be effectively and safely performed using a modified pool-skimmer and a hand sampling methodology. Samples can be reliably transferred to polyethylene zip-style bags, allowed to collapse, and submitted as aqueous samples for appropriate PFAS analyses.
6. Buddy-system safety precautions are essential for work on or near open water, especially in areas near spillways and dams where surface water can quickly fluctuate. Rivers are especially dangerous during flash-flooding events.
7. SWFs tend to collapse and disappear as quickly as they are identified. In several instances when foam was reported by residents or environmental conditions seemed favorable, sampling crews were mobilized to collect SWF samples to find that no samples were present to collect. SWF field sampling programs should consider use of rapid-deployment techniques where sampling gear and personnel are prepared to sample within hours of the SWF observation.
8. Remote telemetry monitoring should be considered as means to accurately identify SWF presence, and would aid in evaluating the processes of SWF formation and dissipation. This would include the use of real-time videography using digital cameras and dedicated observation portals.
9. Field-screening for Linear Alkyl Sulfonates in SWF does not appear to be practical. PFAS concentrations in the SWF led to ambiguous results complicated due to emulsification of SWF samples. However, emulsification observed in this process could be indicative of significant anionic surfactant presence in the sample. This could provide an inexpensive qualitative field "shake" test which may aid in determining the analytical suite requested from the lab (i.e. is "Go-No Go" field test for anionic surfactants).
10. The correlation observed between total PFAS concentrations detected in SWF and surface water indicates an enrichment process is occurring during the development of SWF. Further evaluation of relationships, if any, that may exist between the magnitude in differences between total PFAS concentrations in the two sample types and the PFAS groups (e.g., perfluorinated carboxylates, perfuoroalkane sulfonates, etc.), source types (e.g., mist suppressant, AFFF, Scotchgard™, etc.), and water body type are necessary. Enrichment mechanisms and those processes governing the fractionation will be further pursued in the Phase II study.
11. The PFAS content of all SWFs primarily consist of PFOS. In some cases, as much as 90% of the total PFAS concentration (of the 41 compounds analyzed) was PFOS. Presence of branched isomers of PFOS as well as the PFOS precursors EtFOSAA and MeFOSAA in each sample suggests that ECF was the primary PFAS manufacturing process used in the products which resulted in the contamination observed within the surface water bodies investigated during this study.
12. The resulting PFOS B/L ratios observed in SWF and surface water samples are within 10% of one another (with the exception of Thornapple River-08), suggesting that the PFOS observed in the SWF and surface water samples collected are from the same source within each study area. While the B/L ratios are similar, the ratio of branched isomers is generally greater in the SWF samples. This

may suggest that the branched isomers tend to fractionate more readily into the foam than linear isomers.

13. PFBA and PFPeA appeared more frequently in surface water samples than in SWF samples. Common occurrence of short chained carboxylates, such as these, in surface water compared to the SWF suggests that presence of specific PFAS compounds may play a more significant role in the generation and accumulation of SWFs.
14. Distinct PFAS profiles suggest that there is a site-specific nature of SWF chemical composition. Presence of PFecHS, as seen particularly in Thornapple River samples, is often indicative of use of certain hydraulic fluids in aircrafts. Further refinement of these profiles and forensic finger printing to determine specific formulations would require additional contaminant source data and product standards.
15. Each of the five separate SWF sampling locations (water bodies) indicates distinct phylogenetic groupings, or five geographically distinct microcosms. This is normal as different surface water bodies should harbor different biological communities.
16. All the SWF samples show a distinct fungal signature and presence of *Pseudomonas* bacteria DNA. The occurrence of various ascomycetes fungi, yeasts and some (spore-producing) bacteria DNA residing in the SWF can be explained through terrestrial to surface water transport mechanisms, including overland flow, groundwater to surface water transport, and aerial deposition of spores to surface water bodies.
17. Various plant, fish and human pathogen DNA was identified in various SWF samples. Identified plant pathogen DNA in SWF include *Fusarium avenaceum* and *Colletotrichium gramicola* which can manifest as anthracnose fungi in various cereal grains, corn and legumes. Fish pathogens include bacteria of the genus *Flavobacterium*. Definitive identification of bacteria would involve other diagnostic tools in concert with 16S rRNA, including culturing organisms from the SWF samples.
18. Other bacteria DNA found in the Rogue River SWF samples are suggestive of industrial waste-water effluents, including *Sphaerotilus hippei* and *Arcicella aurantiaca*.
19. SWF transport is lacustrine environments is largely governed by wind and near-shore currents. Transport in fluvial systems is largely dictated by current flow. In both transport scenarios shoreline features including presence of beaches, sheltered coves, snags, rocks or boulders, eddy pools, or backwater low-energy environments serve as areas where SWF may accumulate.
20. SWF persistence is short and measured in terms of hours.

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Figures

Site E: Lake Margarethe - Grayling, MI

Site F: Cedar Lake - Oscoda, MI

Site D: Van Etten Lake - Oscoda, MI

Site A: Rogue River - Rockford, MI

Site B: Thornapple River - Cascade, MI

Site C: Huron River - Wixom, MI

EGLE

AECOM

Prepared: 4/28/2020

Map Location

Legend

Site Location

N

0 10 20 Miles

FIGURE 1
SITE OVERVIEW

PFAS SURFACE WATER & FOAM STUDY

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Figure 2: Total PFAS in SWF vs. Surface Water

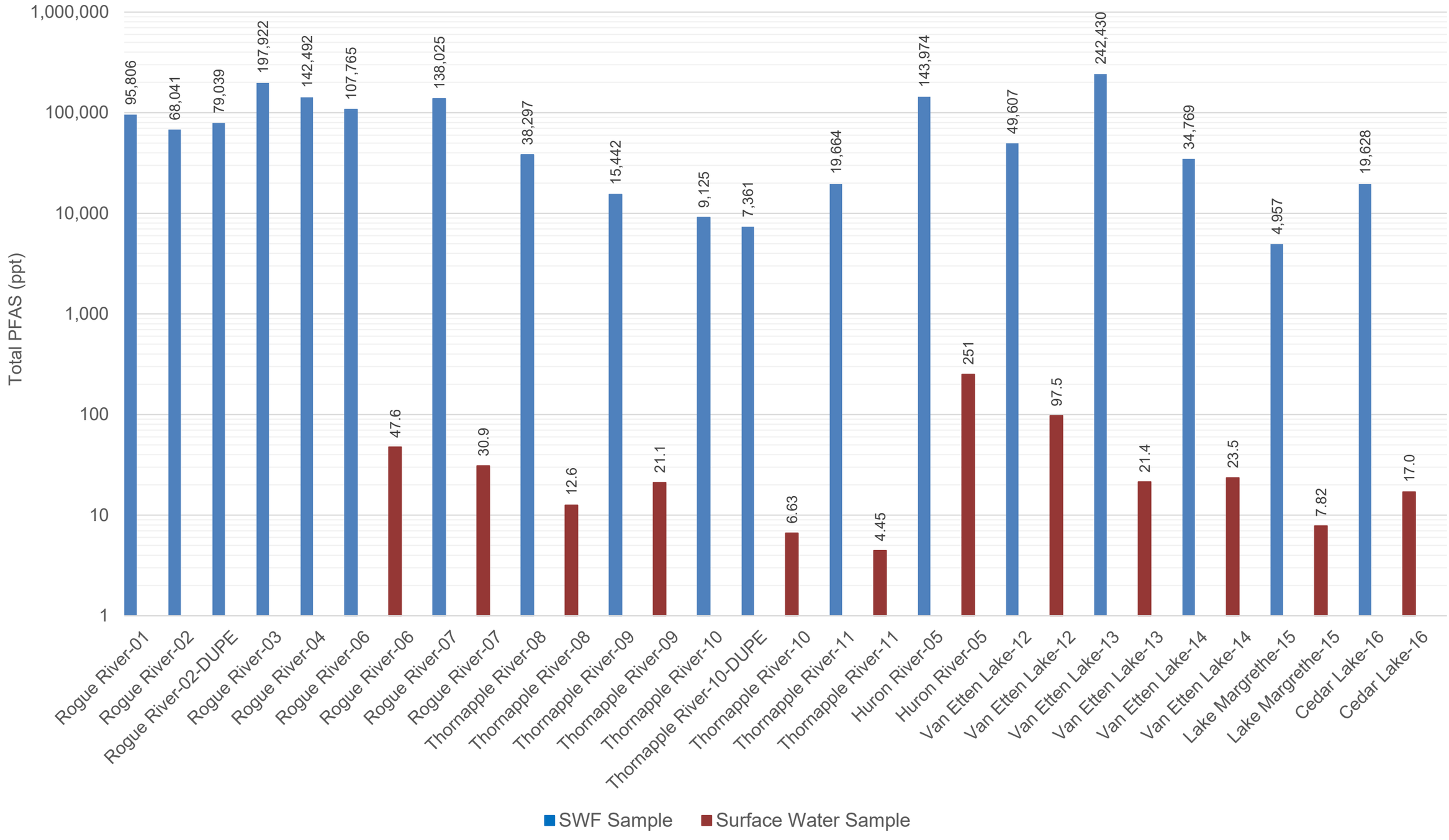
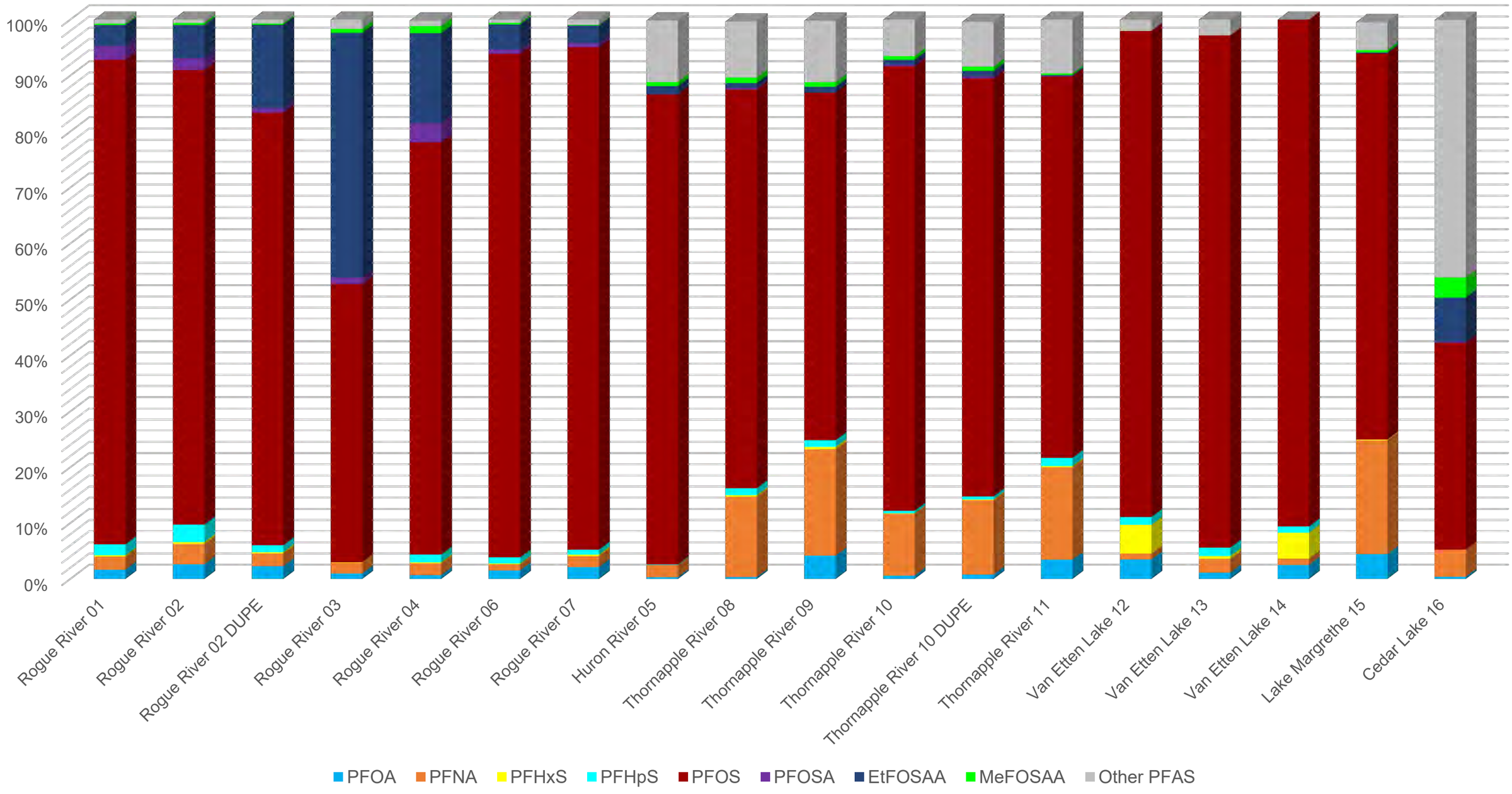
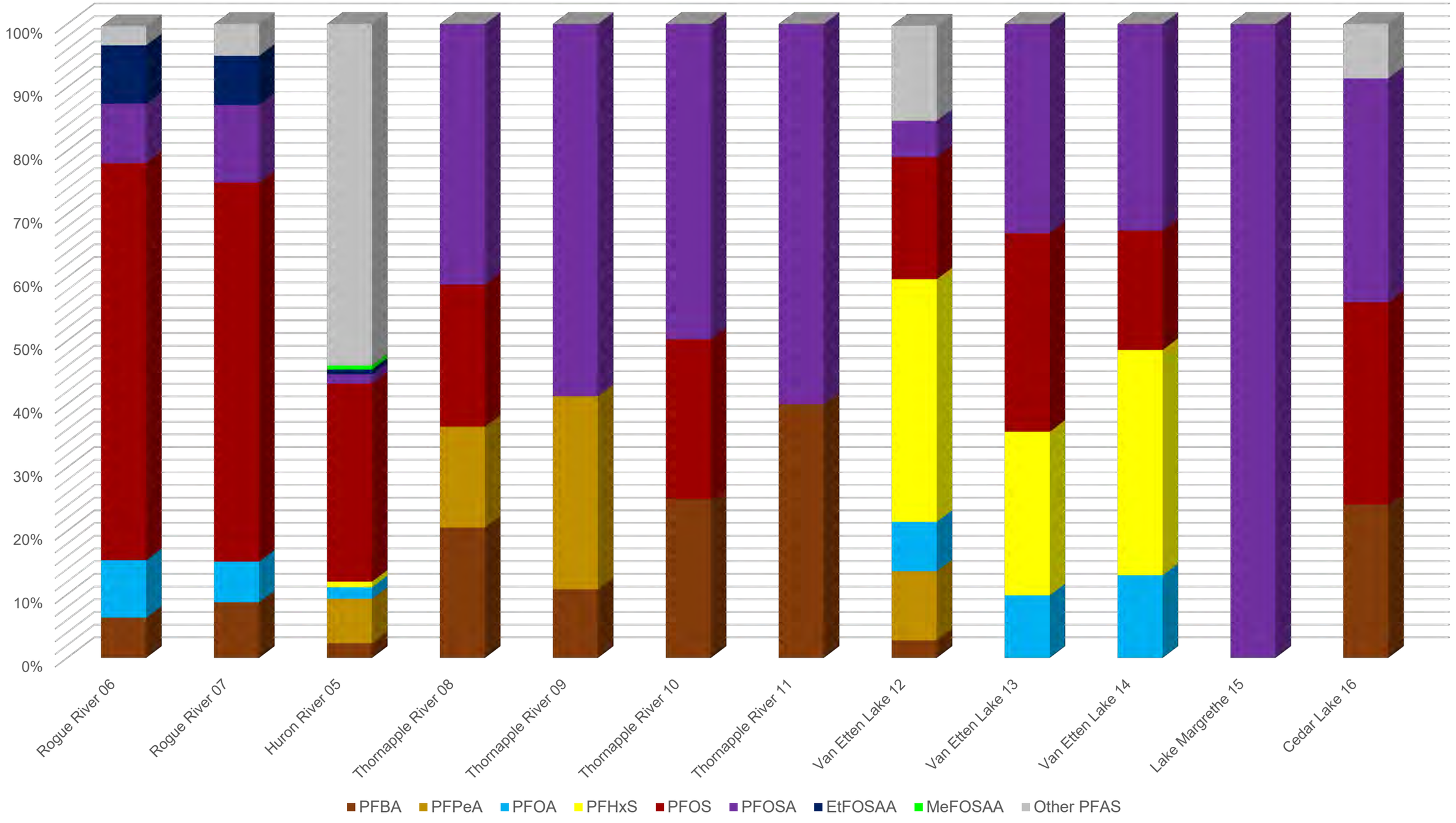


Figure 3: Relative Percentage of Select PFAS Compounds in SWF



Bar chart showing relative percentages of the five most frequently observed PFAS and three PFOS precursors in SWF samples from various inland surface waters in Michigan. Analytes arranged left to right by Group (Carboxylates, Sulfonates, Precursors) and Chain Length (Short to Long).

Figure 4: Relative Percentage of Select PFAS Compounds in Surface Water



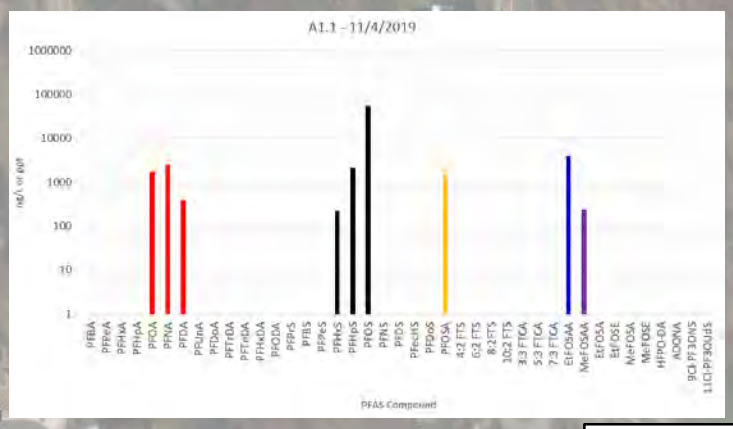
Bar chart showing relative percentages of the five most frequently observed PFAS and three PFOS precursors in surface water samples from various inland surface waters in Michigan. Analytes arranged left to right by Group (Carboxylates, Sulfonates, Precursors) and Chain Length (Short to Long).

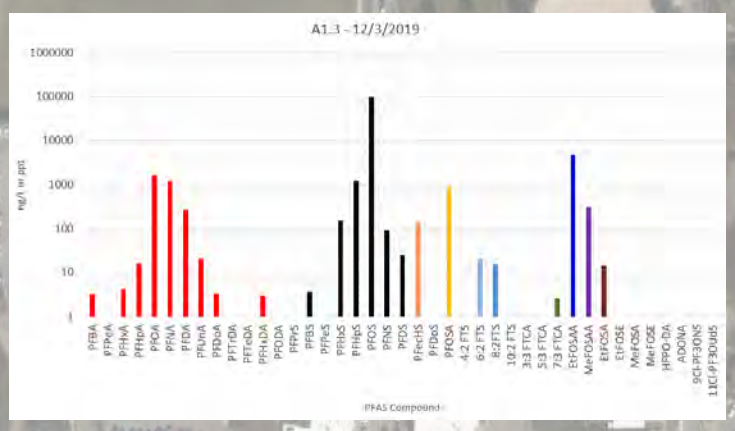
PFAS Groups

- Perfluorinated carboxylic acids (PFCAs)
- Perfluoroalkane sulfonates (PFSAs)
- Perfluoroethylcyclohexane sulfonate (PFecHS)
- Perfluoroalkane sulfonamide (FASA)
- Fluorotelomer sulfonic acids (FTSAs)
- Fluorotelomer carboxylic acids (FTCAs)
- 2-(N-Ethyl-perfluorooctane sulfonamido acetic acid (EtFOSAA)
- 2-(N-Methyl-perfluorooctane sulfonamido acetic acid (MeFOSAA)
- N-Ethyl perfluoroctane sulfonamide (EtFOSA)

Former Rockford Tannery

ROGUE RIVER





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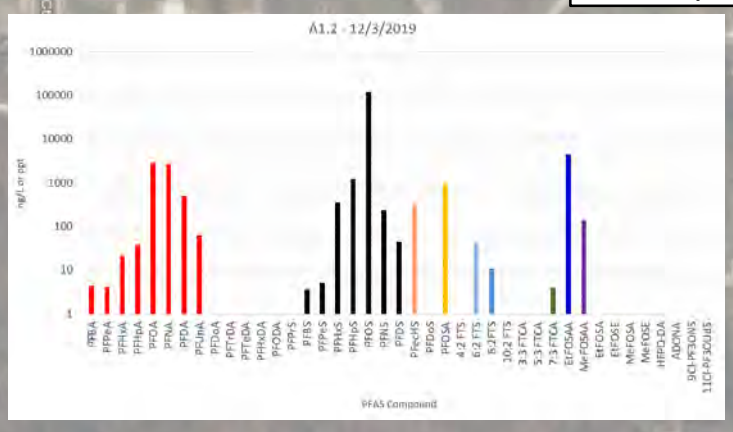
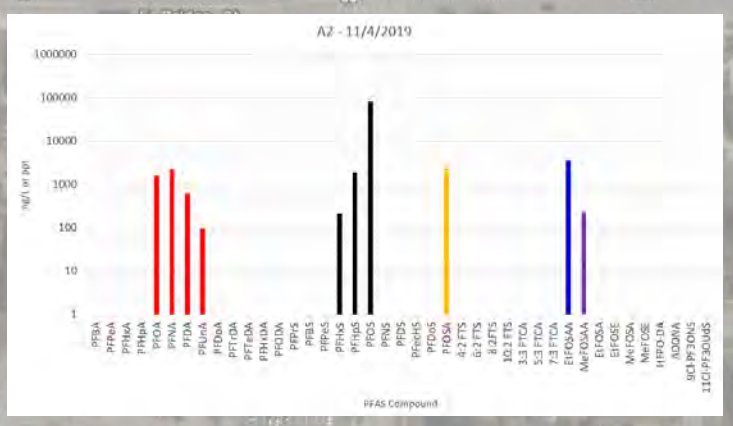
A1.3 (12/3/2019)
107,765 | 47.6

A1.2 (12/3/2019)
138,024 | 30.9





Flow Direction

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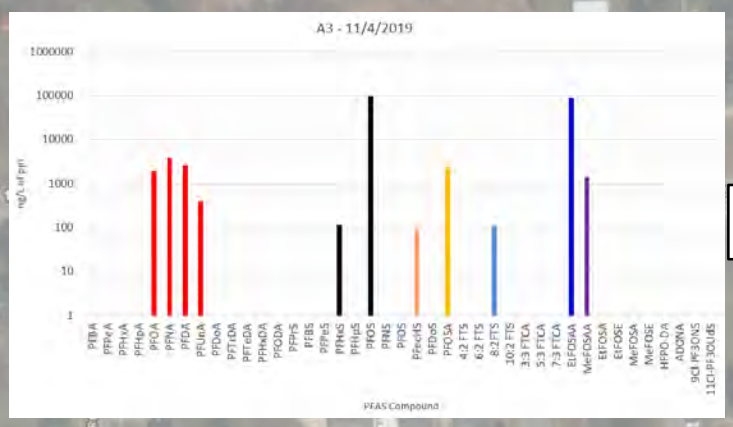
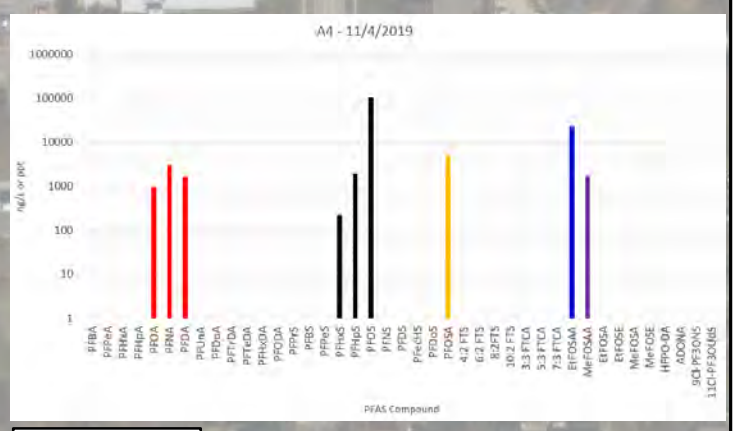
95,806 | -





A3 (11/4/2019)
197,922 | -

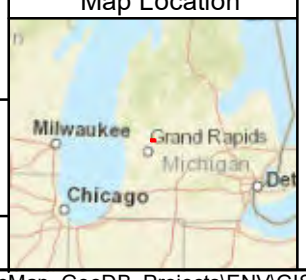
A4 (11/4/2019)
142,492 | -

EGLE

AECOM

Prepared: 2/19/2020

Map Location



Legend

- Foam Sampling Location
- Surface Water Sampling Location

Site ID (Sample Date)
Total PFAS in foam (ppt) | Total PFAS in surface water (ppt)

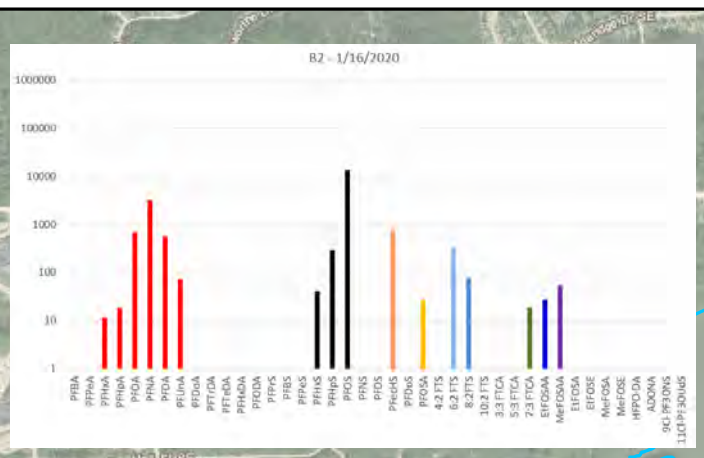
N

0 100 200 Feet

FIGURE 5
ROGUE RIVER -
ROCKFORD, MI

PFAS SURFACE WATER & FOAM STUDY

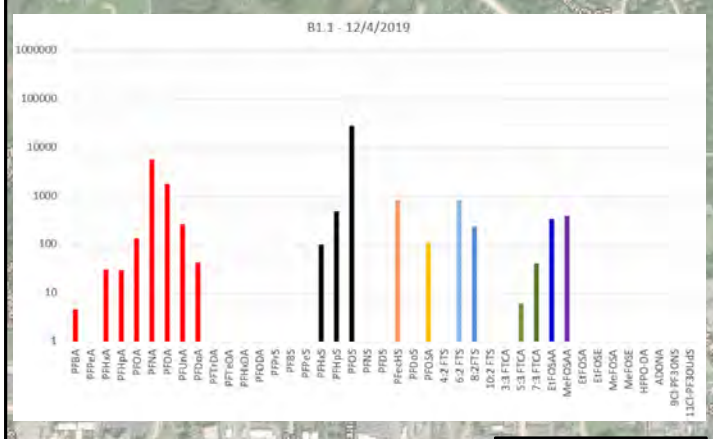
G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\PFAS_SW_Foam_Study\MXDs\Figure_2_Rogue_River_Rockford.mxd



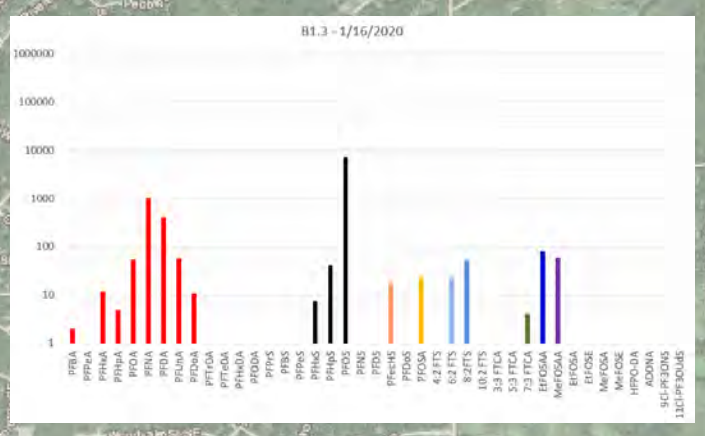
B2 (1/16/2020)
19,664 | 4.5

PFAS Groups

- Perfluorinated carboxylic acids (PFCAs)
- Perfluoroalkane sulfonates (PFSAs)
- Perfluoroethylcyclohexane sulfonate (PFecHS)
- Perfluoroalkane sulfonamide (FASA)
- Fluorotelomer sulfonic acids (FTSAs)
- Fluorotelomer carboxylic acids (FTCAs)
- 2-(N-Ethyl-perfluorooctane sulfonamido acetic acid (EtFOSAA)
- 2-(N-Methyl-perfluorooctane sulfonamido acetic acid (MeFOSAA)
- N-Ethyl perfluoroctane sulfonamide (EtFOSA)

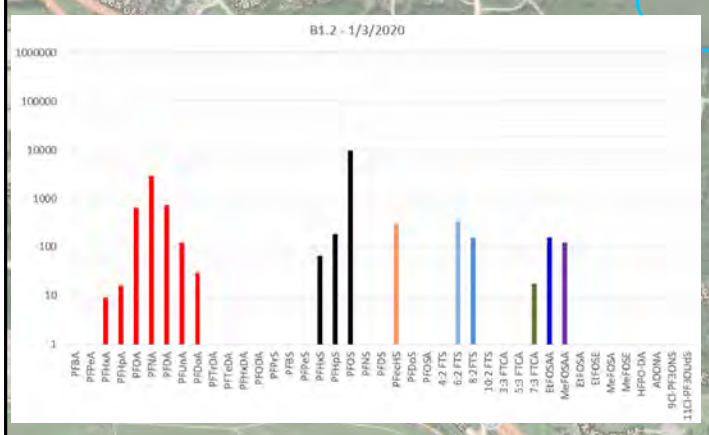


B1.1 (12/4/2019)
38,296 | 12.6



B1.3 (1/16/2020)
9,125 | 6.6

B1.2 (1/3/2020)
15,442 | 21.1



Flow Direction

THORNAPPLE RIVER

Grand Rapids Airport

Map Location

Legend

- Foam Sampling Location
- Surface Water Sampling Location

Site ID (Sample Date)
Total PFAS in foam (ppt) | Total PFAS in surface water (ppt)

N

0 1,000 2,000 Feet

EGLE

AECOM

Prepared: 2/19/2020

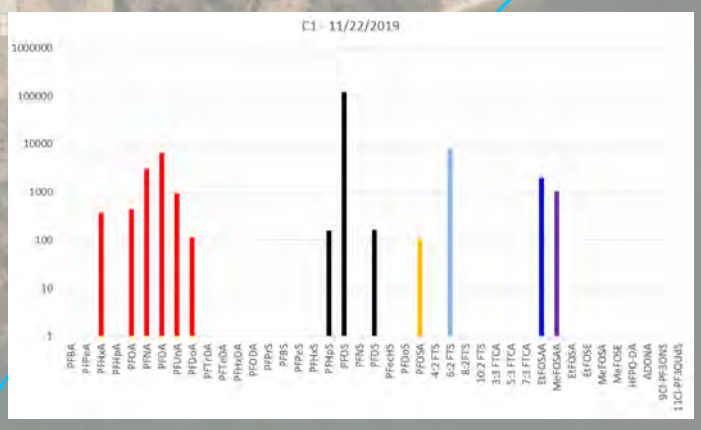
FIGURE 6
THORNAPPLE RIVER - CASCADE, MI

PFAS SURFACE WATER & FOAM STUDY

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\PFAS_SW_Foam_Study\MXDs\Figure_3_Thornapple_River_Cascade.mxd

PFAS Groups

- Perfluorinated carboxylic acids (PFCAs)
- Perfluoroalkane sulfonates (PFSAs)
- Perfluoroethylcyclohexane sulfonate (PFecHS)
- Perfluoroalkane sulfonamide (FASA)
- Fluorotelomer sulfonic acids (FTSAs)
- Fluorotelomer carboxylic acids (FTCAs)
- 2-(N-Ethyl-perfluorooctane sulfonamido acetic acid (EtFOSAA)
- 2-(N-Methyl-perfluorooctane sulfonamido acetic acid (MeFOSAA)
- N-Ethyl perfluoroctane sulfonamide (EtFOSA)



C1 (11/22/2019)
121,439 | 82.9

Flow Direction

Huron River

EGLE

AECOM

Prepared: 2/19/2020

Map Location

Legend

- Foam Sampling Location
- Surface Water Sampling Location

Site ID (Sample Date)
Total PFAS in foam (ppt) | Total PFAS in surface water (ppt)

N

0 100 200 Feet

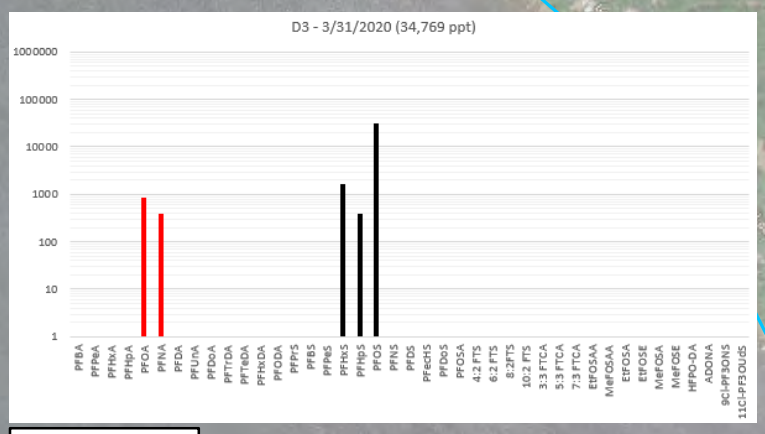
FIGURE 7
HURON RIVER -
WIXOM, MI

PFAS SURFACE WATER &
FOAM STUDY

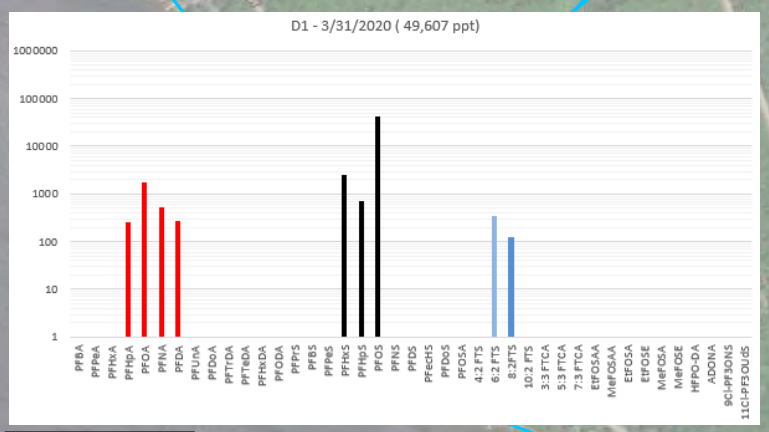
G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\PFAS_SW_Foam_Study\MXDs\Figure_4_Huron_River_Wixom.mxd

PFAS Groups

- Perfluorinated carboxylic acids (PFCAs)
- Perfluoroalkane sulfonates (PFSAs)
- Perfluoroethylcyclohexane sulfonate (PFecHS)
- Perfluoroalkane sulfonamide (FASA)
- Fluorotelomer sulfonic acids (FTSAs)
- Fluorotelomer carboxylic acids (FTCAs)
- 2-(N-Ethyl-perfluorooctane sulfonamido acetic acid (EtFOSAA)
- 2-(N-Methyl-perfluorooctane sulfonamido acetic acid (MeFOSAA)
- N-Ethyl perfluoroctane sulfonamide (EtFOSA)



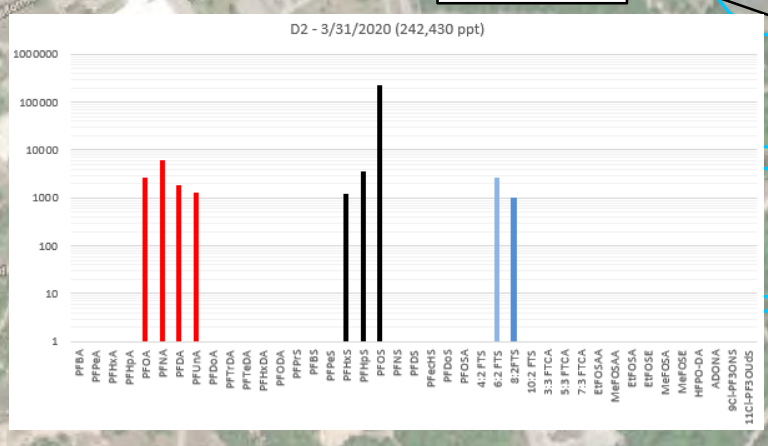
D3 (3/31/2020)
34,769 | 23.5



D1 (3/31/2020)
49,607 | 97.5

Flow Direction

D2 (3/31/2020)
242,430 | 21.4



EGLE

AECOM

Prepared: 5/6/2020

Map Location

Legend

- Foam Sampling Location
- Surface Water Sampling Location

Site ID (Sample Date)
Total PFAS in foam (ppt) | Total PFAS in surface water (ppt)

N

0 500 1,000 Feet

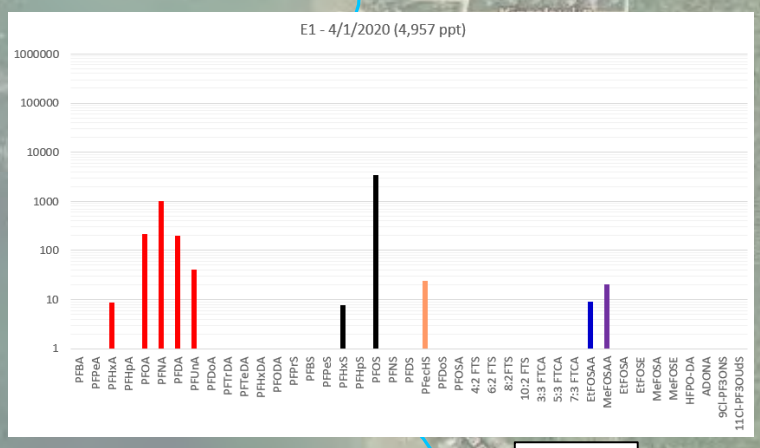
FIGURE 8
VAN ETTEN LAKE -
OSCODA, MI

PFAS SURFACE WATER &
FOAM STUDY

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\PFAS_SW_Foam_Study\MXDs\Figure_5_Van_Etten_Lake.mxd

PFAS Groups

- Perfluorinated carboxylic acids (PFCAs)
- Perfluoroalkane sulfonates (PFSAs)
- Perfluoroethylcyclohexane sulfonate (PFecHS)
- Perfluoroalkane sulfonamide (FASA)
- Fluorotelomer sulfonic acids (FTSAs)
- Fluorotelomer carboxylic acids (FTCAs)
- 2-(N-Ethyl-perfluorooctane sulfonamido acetic acid (EtFOSAA)
- 2-(N-Methyl-perfluorooctane sulfonamido acetic acid (MeFOSAA)
- N-Ethyl perfluoroctane sulfonamide (EtFOSA)



E1 (4/1/2020)
4,957 | 7.82

Portage Creek

Dollar Lake Rd
Portage Heights Ave
Monroe Ave
Madison Ave
Washington Ave
Regimental Way
Battalion Blvd
Blue Heron Pl
Chicago Blvd
Outing Pl
W M 72 Hwy
Own Way
Beech Ter
Apollo Ave
Lincoln Park Blvd
Spinnaker St
Sand Castle Ct
Nelson Dr
Matilda Dr
Queensborough Ln
Oakdale Dr
Arnall Rd
Laura Ln
Eagle Point Rd
Florida Pl
Berns Dr
Eagle St
McIntyre Landing Rd
Euclid Ave
Euclid Rd
McAuley Rd
E Lake Shore Dr
Summet Ave
Finch Ln
Magnetic Blvd
N Portage Ave
Insley Ave
Rasmus Dr
Borchers Way
Trailer Park Rd
Service Rd
1st St
Beaver Creek Rd
Howe Rd
Wilson Hill Rd
S Military Rd
2nd St
3rd St
Kitchen Rd
Lake Rd
Parade Rd
11th St
10th St
9th St
8th St
7th St
6th St
Howe Rd
M-25

Map Location

Legend

- Foam Sampling Location
- Surface Water Sampling Location

Site ID (Sample Date)
Total PFAS in foam (ppt) | Total PFAS in surface water (ppt)

N

0 500 1,000 Feet

EGLE

AECOM

Prepared: 5/6/2020

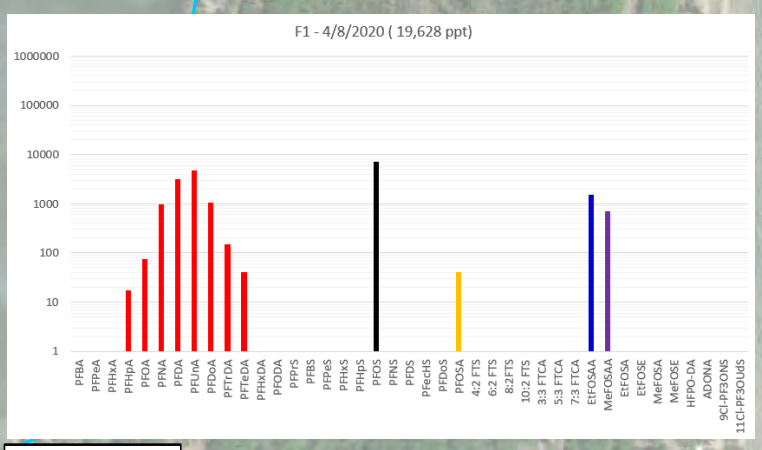
FIGURE 9
LAKE MARGARETHE-
GRAYLING, MI

PFAS SURFACE WATER &
FOAM STUDY

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\PFAS_SW_Foam_Study\MXDs\Figure_6_Lake_Margarethe.mxd

PFAS Groups

- Perfluorinated carboxylic acids (PFCAs)
- Perfluoroalkane sulfonates (PFSAs)
- Perfluoroethylcyclohexane sulfonate (PFecHS)
- Perfluoroalkane sulfonamide (FASA)
- Fluorotelomer sulfonic acids (FTSAs)
- Fluorotelomer carboxylic acids (FTCAs)
- 2-(N-Ethyl-perfluorooctane sulfonamido acetic acid (EtFOSAA)
- 2-(N-Methyl-perfluorooctane sulfonamido acetic acid (MeFOSAA)
- N-Ethyl perfluoroctane sulfonamide (EtFOSA)



F1 (4/8/2020)
19,628 | 17.0

Map Location

Legend

- Foam Sampling Location
- Surface Water Sampling Location

Site ID (Sample Date)
Total PFAS in foam (ppt) | Total PFAS in surface water (ppt)

N

0 500 1,000 Feet

EGLE

AECOM

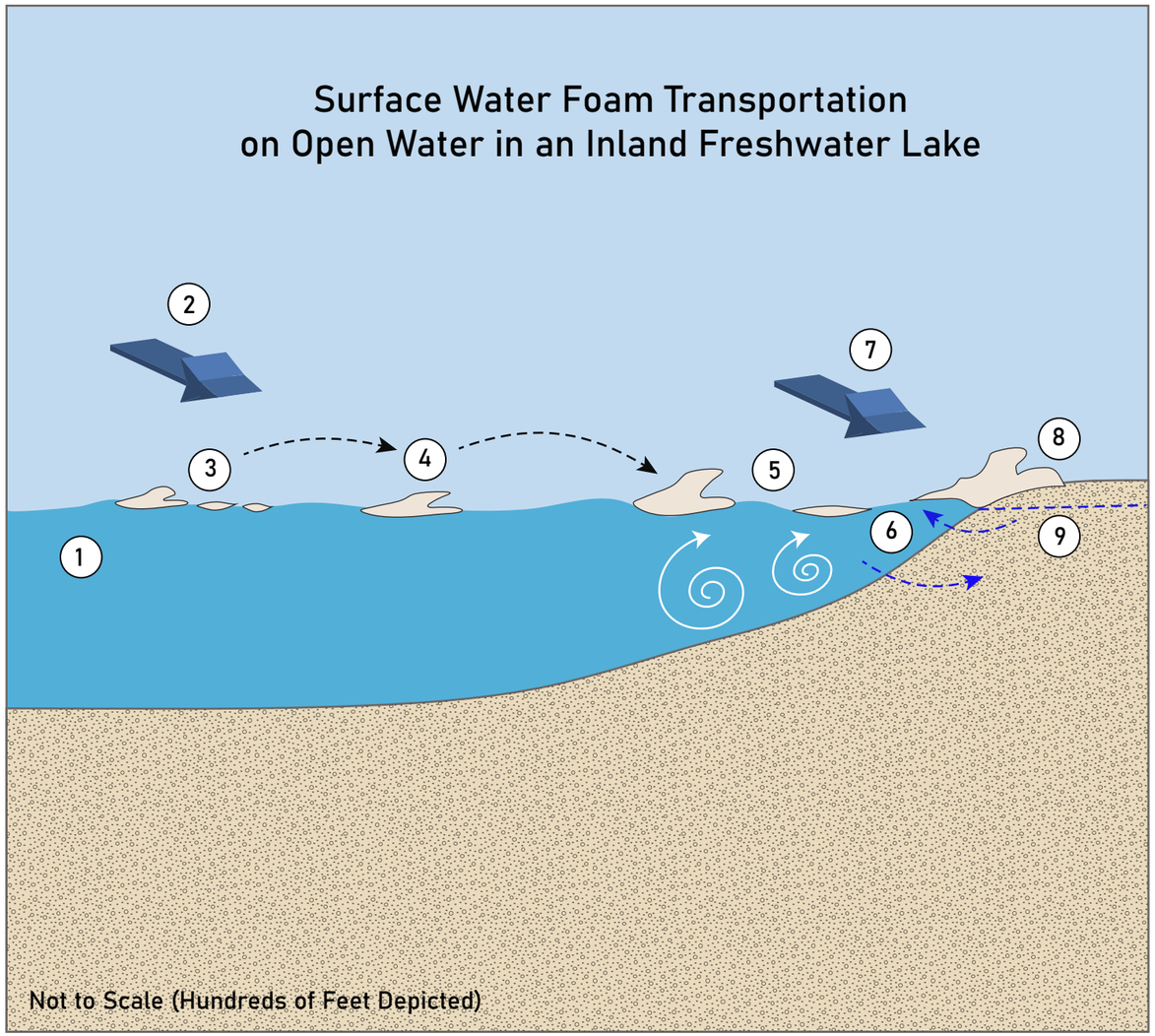
Prepared: 5/6/2020

FIGURE 10
CEDAR LAKE-
OSCODA, MI

PFAS SURFACE WATER &
FOAM STUDY

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\PFAS_SW_Foam_Study\MXDs\Figure_7_Cedar_Lake.mxd

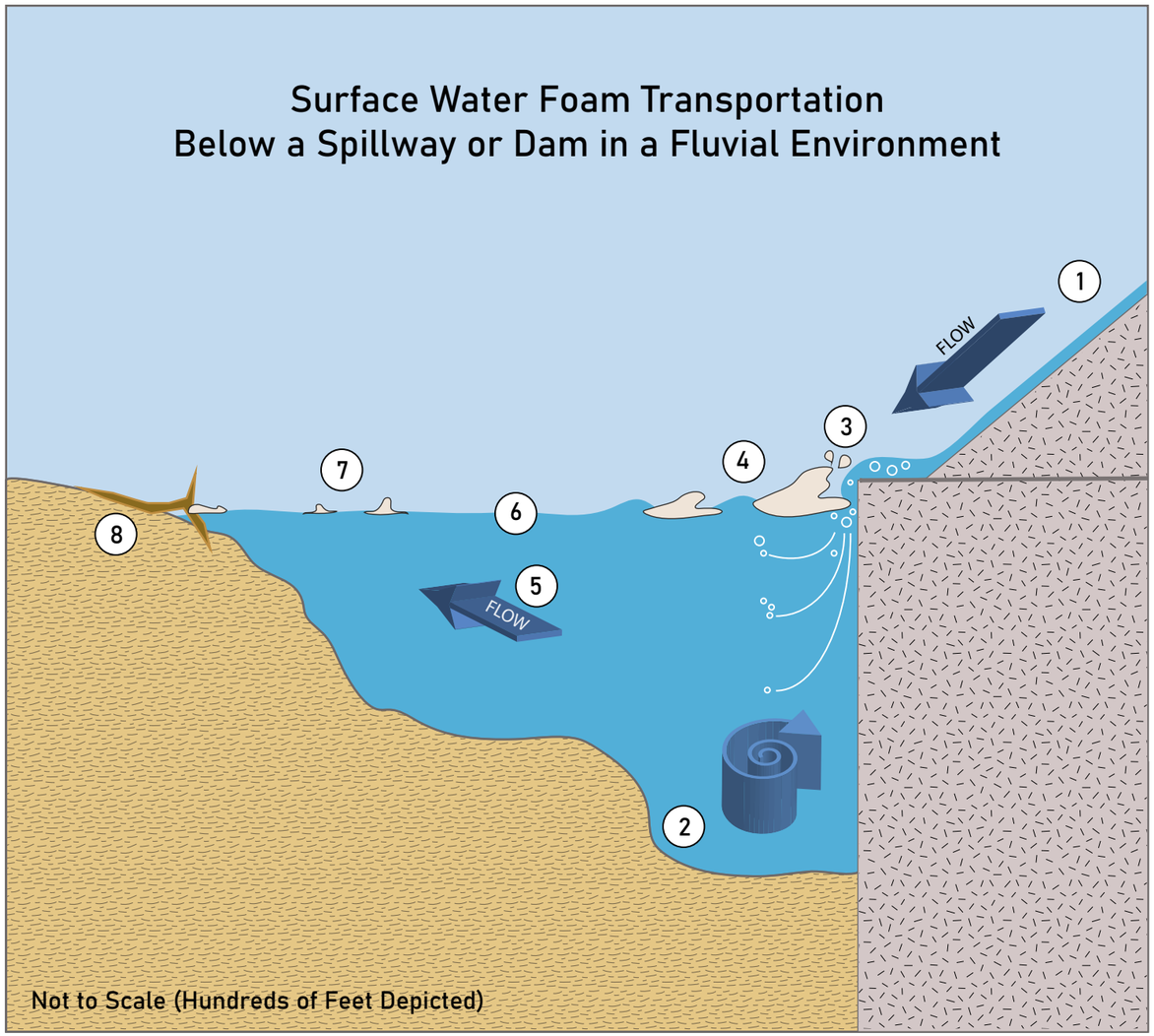
Surface Water Foam Transportation on Open Water in an Inland Freshwater Lake



Not to Scale (Hundreds of Feet Depicted)

1. Inland freshwater surface water body having measurable bathymetry and shoreline features. Both natural and synthetic surfactants may be present dissolved in the surface water.
2. Wind creates surface "chop" and zones of agitation or turbulence.
3. Surface Water Foam (SWF) "nuclei" develop. These are discrete and localized occurrences of SWF. The SWF nuclei are transported by wind and wave-action.
4. Larger SWF bodies form as an aggregation of the SWF nuclei. These SWF bodies can develop "sails" or foam peaks that aid in the surface water transport.
5. The SWF accumulates near-shore or within the littoral zone.
6. Near-shore water currents also carry the SWF near the shoreline or within the littoral zone.
7. Wind also transports SWF to shoreline.
8. SWF accumulates on the windward side of beaches, shorelines or other terrestrial interfaces. The SWF can be transported back to the surface water, or eventually collapses on-shore.
9. Groundwater-to-Surface Water Interface (GSI) pathway. Groundwater and surface water interact. Natural and synthetic surfactants may be transported via groundwater advection to littoral zone, where "foaming" potentially occurs within the energetic and turbulent environment.

Surface Water Foam Transportation Below a Spillway or Dam in a Fluvial Environment



Not to Scale (Hundreds of Feet Depicted)

1. Spillway or weir. Impounded surface water flows into a river. Both natural and synthetic surfactants may be present dissolved in the impounded water and in the river water.
2. An eddy current and "scour pool" develops at the base of the spillway. This is a zone of turbulence. Both Surface Water Foam (SWF), flotsam and other debris can get caught in the eddy currents.
3. SWF develops in the turbulent conditions below the spillway or below natural riffles on the river.
4. SWF are transported downstream via surface water advection.
5. River flow. Flow velocity is highest in the thalweg of the river and less so along the riverbanks. The SWF tend to be transported in the high velocity area in the middle of the river.
6. Represents downstream portions of the river.
7. SWF are transported downstream, away from the turbulent spillway areas.
8. SWF can accumulate near shoreline features such as snags, coves, or other zones of entrapment or backwater, sheltered or bayou areas.

AECOM

Figure 11
Conceptual Site Model
Surface Water Foam Transport
Michigan Surface Water Foam Study

Tables

Table 1
Atmospheric Data During Sample Collection
PFAS Surface Water Foam Study

Location	Figure ID	Date Sampled	Time Sampled	Air Temperature	Wind Speed/Direction	Humidity Range	Pressure Prior to and During Observation/High Pressure (MB)	Sample Type	Foam Volume (gal)	Collapsed Volume (mL)	% of Original Foam Volume	Comments
Rogue River - 01	A2	11/4/2019	13:10	50-48 F	13 mph / SW	76-80%	1013 / 1015	Foam	3	160	1.41%	Bright White; pillowy accumulation on woody debris
Rogue River - 02	A1.1	11/4/2019	13:55	50-48 F	13 mph / SW	76-80%	1013 / 1015	Foam	6	395	1.74%	Bright White; pillowy accumulation in eddy below floodgate - Collected Duplicate
Rogue River - 03	A3	11/4/2019	14:55	48-46 F	13-12 mph / SW	80-82%	1013-1014 / 1015	Foam	4	245	1.62%	Light Brown; pillowy accumulation on woody debris
Rogue River - 04	A4	11/4/2019	15:30	48-46 F	13-12 mph / SW	80-82%	1013-1014 / 1015	Foam	3.5	225	1.70%	Light Brown; pillowy accumulation on woody debris
Huron River - 05	C1	11/22/2019	13:15	36-37 F	12-11 mph / NW	64-61%	1019-1020 / 1020	Foam	0.5	65	3.43%	Light Brown; accumulation along rocky shore
Rogue River - 06	A1.3	12/3/2019	14:30	34-35 F	13 mph / SW	81-82%	1004-1003 / 1016	Foam	2	175	2.31%	Bright White; pillowy accumulation in eddy below floodgate
Rogue River - 07	A1.2	12/3/2019	15:10	34-35 F	13 mph / SW	81-82%	1004-1003 / 1016	Foam	4	150	0.99%	Bright White; pillowy accumulation in eddy below floodgate
Thornapple River - 08	B1.1	12/4/2019	9:35	35-36 F	10-14 mph / SW-W	84-80%	1000-1001 / 1000	Foam	6	180	0.79%	Cascade Dam - White; accumulation along rocky shore
Thornapple River - 09	B1.2	1/3/2020	8:00	34-35 F	4-3 mph / NW-W	94-89%	1009 / 1009	Foam	8	300	0.99%	Cascade Dam - White; accumulation along rocky shore
Thornapple River - 10	B1.3	1/16/2020	13:20	24-23 F	16-14 mph / NW	76-73%	1034-1035 / 1035	Foam	3.5	550	4.15%	Cascade Dam - White; pillowy accumulation with icy crust along sandy shore - Collected Duplicate
Thornapple River - 11	B2	1/16/2020	14:35	23 F	14-13 mph / NW	73-71%	1035-1037 / 1037	Foam	3.5	355	2.68%	Ada Dam - Light Brown; pillowy accumulation on woody debris
Van Etten Lake - 12	D1	3/31/2020	15:45	38 F	10-12 mph / NE	85%	1018 / 1020	Foam	4	150	0.99%	Ratliff Park - White; accumulation on lake surface/piling on shore
Van Etten Lake - 13	D2	3/31/2020	16:45	38 F	12-13 mph / NE	85-82%	1018-1017 / 1020	Foam	2	25	0.33%	Southeast end of lake (Coles Cottages) - White; Spotty accumulation on lake surface/some piling on shore
Van Etten Lake - 14	D3	3/31/2020	17:25	38 F	12-13 mph / NE	85-82%	1018-1017 / 1020	Foam	2	25	0.33%	Northwest DNR Boat Launch- White; Spotty accumulation on lake surface/some piling on shore
Lake Margrethe - 15	E1	4/1/2020	12:10	42 F	7 mph / NE	82%	1019-1018 / 1019	Foam	2	125	1.65%	Light Brown foam acculation on vegetation at mouth of creek
Cedar Lake - 16	F1	4/8/2020	13:20	48-52 F	7 mph / NW-SW	68-59%	1015 / 1015	Foam	1	60	1.59%	Causeway by lakewood shores - White/light brown; accumulation on lake surface against causeway structure

*Weather data collected from Dark Sky Weather App & USA NOAA's NEXRAD system

Table 2
Atmospheric Data During SWF Reconnaissance
PFAS Surface Water Foam Study

Location	Reporter	Date Reported	Time of Report	Air Temperature	Wind Speed/Direction	Humidity Range	Pressure Prior to and During Observation/High Pressure (MB)	Comments
Van Etten Lake	Coles	3/31/2020	8:30	38 F	8mph / NE	81-78%	1019-1018 / 1019	Southeast end of lake (Coles Cottages) - Bright White; thin accumulation on lake surface/ no piling observed.
Van Etten Lake	AECOM	4/8/2020	--	38-52 F	4-7 mph / WNW	90-53%	1003-1006 / 1006	Very little foam observed on lake surface; Insufficient volume for sample
Van Etten Lake	Coles	4/23/2020	19:30	38 F	13-11 mph / NE	56-61%	1012-1011 / 1017	Southeast end of lake (Coles Cottages) - White & Light Brown; Spotty accumulation on lake surface/some piling on shore.
Van Etten Lake	Coles	4/30/2020	8:30	45 F	11 mph / N	92%	1001-1002 / 1008	Southwest end of lake - Bright white; sparse accumulation on lake surface/thin on shore.
Van Etten Lake	AECOM	5/1/2020	--	38-53 F	9-14 mph / NNW	80-49%	1010-1016 / 1016	No Foam Observed on Lake.
Van Etten Lake	Coles	5/4/2020	11:00	42 F	13 mph / NNE	68-62%	1020-1022 / 1022	South end of lake - Bright White; accumulation on lake surface/piling at Dam.
Van Etten Lake	Coles	5/5/2020	13:00	42 F	10-15 mph / NE	62-52%	1020 / 1022	Ratliff Park - Bright White; accumulation on lake surface/piling on shore.
Huron River	AECOM	5/27/2020	20:00	77 F	6 mph / S	73%	1014 / 1017	No Foam Observed below dam on River.
Lake M	AECOM	6/3/2020	17:00	79 F	11-7 mph / NW	35-36%	1006 / 1007	No Foam Observed on Lake.
Lake M	AECOM	6/8/2020	17:00	81-82 F	10-9 mph / S	43-42%	1014-1013 / 1018	No Foam Observed on Lake.

*Weather data collected from Dark Sky Weather App & USA NOAA's NEXRAD system

Table 3
41-PFAS Analytical Results
PFAS Surface Water Foam Study

Location	Rogue River - Rockford							
Sample ID	FM1911041310-01	FM1911041355-02	FM1911041455-03	FM1911041530-04	FM1912031430-06	SW1912031435-06	FM1912031510-07	SW1912031515-07
Location ID	Rogue River 01	Rogue River 02	Rogue River 03	Rogue River 04	Rogue River 06	Rogue River 06	Rogue River 07	Rogue River 07
Figure ID	A2	A1.1	A3	A4	A1.3	A1.3	A1.2	A1.2
Date Collected	11/4/2019	11/4/2019	11/4/2019	11/4/2019	12/3/2019	12/3/2019	12/3/2019	12/3/2019
Units	ppt	ppt	ppt	ppt	ppt	ppt	ppt	ppt
Lab Report Number	1903983	1903983	1903983	1903983	1904263	1904263	1904263	1904263
PFBA	ND	ND	ND	ND	**3.22**	**3.01**	**4.43**	**2.71**
PFPeA	ND	ND	ND	ND	ND	ND	**4.11**	ND
PFHxA	ND	ND	ND	ND	**4.32**	ND	**21.6**	ND
PFHpA	ND	ND	ND	ND	**16.4**	ND	**39.8**	ND
L-PFOA	***1,390***	***1,590***	***1,700***	***867***	***1,470***	***3.59***	***2,570***	***1.98***
Br-PFOA	***198***	***188***	***219***	***87.4***	***156***	ND	***349***	ND
Total-PFOA	**1,580**	**1,780**	**1,920**	**955**	**1,630**	**4.30**	**2,920**	**1.98**
PFNA	**2,260**	**2,480**	**3,920**	**3,040**	**1,190**	ND	**2,730**	ND
PFDA	**606**	**406**	**2,640**	**1,660**	**270**	ND	**509**	ND
PFUnA	**93.1**	ND	**405**	ND	**20.3**	ND	**63.1**	ND
PFDoA	ND	ND	ND	ND	**3.34**	ND	ND	ND
PFTrDA	ND	ND	ND	ND	ND	ND	ND	ND
PFTeDA	ND	ND	ND	ND	ND	ND	ND	ND
PFHxDA	ND	ND	ND	ND	**2.87**	ND	ND	ND
PFODA	ND	ND	ND	ND	ND	ND	ND	ND
PFPrS	ND	ND	ND	ND	ND	ND	ND	ND
PFBS	ND	ND	ND	ND	**3.73**	**1.60**	**3.72**	**1.55**
PFPeS	ND	ND	ND	ND	ND	ND	**5.14**	ND
L-PFHxS	***199***	***229***	***113***	***227***	***142***	ND	***316***	ND
Br-PFHxS	ND	ND	ND	ND	***11.1***	ND	***35.6***	ND
Total-PFHxS	**221**	**229**	**113**	**227**	**153**	ND	**352**	ND
PFHpS	**1,880**	**2,130**	ND	**2,010**	**1,200**	ND	**1,240**	ND
L-PFOS	***47,700***	***32,000***	***56,000***	***59,800***	***59,800***	***19.6***	***75,100***	***13.1***
Br-PFOS	***35,300***	***23,300***	***42,500***	***45,500***	***37,100***	***10.3***	***48,900***	***5.38***
Total-PFOS	**83,000**	**55,300**	**98,500**	**105,000**	**97,000**	**29.8**	**124,000**	**18.50**
PFNS	ND	ND	ND	ND	**92.5**	ND	**233**	ND
PFDS	ND	ND	ND	ND	**25.0**	ND	**46.0**	ND
PFecHS	ND	ND	**95.7**	ND	**142**	ND	**318**	ND
PFDoS	ND	ND	ND	ND	ND	ND	ND	ND
PFOSA	**2,320**	**1,440**	**2,290**	**4,920**	**851**	**4.45**	**951**	**3.79**
4:2 FTS	ND	ND	ND	ND	ND	ND	ND	ND
6:2 FTS	ND	ND	ND	ND	**20.3**	ND	**43.7**	ND
8:2FTS	ND	ND	**108**	ND	**15.7**	ND	**11.1**	ND
10:2 FTS	ND	ND	ND	ND	ND	ND	ND	ND
3:3 FTCA	ND	ND	ND	ND	ND	ND	ND	ND
5:3 FTCA	ND	ND	ND	ND	ND	ND	ND	ND
7:3 FTCA	ND	ND	ND	ND	**2.68**	ND	**3.96**	ND
L-EtFOSAA	***1,830***	***1,960***	***48,800***	***12,900***	***2,890***	***2.68***	***2,270***	ND
Br-EtFOSAA	***1,790***	***2,070***	***35,600***	***9,930***	***1,910***	***1.70***	***2,110***	ND
Total-EtFOSAA	**3,620**	**4,030**	**86,500**	**22,900**	**4,800**	**4.39**	**4,380**	**2.40**
L-MeFOSAA	***100***	***92.3***	***533***	***669***	***113***	ND	***45.7***	ND
Br-MeFOSAA	***126***	***154***	***901***	***1,110***	***191***	ND	***99.7***	ND
Total-MeFOSAA	**226**	**246**	**1,430**	**1,780**	**304**	ND	**145**	ND
EtFOSA	ND	ND	ND	ND	**14.7**	ND	ND	ND
EtFOSE	ND	ND	ND	ND	ND	ND	ND	ND
MeFOSA	ND	ND	ND	ND	ND	ND	ND	ND
MeFOSE	ND	ND	ND	ND	ND	ND	ND	ND
HFPO-DA	ND	ND	ND	ND	ND	ND	ND	ND
ADONA	ND	ND	ND	ND	ND	ND	ND	ND
9Cl-PF3ONS	ND	ND	ND	ND	ND	ND	ND	ND
11Cl-PF3OUdS	ND	ND	ND	ND	ND	ND	ND	ND
Total PFAS	**95,806**	**68,041**	**197,922**	**142,492**	**107,765**	**47.6**	**138,025**	**30.9**

Notes:
Concentrations reported as ppt
FM = Foam
SW = Surface Water
ND = Contaminant not detected above laboratory reporting limits
L = Linear Isomers
Br = Branched Isomers
Total = Sum total of branched and linear isomers

Table 3
41-PFAS Analytical Results
PFAS Surface Water Foam Study

Location	Thornapple River - Cascade								Huron River - Brighton	
Sample ID	FM1912040935-08	SW1912040940-08	FM2001030800-09	SW2001030805-09	FM2001161320-10	SW2001161325-10	FM2001161435-11	SW2001161450-11	FM1911221315-05	SW1911221320-05
Location ID	Thornapple River 08	Thornapple River 08	Thornapple River 09	Thornapple River 09	Thornapple River 10	Thornapple River 10	Thornapple River 11	Thornapple River 11	Huron River 05	Huron River 05
Figure ID	B1.1	B1.1	B1.2	B1.2	B1.3	B1.3	B2	B2	C1	C1
Date Collected	12/4/2019	12/4/2019	1/3/2020	1/3/2020	1/16/2020	1/16/2020	1/16/2020	1/16/2020	11/22/2019	11/22/2019
Units	ppt	ppt	ppt	ppt	ppt	ppt	ppt	ppt	ppt	ppt
Lab Report Number	1904263	1904263	2000012	2000012	2000137	2000137	2000137	2000137	1904149	1904149
PFBA	**4.66**	**2.58**	ND	**2.28**	**2.03**	**1.66**	ND	**1.78**	ND	**5.76**
PFPeA	ND	**2.00**	ND	**6.42**	ND	ND	ND	ND	ND	**17.6**
PFHxA	**30.1**	ND	**9.19**	ND	**12.1**	ND	**11.7**	ND	**381**	**8.72**
PFHpA	**29.5**	ND	**16.1**	ND	**4.90**	ND	**18.7**	ND	ND	**13.4**
L-PFOA	***1,260***	ND	***616***	ND	***50.9***	ND	***656***	ND	***408***	***4.54***
Br-PFOA	***64.7***	ND	***29.1***	ND	***3.80***	ND	***26.0***	ND	ND	ND
Total-PFOA	**132**	ND	**645**	ND	**54.7**	ND	**682**	ND	**439**	**4.54**
PFNA	**5,510**	ND	**2,940**	ND	**1,010**	ND	**3,250**	ND	**3,130**	**3.08**
PFDA	**1,710**	ND	**729**	ND	**408**	ND	**574**	ND	**6,560**	**4.10**
PFUnA	**255**	ND	**124**	ND	**59.0**	ND	**73.5**	ND	**945**	ND
PFDoA	**42.5**	ND	**29.9**	ND	**10.9**	ND	ND	ND	**115**	ND
PFTrDA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFTeDA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFHxDA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFODA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFPrS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFBS	ND	ND	ND	ND	ND	ND	ND	ND	ND	**2.96**
PFPeS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
L-PFHxS	***88.5***	ND	***58.7***	ND	***7.63***	ND	***41.2***	ND	ND	***2.25***
Br-PFHxS	***10.0***	ND	***8.41***	ND	ND	ND	ND	ND	ND	ND
Total-PFHxS	**98.6**	ND	**67.1**	ND	**7.63**	ND	**41.2**	ND	ND	**2.25**
PFHpS	**479**	ND	**186**	ND	**42.2**	ND	**291**	ND	**160**	ND
L-PFOS	***10,100***	***2.01***	***4,150***	ND	***3,470***	ND	***5,130***	ND	***84,800***	***58.6***
Br-PFOS	***17,200***	ND	***5,440***	ND	***3,780***	ND	***8,300***	ND	***36,100***	***19.8***
Total-PFOS	**27,300**	**2.82**	**9,590**	**0.820**	**7,250**	**1.67**	**13,400**	**0.695**	**121,000**	**78.4**
PFNS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFDS	ND	ND	ND	ND	ND	ND	ND	ND	**166**	ND
PFecHS	**798**	ND	**299**	ND	**18.1**	ND	**787**	ND	ND	ND
PFDoS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFOSA	**110**	**5.17**	ND	**12.4**	**23.6**	**3.30**	**26.3**	**2.67**	**108**	**3.63**
4:2 FTS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6:2 FTS	**813**	ND	**345**	ND	**22.7**	ND	**329**	ND	**7,890**	**103**
8:2FTS	**232**	ND	**156**	ND	**53.0**	ND	**78.8**	ND	ND	ND
10:2 FTS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3:3 FTCA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5:3 FTCA	**6.04**	ND	ND	ND	ND	ND	ND	ND	ND	ND
7:3 FTCA	**40.4**	ND	**17.9**	ND	**4.06**	ND	**18.9**	ND	ND	ND
L-EtFOSAA	***155***	ND	***89.4***	ND	***47.8***	ND	***11.8***	ND	***1,320***	***1.93***
Br-EtFOSAA	***176***	ND	***72.3***	ND	***33.6***	ND	***15.3***	ND	***719***	ND
Total-EtFOSAA	**330**	ND	**162**	ND	**81.5**	ND	**27.1**	ND	**2,040**	**1.93**
L-MeFOSAA	***125***	ND	***40.0***	ND	***26.8***	ND	***21.2***	ND	***377***	ND
Br-MeFOSAA	***252***	ND	***86.3***	ND	***33.9***	ND	***33.5***	ND	***660***	ND
Total-MeFOSAA	**376**	ND	**126**	ND	**60.6**	ND	**54.6**	ND	**1,040**	**1.63**
EtFOSA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EtFOSE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MeFOSA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MeFOSE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HFPO-DA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADONA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9Cl-PF3ONS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11Cl-PF3OUdS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total PFAS	**38,297**	**12.6**	**15,442**	**21.1**	**9,125**	**6.63**	**19,664**	**4.45**	**143,974**	**251**

Notes:
Concentrations reported as ppt
FM = Foam
SW = Surface Water
ND = Contaminant not detected above laboratory reporting limits
L = Linear Isomers
Br = Branched Isomers
Total = Sum total of branched and linear isomers

Table 3
41-PFAS Analytical Results
PFAS Surface Water Foam Study

Location	Van Etten Lake - Oscoda						Lake Margrethe - Grayling		Cedar Lake - Oscoda	
Sample ID	FM2003311545-12	SW2003311530-12	FM2003311645-13	SW2003311630-13	FM2003311725-14	SW2003311710-14	FM2004011210-15	SW2004011215-15	FM2004081320-16	SW2004081325-16
Location ID	Van Etten Lake 12	Van Etten Lake 12	Van Etten Lake 13	Van Etten Lake 13	Van Etten Lake 14	Van Etten Lake 14	Lake Margrethe 15	Lake Margrethe 15	Cedar Lake 16	Cedar Lake 16
Figure ID	D1	D1	D2	D2	D3	D3	E1	E1	F1	F1
Date Collected	3/31/2020	3/31/2020	3/31/2020	3/31/2020	3/31/2020	3/31/2020	4/1/2020	4/1/2020	4/8/2020	4/8/2020
Units	ppt	ppt	ppt	ppt	ppt	ppt	ppt	ppt	ppt	ppt
Lab Report Number	2000756	2000736	2000756	2000736	2000756	2000736	2000791	2000792	2000864	2000865
PFBA	ND	**2.70**	ND	ND	ND	ND	ND	ND	ND	**4.11**
PFPeA	ND	**10.6**	ND	ND	ND	ND	ND	ND	ND	ND
PFHxA	ND	**8.77**	ND	ND	ND	ND	**8.54**	ND	ND	ND
PFHpA	**258**	**4.29**	ND	ND	ND	ND	ND	ND	**17.0**	ND
L-PFOA	***1,730***	***7.31***	***2,730***	***2.11***	***869***	***3.06***	***207***	ND	***71.9***	ND
Br-PFOA	ND	ND	ND	ND	ND	ND	***13.6***	ND	ND	ND
Total-PFOA	**1,730**	**7.58**	**2,730**	**2.11**	**869**	**3.06**	**220**	ND	**76.2**	ND
PFNA	**523**	ND	**6,010**	ND	**400**	ND	**1,010**	ND	**956**	**1.46**
PFDA	**269**	ND	**1,880**	ND	ND	ND	**198**	ND	**3,100**	ND
PFUnA	ND	ND	**1,270**	ND	ND	ND	**39.9**	ND	**4,700**	ND
PFDoA	ND	ND	ND	ND	ND	ND	ND	ND	**1,040**	ND
PFTrDA	ND	ND	ND	ND	ND	ND	ND	ND	**144**	ND
PFTeDA	ND	ND	ND	ND	ND	ND	ND	ND	**40.5**	ND
PFHxDA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFODA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFPrS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFBS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFPeS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
L-PFHxS	***2,340***	***32.8***	***1,190***	***5.53***	***1,610***	***7.69***	***7.55***	ND	ND	ND
Br-PFHxS	***210***	***4.44***	ND	ND	ND	ND	ND	ND	ND	ND
Total-PFHxS	**2,550**	**37.3**	**1,190**	**5.53**	**1,610**	**8.36**	**7.55**	ND	ND	ND
PFHpS	**697**	ND	**3,670**	ND	**390**	ND	ND	ND	ND	ND
L-PFOS	***20,400***	***8.80***	***108,000***	***3.86***	***17,800***	***4.43***	***1,210***	ND	***3,580***	***2.63***
Br-PFOS	***22,600***	***10.0***	***115,000***	***2.86***	***13,700***	ND	***2,210***	ND	***3,680***	***2.80***
Total-PFOS	**43,100**	**18.8**	**222,000**	**6.72**	**31,500**	**4.43**	**3,420**	ND	**7,260**	**5.43**
PFNS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFDS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFecHS	ND	ND	ND	ND	ND	ND	**23.7**	ND	ND	ND
PFDoS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFOSA	ND	**5.59**	ND	**7.08**	ND	**7.67**	ND	**7.82**	**40.8**	**6.02**
4:2 FTS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6:2 FTS	**354**	**1.82**	**2,650**	ND	ND	ND	ND	ND	ND	ND
8:2FTS	**126**	ND	**1,030**	ND	ND	ND	ND	ND	ND	ND
10:2 FTS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3:3 FTCA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5:3 FTCA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7:3 FTCA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
L-EtFOSAA	ND	ND	ND	ND	ND	ND	***4.60***	ND	***1,020***	ND
Br-EtFOSAA	ND	ND	ND	ND	ND	ND	***4.37***	ND	***526***	ND
Total-EtFOSAA	ND	ND	ND	ND	ND	ND	**8.97**	ND	**1,550**	ND
L-MeFOSAA	ND	ND	ND	ND	ND	ND	***3.37***	ND	***295***	ND
Br-MeFOSAA	ND	ND	ND	ND	ND	ND	***17.1***	ND	***408***	ND
Total-MeFOSAA	ND	ND	ND	ND	ND	ND	**20.5**	ND	**703**	ND
EtFOSA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EtFOSE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MeFOSA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MeFOSE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HFPO-DA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADONA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9Cl-PF3ONS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11Cl-PF3OUdS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total PFAS	**49,607**	**97.5**	**242,430**	**21.4**	**34,769**	**23.5**	**4,957**	**7.82**	**19,628**	**17.0**

Notes:
Concentrations reported as ppt
FM = Foam
SW = Surface Water
ND = Contaminant not detected above laboratory reporting limits
L = Linear Isomers
Br = Branched Isomers
Total = Sum total of branched and linear isomers

Appendix A

December 16, 2019

Vista Work Order No. 1903983

Ms. Maya Murshak
Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 08, 2019 under your Project Name 'EGLE Foam Study'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Work Order No. 1903983
Case Narrative

Sample Condition on Receipt:

Six aqueous (collapsed foam) samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

PFAS Isotope Dilution Method

The following samples contained particulate and were centrifuged prior to extraction:

Laboratory ID	Sample Name
1903983-02	FM1911041310-01
1903983-03	FM1911041355-02
1903983-04	FM1911041355-02-DUP
1903983-05	FM1911041455-03
1903983-06	FM1911041530-04

The samples were extracted and analyzed for a selected list of PFAS using the PFAS Isotope Dilution Method (Modified EPA Method 537). The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers, reported separately. Results for all other analytes include the linear isomers only.

Holding Times

The samples were extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The recovery of PFPrS was greater than 130% in the OPR. This analyte was not detected in the samples. The recovery of PFODA was less than 40% in the OPR. The reported sample results for this analyte may be biased low. The recoveries of all other analytes were within the method acceptance criteria.

Results for the following analytes could not be reported:
EtFOSA in sample "FM1911041310-01"
MeFOSA in sample "FM1911041455-03"
EtFOSA in sample "FM1911041530-04"

The labeled standard recoveries outside the acceptance criteria are flagged with an "H" qualifier.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1903983-01	EB1911041300JLB	04-Nov-19 13:00	08-Nov-19 08:53	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1903983-02	FM1911041310-01	04-Nov-19 13:10	08-Nov-19 08:53	HDPE Bottle, 250 mL
1903983-03	FM1911041355-02	04-Nov-19 13:55	08-Nov-19 08:53	HDPE Bottle, 250 mL
1903983-04	FM1911041355-02-DUP	04-Nov-19 13:55	08-Nov-19 08:53	HDPE Bottle, 250 mL
1903983-05	FM1911041455-03	04-Nov-19 14:55	08-Nov-19 08:53	HDPE Bottle, 250 mL
1903983-06	FM1911041530-04	04-Nov-19 15:30	08-Nov-19 08:53	HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9K0116-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
PFPrS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
3:3 FTCA	ND	1.60	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFPeA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFBS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-4:2 FTS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFHxA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFPeS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
HFPO-DA	ND	2.41	3.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
5:3 FTCA	ND	2.41	3.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFHpA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
ADONA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFHxS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
Br-PFHxS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
Total PFHxS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-6:2 FTS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFOA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
Br-PFOA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
Total PFOA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
PFecHS	ND	2.41	3.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFHpS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
7:3 FTCA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFNA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFOSA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFOS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
Br-PFOS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
Total PFOS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFDA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-8:2FTS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFNS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-MeFOSAA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
Total MeFOSAA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9K0116-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-EtFOSAA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
Total EtFOSAA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFUnA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFDS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
10:2 FTS	ND	2.41	3.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFDoA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFTrDA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
PFDoS	ND	2.41	3.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFTeDA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-MeFOSA	ND	4.41	10.0	20.0		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-EtFOSA	ND	4.41	10.0	20.0		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-EtFOSE	ND	4.41	10.0	20.0		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-MeFOSE	ND	4.41	10.0	20.0		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFHxDA	ND	1.37	2.00	4.00		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
L-PFODA	ND	3.07	7.50	10.0		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	85.6	60 - 130		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C3-PFPeA	IS	96.8	60 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C3-PFBS	IS	96.9	60 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C2-4:2 FTS	IS	95.1	40 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C2-PFHxA	IS	98.0	70 - 130		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C4-PFHpA	IS	102	60 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C3-PFHxS	IS	98.5	60 - 130		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C2-6:2 FTS	IS	98.4	40 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C2-PFOA	IS	97.1	60 - 130		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C5-PFNA	IS	92.9	50 - 130		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C8-PFOSA	IS	59.2	20 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C8-PFOS	IS	90.7	60 - 130		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C2-PFDA	IS	87.5	60 - 130		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C2-8:2 FTS	IS	87.3	40 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
d3-MeFOSAA	IS	72.5	50 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
d5-EtFOSAA	IS	66.6	50 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C2-PFUnA	IS	81.8	60 - 130		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C2-PFDoA	IS	74.6	30 - 130		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc. Matrix: Aqueous

Project: EGLE Foam Study

Laboratory Data

Lab Sample: B9K0116-BLK1 Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d3-MeFOSA	IS	30.4	10 - 130		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C2-PFTeDA	IS	71.9	20 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
d5-EtFOSA	IS	26.7	10 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C2-PFHxDA	IS	50.9	20 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
d7-MeFOSE	IS	48.4	10 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
d9-EtFOSE	IS	46.6	10 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1
13C3-HFPO-DA	IS	91.5	50 - 150		B9K0116	15-Nov-19	0.250 L	25-Nov-19 23:21	1

DL - Detection Limit LOD - Limit of Detection LOQ - Limit of quantitation Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9K0116-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	41.2	40.0	103	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
PFPrS	68.1	40.0	170	60 - 130	H	B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
3:3 FTCA	40.6	40.0	101	60 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFPeA	39.0	40.0	97.6	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFBS	45.8	40.0	115	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-4:2 FTS	40.0	40.0	100	60 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFHxA	30.7	40.0	76.7	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFPeS	44.0	40.0	110	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
HFPO-DA	40.7	40.0	102	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
5:3 FTCA	38.4	40.0	95.9	60 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFHpA	43.5	40.0	109	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
ADONA	41.4	40.0	104	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
Total PFHxS	38.3	40.0	95.7	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-6:2 FTS	35.6	40.0	89.0	60 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
Total PFOA	44.1	40.0	110	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
PFecHS	38.3	40.0	95.7	60 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFHpS	42.3	40.0	106	60 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
7:3 FTCA	30.5	40.0	76.2	60 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFNA	42.5	40.0	106	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFOSA	34.2	40.0	85.5	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
Total PFOS	43.5	40.1	108	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
9Cl-PF3ONS	37.7	40.0	94.1	70 - 130	Q	B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFDA	40.6	40.0	102	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-8:2FTS	43.3	40.0	108	60 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFNS	38.9	40.0	97.2	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
Total MeFOSAA	30.9	40.0	77.2	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
Total EtFOSAA	34.5	40.0	86.3	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFUnA	40.5	40.0	101	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFDS	31.9	40.1	79.5	60 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
11Cl-PF3OUdS	49.7	40.0	124	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
10:2 FTS	37.5	40.0	93.8	60 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFDoA	44.4	40.0	111	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFTrDA	43.9	40.0	110	60 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
PFDoS	47.6	40.0	119	60 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1

Sample ID: OPR — **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9K0116-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFTeDA	46.6	40.0	117	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-MeFOSA	184	200	91.8	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-EtFOSA	157	200	78.5	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-EtFOSE	197	200	98.3	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-MeFOSE	203	200	102	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFHxDA	47.2	40.0	118	70 - 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
L-PFODA	10.2	40.0	25.6	40 - 130	H	B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	86.8	60- 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C3-PFPeA	IS	101	60- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C3-PFBS	IS	92.2	60- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C2-4:2 FTS	IS	89.3	40- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C2-PFHxA	IS	101	70- 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C4-PFHpA	IS	95.9	60- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C3-PFHxS	IS	101	60- 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C2-6:2 FTS	IS	84.9	40- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C2-PFOA	IS	95.8	60- 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C5-PFNA	IS	90.0	50- 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C8-PFOSA	IS	75.9	20- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C8-PFOS	IS	89.5	60- 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C2-PFDA	IS	87.1	60- 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C2-8:2 FTS	IS	70.4	40- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
d3-MeFOSAA	IS	114	50- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
d5-EtFOSAA	IS	100	50- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C2-PFUnA	IS	85.7	60- 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C2-PFDoA	IS	65.7	30- 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
d3-MeFOSA	IS	35.3	10- 130		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C2-PFTeDA	IS	71.0	20- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
d5-EtFOSA	IS	35.8	10- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C2-PFHxDA	IS	42.8	20- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
d7-MeFOSE	IS	57.9	10- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
d9-EtFOSE	IS	58.0	10- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1
13C3-HFPO-DA	IS	103	50- 150		B9K0116	15-Nov-19	0.250 L	27-Nov-19 06:07	1

Sample ID: EB1911041300JLB **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Foam Skimmer
Matrix: Aqueous
Date Collected: 04-Nov-19 13:00

Laboratory Data

Lab Sample: 1903983-01
Date Received: 08-Nov-19 08:53
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
PFPrS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
3:3 FTCA	ND	1.67	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFPeA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFBS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-4:2 FTS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFHxA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFPeS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
HFPO-DA	ND	2.52	3.14	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
5:3 FTCA	ND	2.52	3.14	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFHpA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
ADONA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFHxS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
Br-PFHxS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
Total PFHxS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-6:2 FTS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFOA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
Br-PFOA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
Total PFOA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
PFecHS	ND	2.52	3.14	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFHpS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
7:3 FTCA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFNA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFOSA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFOS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
Br-PFOS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
Total PFOS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
9Cl-PF3ONS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFDA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-8:2FTS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFNS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-MeFOSAA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1

Sample ID: EB1911041300JLB **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Foam Skimmer
Matrix: Aqueous
Date Collected: 04-Nov-19 13:00

Laboratory Data

Lab Sample: 1903983-01
Date Received: 08-Nov-19 08:53
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
Total MeFOSAA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-EtFOSAA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
Br-EtFOSAA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
Total EtFOSAA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFUnA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFDS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
11Cl-PF3OUdS	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
10:2 FTS	ND	2.52	3.14	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFDoA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFTrDA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
PFDoS	ND	2.52	3.14	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFTeDA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-MeFOSA	ND	4.61	10.5	20.9		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-EtFOSA	ND	4.61	10.5	20.9		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-EtFOSE	ND	4.61	10.5	20.9		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-MeFOSE	ND	4.61	10.5	20.9		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFHxDA	ND	1.43	2.09	4.18		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
L-PFODA	ND	3.21	7.85	10.5		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	78.1	60 - 130		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C3-PFPeA	IS	92.8	60 - 150		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C3-PFBS	IS	97.0	60 - 150		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C2-4:2 FTS	IS	100	40 - 150		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C2-PFHxA	IS	91.1	70 - 130		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C4-PFHpA	IS	91.9	60 - 150		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C3-PFHxS	IS	97.9	60 - 130		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C2-6:2 FTS	IS	98.2	40 - 150		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C2-PFOA	IS	96.3	60 - 130		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C5-PFNA	IS	96.5	50 - 130		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C8-PFOSA	IS	65.3	20 - 150		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C8-PFOS	IS	97.0	60 - 130		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C2-PFDA	IS	90.4	60 - 130		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C2-8:2 FTS	IS	96.9	40 - 150		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1

Sample ID: EB1911041300JLB

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Foam Skimmer
Matrix: Aqueous
Date Collected: 04-Nov-19 13:00

Laboratory Data

Lab Sample: 1903983-01
Date Received: 08-Nov-19 08:53
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d3-MeFOSAA	IS	87.7	50 - 150		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
d5-EtFOSAA	IS	82.2	50 - 150		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C2-PFUnA	IS	93.8	60 - 130		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C2-PFDoA	IS	83.4	30 - 130		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
d3-MeFOSA	IS	7.90	10 - 130	H	B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C2-PFTeDA	IS	55.2	20 - 150		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
d5-EtFOSA	IS	7.80	10 - 150	H	B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C2-PFHxDA	IS	32.1	20 - 150		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
d7-MeFOSE	IS	44.3	10 - 150		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
d9-EtFOSE	IS	45.7	10 - 150		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1
13C3-HFPO-DA	IS	83.7	50 - 150		B9K0116	15-Nov-19	0.239 L	25-Nov-19 23:43	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: FM1911041310-01 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-01
Matrix: Aqueous
Date Collected: 04-Nov-19 13:10

Laboratory Data

Lab Sample: 1903983-02
Date Received: 08-Nov-19 08:53
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
PFPrS	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
3:3 FTCA	ND	88.0	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFPeA	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFBS	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-4:2 FTS	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFHxA	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFPeS	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
HFPO-DA	ND	133	166	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
5:3 FTCA	ND	133	166	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFHpA	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
ADONA	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFHxS	199	75.6	110	221	D, J	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
Br-PFHxS	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
Total PFHxS	221	75.6	110	221		B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-6:2 FTS	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFOA	1390	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
Br-PFOA	198	75.6	110	221	D, J	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
Total PFOA	1580	75.6	110	221		B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
PFecHS	ND	133	166	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFHpS	1880	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
7:3 FTCA	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFNA	2260	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFOSA	2320	151	221	441	D	B9K0116	15-Nov-19	0.113 L	25-Nov-19 23:53	50
L-PFOS	47700	151	221	441	D	B9K0116	15-Nov-19	0.113 L	25-Nov-19 23:53	50
Br-PFOS	35300	151	221	441	D	B9K0116	15-Nov-19	0.113 L	25-Nov-19 23:53	50
Total PFOS	83000	151	221	441		B9K0116	15-Nov-19	0.113 L	25-Nov-19 23:53	50
9Cl-PF3ONS	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFDA	606	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-8:2FTS	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFNS	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-MeFOSAA	100	75.6	110	221	D, J, Q	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25

Sample ID: FM1911041310-01

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-01

Matrix: Aqueous
Date Collected: 04-Nov-19 13:10

Laboratory Data

Lab Sample: 1903983-02
Date Received: 08-Nov-19 08:53

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	126	75.6	110	221	D, J, Q	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
Total MeFOSAA	226	75.6	110	221		B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-EtFOSAA	1830	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
Br-EtFOSAA	1790	75.6	110	221	D, Q	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
Total EtFOSAA	3620	75.6	110	221		B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFUnA	93.1	75.6	110	221	D, J, Q	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFDS	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
11Cl-PF3OUdS	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
10:2 FTS	ND	133	166	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFDoA	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFTrDA	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
PFDoS	ND	133	166	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFTeDA	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-MeFOSA	ND	243	552	1100	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-EtFOSE	ND	243	552	1100	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-MeFOSE	ND	243	552	1100	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFHxDA	ND	75.6	110	221	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
L-PFODA	ND	169	414	552	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	66.9	60 - 130	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C3-PFPeA	IS	93.0	60 - 150	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C3-PFBS	IS	122	60 - 150	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C2-4:2 FTS	IS	158	40 - 150	D, H	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C2-PFHxA	IS	107	70 - 130	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C4-PFHpA	IS	71.3	60 - 150	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C3-PFHxS	IS	112	60 - 130	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C2-6:2 FTS	IS	72.1	40 - 150	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C2-PFOA	IS	87.0	60 - 130	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C5-PFNA	IS	121	50 - 130	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C8-PFOSA	IS	32.9	20 - 150	D	B9K0116	15-Nov-19	0.113 L	25-Nov-19 23:53	50
13C8-PFOS	IS	59.6	60 - 130	D, H	B9K0116	15-Nov-19	0.113 L	25-Nov-19 23:53	50
13C2-PFDA	IS	73.8	60 - 130	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C2-8:2 FTS	IS	48.4	40 - 150	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
d3-MeFOSAA	IS	82.6	50 - 150	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25

Sample ID: FM1911041310-01

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-01
Matrix: Aqueous
Date Collected: 04-Nov-19 13:10

Laboratory Data

Lab Sample: 1903983-02
Date Received: 08-Nov-19 08:53
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d5-EtFOSAA	IS	103	50 - 150	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C2-PFUnA	IS	55.3	60 - 130	D, H	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C2-PFDoA	IS	7.30	30 - 130	D, H	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
d3-MeFOSA	IS	1.60	10 - 130	D, H	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C2-PFTeDA	IS	5.50	20 - 150	D, H	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C2-PFHxDA	IS	1.80	20 - 150	D, H	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
d7-MeFOSE	IS	18.2	10 - 150	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
d9-EtFOSE	IS	11.4	10 - 150	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25
13C3-HFPO-DA	IS	89.7	50 - 150	D	B9K0116	15-Nov-19	0.113 L	27-Nov-19 06:18	25

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: FM1911041355-02 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-02
Matrix: Aqueous
Date Collected: 04-Nov-19 13:55

Laboratory Data

Lab Sample: 1903983-03
Date Received: 08-Nov-19 08:53
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
PFPrS	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
3:3 FTCA	ND	62.3	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFPeA	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFBS	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-4:2 FTS	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFHxA	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFPeS	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
HFPO-DA	ND	94.2	117	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
5:3 FTCA	ND	94.2	117	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFHpA	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
ADONA	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFHxS	229	53.5	78.1	156	D, Q	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
Br-PFHxS	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
Total PFHxS	229	53.5	78.1	156		B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-6:2 FTS	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFOA	1590	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
Br-PFOA	188	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
Total PFOA	1780	53.5	78.1	156		B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
PFecHS	ND	94.2	117	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFHpS	2130	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
7:3 FTCA	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFNA	2480	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFOSA	1440	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFOS	32000	107	156	313	D	B9K0116	15-Nov-19	0.160 L	26-Nov-19 00:03	50
Br-PFOS	23300	107	156	313	D	B9K0116	15-Nov-19	0.160 L	26-Nov-19 00:03	50
Total PFOS	55300	107	156	313		B9K0116	15-Nov-19	0.160 L	26-Nov-19 00:03	50
9Cl-PF3ONS	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFDA	406	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-8:2FTS	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFNS	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-MeFOSAA	92.3	53.5	78.1	156	D, J, Q	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25

Sample ID: FM1911041355-02

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-02

Matrix: Aqueous
Date Collected: 04-Nov-19 13:55

Laboratory Data

Lab Sample: 1903983-03
Date Received: 08-Nov-19 08:53

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	154	53.5	78.1	156	D, J, Q	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
Total MeFOSAA	246	53.5	78.1	156		B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-EtFOSAA	1960	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
Br-EtFOSAA	2070	53.5	78.1	156	D, Q	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
Total EtFOSAA	4030	53.5	78.1	156		B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFUnA	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFDS	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
11Cl-PF3OUdS	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
10:2 FTS	ND	94.2	117	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFDoA	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFTrDA	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
PFDoS	ND	94.2	117	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFTeDA	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-MeFOSA	ND	172	391	782	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-EtFOSA	ND	172	391	782	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-EtFOSE	ND	172	391	782	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-MeFOSE	ND	172	391	782	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFHxDA	ND	53.5	78.1	156	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
L-PFODA	ND	120	293	391	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	52.7	60 - 130	D, H	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C3-PFPeA	IS	63.0	60 - 150	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C3-PFBS	IS	30.7	60 - 150	D, H	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C2-4:2 FTS	IS	39.9	40 - 150	D, H	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C2-PFHxA	IS	48.3	70 - 130	D, H	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C4-PFHpA	IS	65.5	60 - 150	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C3-PFHxS	IS	43.4	60 - 130	D, H	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C2-6:2 FTS	IS	58.2	40 - 150	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C2-PFOA	IS	72.4	60 - 130	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C5-PFNA	IS	79.6	50 - 130	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C8-PFOSA	IS	27.7	20 - 150	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C8-PFOS	IS	66.8	60 - 130	D	B9K0116	15-Nov-19	0.160 L	26-Nov-19 00:03	50
13C2-PFDA	IS	75.7	60 - 130	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C2-8:2 FTS	IS	103	40 - 150	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25

Sample ID: FM1911041355-02

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-02
Matrix: Aqueous
Date Collected: 04-Nov-19 13:55

Laboratory Data

Lab Sample: 1903983-03
Date Received: 08-Nov-19 08:53
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d3-MeFOSAA	IS	20.7	50 - 150	D, H	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
d5-EtFOSAA	IS	58.8	50 - 150	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C2-PFUnA	IS	28.4	60 - 130	D, H	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C2-PFDoA	IS	18.2	30 - 130	D, H	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
d3-MeFOSA	IS	5.60	10 - 130	D, H	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C2-PFTeDA	IS	7.50	20 - 150	D, H	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
d5-EtFOSA	IS	1.20	10 - 150	D, H	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C2-PFHxDA	IS	2.80	20 - 150	D, H	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
d7-MeFOSE	IS	25.3	10 - 150	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
d9-EtFOSE	IS	20.1	10 - 150	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25
13C3-HFPO-DA	IS	65.6	50 - 150	D	B9K0116	15-Nov-19	0.160 L	27-Nov-19 06:28	25

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: FM1911041355-02-DUP

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-02
Matrix: Aqueous
Date Collected: 04-Nov-19 13:55

Laboratory Data

Lab Sample: 1903983-04
Date Received: 08-Nov-19 08:53
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
PFPrS	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
3:3 FTCA	ND	72.4	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFPeA	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFBS	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-4:2 FTS	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFHxA	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFPeS	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
HFPO-DA	ND	109	136	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
5:3 FTCA	ND	109	136	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFHpA	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
ADONA	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFHxS	176	62.2	90.6	182	D, J	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
Br-PFHxS	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
Total PFHxS	176	62.2	90.6	182	J	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-6:2 FTS	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFOA	1600	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
Br-PFOA	201	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
Total PFOA	1800	62.2	90.6	182		B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
PFecHS	ND	109	136	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFHpS	985	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
7:3 FTCA	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFNA	1810	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFOSA	640	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFOS	36300	124	182	363	D	B9K0116	15-Nov-19	0.138 L	26-Nov-19 00:14	50
Br-PFOS	24800	124	182	363	D	B9K0116	15-Nov-19	0.138 L	26-Nov-19 00:14	50
Total PFOS	61100	124	182	363		B9K0116	15-Nov-19	0.138 L	26-Nov-19 00:14	50
9Cl-PF3ONS	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFDA	544	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-8:2FTS	ND	124	182	363	D	B9K0116	15-Nov-19	0.138 L	26-Nov-19 00:14	50
L-PFNS	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-MeFOSAA	184	62.2	90.6	182	D, Q	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25

Sample ID: FM1911041355-02-DUP

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-02
Matrix: Aqueous
Date Collected: 04-Nov-19 13:55

Laboratory Data

Lab Sample: 1903983-04
Date Received: 08-Nov-19 08:53
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
Total MeFOSAA	184	62.2	90.6	182		B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-EtFOSAA	5940	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
Br-EtFOSAA	5820	62.2	90.6	182	D, Q	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
Total EtFOSAA	11800	62.2	90.6	182		B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFUnA	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFDS	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
11Cl-PF3OUdS	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
10:2 FTS	ND	219	273	363	D	B9K0116	15-Nov-19	0.138 L	26-Nov-19 00:14	50
L-PFDoA	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFTrDA	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
PFDoS	ND	109	136	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFTeDA	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-MeFOSA	ND	200	454	908	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-EtFOSA	ND	200	454	908	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-EtFOSE	ND	200	454	908	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-MeFOSE	ND	200	454	908	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFHxDA	ND	62.2	90.6	182	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
L-PFODA	ND	139	341	454	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	49.1	60 - 130	D, H	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C3-PFPeA	IS	82.6	60 - 150	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C3-PFBS	IS	70.0	60 - 150	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C2-4:2 FTS	IS	56.2	40 - 150	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C2-PFHxA	IS	80.0	70 - 130	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C4-PFHpA	IS	56.0	60 - 150	D, H	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C3-PFHxS	IS	56.2	60 - 130	D, H	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C2-6:2 FTS	IS	45.3	40 - 150	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C2-PFOA	IS	81.3	60 - 130	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C5-PFNA	IS	107	50 - 130	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C8-PFOSA	IS	94.4	20 - 150	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C8-PFOS	IS	73.5	60 - 130	D	B9K0116	15-Nov-19	0.138 L	26-Nov-19 00:14	50
13C2-PFDA	IS	110	60 - 130	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C2-8:2 FTS	IS	62.7	40 - 150	D	B9K0116	15-Nov-19	0.138 L	26-Nov-19 00:14	50

Sample ID: FM1911041355-02-DUP

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-02
Matrix: Aqueous
Date Collected: 04-Nov-19 13:55

Laboratory Data

Lab Sample: 1903983-04
Date Received: 08-Nov-19 08:53
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d3-MeFOSAA	IS	10.2	50 - 150	D, H	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
d5-EtFOSAA	IS	39.1	50 - 150	D, H	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C2-PFUnA	IS	52.1	60 - 130	D, H	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C2-PFDoA	IS	43.8	30 - 130	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
d3-MeFOSA	IS	24.5	10 - 130	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C2-PFTeDA	IS	13.6	20 - 150	D, H	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
d5-EtFOSA	IS	32.1	10 - 150	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C2-PFHxDA	IS	5.90	20 - 150	D, H	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
d7-MeFOSE	IS	40.1	10 - 150	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
d9-EtFOSE	IS	39.1	10 - 150	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25
13C3-HFPO-DA	IS	76.8	50 - 150	D	B9K0116	15-Nov-19	0.138 L	27-Nov-19 07:00	25

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: FM1911041455-03 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-03
Matrix: Aqueous
Date Collected: 04-Nov-19 14:55

Laboratory Data

Lab Sample: 1903983-05
Date Received: 08-Nov-19 08:53
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
PFPrS	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
3:3 FTCA	ND	49.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFPeA	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFBS	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-4:2 FTS	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFHxA	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFPeS	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
HFPO-DA	ND	74.4	92.8	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
5:3 FTCA	ND	74.4	92.8	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFHpA	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
ADONA	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFHxS	113	42.3	61.9	124	D, J, Q	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
Br-PFHxS	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
Total PFHxS	113	42.3	61.9	124	J	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-6:2 FTS	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFOA	1700	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
Br-PFOA	219	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
Total PFOA	1920	42.3	61.9	124		B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
PFecHS	95.7	74.4	92.8	124	D, J	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFHpS	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
7:3 FTCA	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFNA	3920	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFOSA	2290	67.7	99.0	198	D, Q	B9K0116	15-Nov-19	0.202 L	12-Dec-19 02:45	40
L-PFOS	56000	67.7	99.0	198	D	B9K0116	15-Nov-19	0.202 L	12-Dec-19 02:45	40
Br-PFOS	42500	67.7	99.0	198	D, Q	B9K0116	15-Nov-19	0.202 L	12-Dec-19 02:45	40
Total PFOS	98500	67.7	99.0	198		B9K0116	15-Nov-19	0.202 L	12-Dec-19 02:45	40
9Cl-PF3ONS	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFDA	2640	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-8:2FTS	108	42.3	61.9	124	D, J, Q	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFNS	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-MeFOSAA	533	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25

Sample ID: FM1911041455-03

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-03

Matrix: Aqueous
Date Collected: 04-Nov-19 14:55

Laboratory Data

Lab Sample: 1903983-05
Date Received: 08-Nov-19 08:53

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	901	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
Total MeFOSAA	1430	42.3	61.9	124		B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-EtFOSAA	48800	67.7	99.0	198	D	B9K0116	15-Nov-19	0.202 L	12-Dec-19 02:45	40
Br-EtFOSAA	37600	67.7	99.0	198	D, Q	B9K0116	15-Nov-19	0.202 L	12-Dec-19 02:45	40
Total EtFOSAA	86500	67.7	99.0	198		B9K0116	15-Nov-19	0.202 L	12-Dec-19 02:45	40
L-PFUnA	405	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFDS	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
11Cl-PF3OUdS	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
10:2 FTS	ND	74.4	92.8	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFDoA	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFTrDA	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
PFDoS	ND	74.4	92.8	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFTeDA	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-EtFOSA	ND	136	309	618	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-EtFOSE	ND	136	309	618	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-MeFOSE	ND	136	309	618	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFHxDA	ND	42.3	61.9	124	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
L-PFODA	ND	94.8	232	309	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	47.6	60 - 130	D, H	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C3-PFPeA	IS	83.8	60 - 150	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C3-PFBS	IS	55.5	60 - 150	D, H	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C2-4:2 FTS	IS	67.2	40 - 150	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C2-PFHxA	IS	77.2	70 - 130	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C4-PFHpA	IS	105	60 - 150	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C3-PFHxS	IS	93.6	60 - 130	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C2-6:2 FTS	IS	169	40 - 150	D, H	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C2-PFOA	IS	96.0	60 - 130	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C5-PFNA	IS	65.2	50 - 130	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C8-PFOSA	IS	31.2	20 - 150	D	B9K0116	15-Nov-19	0.202 L	12-Dec-19 02:45	40
13C8-PFOS	IS	65.8	60 - 130	D	B9K0116	15-Nov-19	0.202 L	12-Dec-19 02:45	40
13C2-PFDA	IS	32.6	60 - 130	D, H	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C2-8:2 FTS	IS	29.7	40 - 150	D, H	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
d3-MeFOSAA	IS	13.2	50 - 150	D, H	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25

Sample ID: FM1911041455-03

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-03
Matrix: Aqueous
Date Collected: 04-Nov-19 14:55

Laboratory Data

Lab Sample: 1903983-05
Date Received: 08-Nov-19 08:53
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d5-EtFOSAA	IS	7.70	50 - 150	D, H	B9K0116	15-Nov-19	0.202 L	12-Dec-19 02:45	40
13C2-PFUnA	IS	9.80	60 - 130	D, H	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C2-PFDoA	IS	9.80	30 - 130	D, H	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C2-PFTeDA	IS	3.90	20 - 150	D, H	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
d5-EtFOSA	IS	1.00	10 - 150	D, H	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C2-PFHxDA	IS	1.40	20 - 150	D, H	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
d7-MeFOSE	IS	12.9	10 - 150	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
d9-EtFOSE	IS	12.3	10 - 150	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25
13C3-HFPO-DA	IS	67.8	50 - 150	D	B9K0116	15-Nov-19	0.202 L	27-Nov-19 07:11	25

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: FM1911041530-04 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-04
Matrix: Aqueous
Date Collected: 04-Nov-19 15:30

Laboratory Data

Lab Sample: 1903983-06
Date Received: 08-Nov-19 08:53
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
PFPrS	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
3:3 FTCA	ND	54.1	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFPeA	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFBS	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-4:2 FTS	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFHxA	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFPeS	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
HFPO-DA	ND	81.8	102	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
5:3 FTCA	ND	81.8	102	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFHpA	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
ADONA	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFHxS	227	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
Br-PFHxS	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
Total PFHxS	227	46.5	67.9	136		B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-6:2 FTS	ND	93.0	136	272	D	B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
L-PFOA	867	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
Br-PFOA	87.4	46.5	67.9	136	D, J	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
Total PFOA	955	46.5	67.9	136		B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
PFecHS	ND	81.8	102	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFHpS	2010	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
7:3 FTCA	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFNA	3040	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFOSA	4920	93.0	136	272	D	B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
L-PFOS	59800	93.0	136	272	D	B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
Br-PFOS	45500	93.0	136	272	D	B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
Total PFOS	105000	93.0	136	272		B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
9Cl-PF3ONS	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFDA	1660	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-8:2FTS	ND	93.0	136	272	D	B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
L-PFNS	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-MeFOSAA	669	46.5	67.9	136	D, Q	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25

Sample ID: FM1911041530-04

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-04

Matrix: Aqueous
Date Collected: 04-Nov-19 15:30

Laboratory Data

Lab Sample: 1903983-06
Date Received: 08-Nov-19 08:53

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	1110	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
Total MeFOSAA	1780	46.5	67.9	136		B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-EtFOSAA	12900	93.0	136	272	D	B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
Br-EtFOSAA	9930	93.0	136	272	D	B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
Total EtFOSAA	22900	93.0	136	272		B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
L-PFUnA	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFDS	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
11Cl-PF3OUdS	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
10:2 FTS	ND	164	204	272	D	B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
L-PFDoA	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFTrDA	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
PFDoS	ND	81.8	102	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFTeDA	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-MeFOSA	ND	150	339	679	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-EtFOSE	ND	150	339	679	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-MeFOSE	ND	150	339	679	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFHxDA	ND	46.5	67.9	136	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
L-PFODA	ND	104	255	339	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	46.3	60 - 130	D, H	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
13C3-PFPeA	IS	55.3	60 - 150	D, H	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
13C3-PFBS	IS	48.5	60 - 150	D, H	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
13C2-4:2 FTS	IS	61.4	40 - 150	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
13C2-PFHxA	IS	51.2	70 - 130	D, H	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
13C4-PFHpA	IS	68.0	60 - 150	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
13C3-PFHxS	IS	23.0	60 - 130	D, H	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
13C2-6:2 FTS	IS	67.6	40 - 150	D	B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
13C2-PFOA	IS	50.1	60 - 130	D, H	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
13C5-PFNA	IS	57.3	50 - 130	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
13C8-PFOSA	IS	17.1	20 - 150	D, H	B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
13C8-PFOS	IS	26.4	60 - 130	D, H	B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
13C2-PFDA	IS	51.1	60 - 130	D, H	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
13C2-8:2 FTS	IS	46.8	40 - 150	D	B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
d3-MeFOSAA	IS	26.3	50 - 150	D, H	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25

Sample ID: FM1911041530-04

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-04
Matrix: Aqueous
Date Collected: 04-Nov-19 15:30

Laboratory Data

Lab Sample: 1903983-06
Date Received: 08-Nov-19 08:53
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d5-EtFOSAA	IS	29.3	50 - 150	D, H	B9K0116	15-Nov-19	0.184 L	26-Nov-19 00:56	50
13C2-PFUnA	IS	26.7	60 - 130	D, H	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
13C2-PFDoA	IS	7.00	30 - 130	D, H	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
d3-MeFOSA	IS	3.30	10 - 130	D, H	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
13C2-PFTeDA	IS	4.70	20 - 150	D, H	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
13C2-PFHxDA	IS	4.70	20 - 150	D, H	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
d7-MeFOSE	IS	15.2	10 - 150	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
d9-EtFOSE	IS	12.3	10 - 150	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25
13C3-HFPO-DA	IS	51.2	50 - 150	D	B9K0116	15-Nov-19	0.184 L	27-Nov-19 07:21	25

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 1903983 Temp: 2.1 °C
Storage ID: R-13, WR-2 Storage Secured: Yes ☑ No ☐

Project ID: **EGLE Foam Study** PO#: **60612688** Sampler: **Jim Buzzell** (name)

TAT (check one): Standard: [X] 21 days; Rush (surcharge may apply): [ ] 14 days [ ] 7 days Specify:

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
Mike Jury	**EGLE**	**401 Ketchum, Suite B**	**Bay City**	**MI**	**989-894-6255**	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Jim Buzzell	11/7/19	17:00	Ashley Mason	11/08/19	0853
Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

Method of Shipment:

ATTN:

Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	Mod. EPA Method 537: PFOA/PFOS	UCMR3 PFAS List:6	537 List: 14	PFAS List of 24	Other: Please List Below	PFAS Full list of 41 Branch and Linear	EPA Method 537(DW only): PFOA/PFOS	UCMR3 PFAS List:6	PFAS List: 14	Comments
EB1911041300JLB	**11/4/19**	**13:00**	**Foam Skimmer**	**2**	**P**	**AQ**						**X**				
FM1911041310-01	**11/4/19**	**13:10**	**Rogue River-01**	**1**	**P**	**AQ**						**X**				**Collapsed foam sample (high results expected)**
FM1911041355-02	**11/4/19**	**13:55**	**Rogue River-02**	**1**	**P**	**AQ**						**X**				**Collapsed foam sample (high results expected)**
FM1911041355-02-DUP	**11/4/19**	**13:55**	**Rogue River-02**	**1**	**P**	**AQ**						**X**				**Collapsed foam sample (high results expected)**
FM1911041455-03	**11/4/19**	**14:55**	**Rogue River-03**	**1**	**P**	**AQ**						**X**				**Collapsed foam sample (high results expected)**
FM1911041530-04	**11/4/19**	**15:30**	**Rogue River-04**	**1**	**P**	**AQ**						**X**				**Collapsed foam sample (high results expected)**

Special Instructions/Comments:

Send Results and Acknowledgements to:
JuryM1@aecom.com; Barry.Harding@aecom.com; Nic.Ropotos@aecom.com; Dorin.Bogdan@aecom.com; Matt.Vandereide@aecom.com; Robert.Kennedy@aecom.com; James.Buzzell@aecom.com

SEND DOCUMENTATION AND RESULTS TO:
Name: **Mike Jury**
Company: **EGLE**
Address: **401 Ketchum, Suite B**
City: **Bay City** State: MI Zip: 48708
Phone: **989-894-6255** Fax:
Email: juryM1@michigan.gov

Container Types: P= HDPE, PJ= HDPE Jar, O = Other:

Bottle Preservation Type: T = Thiosulfate, TZ = Trizma:

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1903983 TAT std

Samples Arrival:	Date/Time 11/08/19 0853	Initials: agm	Location: WR-2 Shelf/Rack: N/A

Delivered By:	FedEx	UPS	On Trac	GSO	DHL	Hand Delivered	Other
	(FedEx)						

Preservation:	Ice	Blue Ice	Dry Ice	None
	(Ice)			

Temp °C: 2.1 (uncorrected)	Probe used: Y (N)	Thermometer ID: IR-4
Temp °C: 2.1 (corrected)		

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?			✓
Airbill ✓ Trk # 4894 6696 3444	✓		
Shipping Documentation Present?	✓		

Shipping Container	Vista	Client	Retain	Return	Dispose
		(Client)		(Return)	

Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	Date/Time 11/12/19 1256	Initials: MMS	Location: R-13, WR-2 Shelf/Rack: B-1, E-4

COC Anomaly/Sample Acceptance Form completed?		✓	✓

Comments:

CoC/Label Reconciliation Report WO# 1903983

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	Sample BaseMatrix	Sample Comments
1903983-01	**A EB1911041300JLB**	☑	**Foam Skimmer**	**04-Nov-19 13:00**	☑	**HDPE Bottle, 250 mL**	**Aqueous**	
1903983-01	B EB1911041300JLB	☑	Foam Skimmer	04-Nov-19 13:00	☑	HDPE Bottle, 250 mL	Aqueous	
1903983-02	**A FM1911041310-01**	☑	**Rogue River-01**	**04-Nov-19 13:10**	☑	**HDPE Bottle, 250 mL**	**Aqueous**	
1903983-03	A FM1911041355-02	☑	Rogue River-02	04-Nov-19 13:55	☑	HDPE Bottle, 250 mL	Aqueous	
1903983-04	**A FM1911041355-02-DUP**	☑	**Rogue River-02**	**04-Nov-19 13:55**	☑	**HDPE Bottle, 250 mL**	**Aqueous**	
1903983-05	A FM1911041455-03	☑	Rogue River-03	04-Nov-19 14:55	☑	HDPE Bottle, 250 mL	Aqueous	
1903983-06	**A FM1911041530-04**	☑	**Rogue River-04**	**04-Nov-19 15:30**	☑	**HDPE Bottle, 250 mL**	**Aqueous**	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		
Preservation Documented: Na2S2O3 Trizma None Other		✓	✓
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	✓		

Comments:

Verifed by/Date: 11/12/19 KS

December 20, 2019

Vista Work Order No. 1904149

Ms. Maya Murshak
Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 26, 2019 under your Project Name 'PFAS Foam Study'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Work Order No. 1904149
Case Narrative

Sample Condition on Receipt:

Two aqueous samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A collection time discrepancy was noted on sample "SW1911221320-05". The sample collection information has been reported as listed on the CoC.

Analytical Notes:

PFAS Isotope Dilution Method

Sample "FM1911221315-05" contained particulate and was centrifuged prior to extraction.

The samples were extracted and analyzed for a selected list of PFAS using the PFAS Isotope Dilution Method (Modified EPA Method 537). The results for PFHxS, PFOA, PFOS, MeFOSAA, and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The samples were extracted and analyzed within the method hold times. Sample "SW1911221320-05" was re-extracted and the re-extraction was performed outside of the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with each of the preparation batches. No analytes were detected in the Method Blanks above 1/2 the LOQ concentrations. In analytical batch B9L0026 the OPR recovery of PFODA was less than 40%. All other recoveries in batch B9L0026 and B9L0177 were within the method acceptance criteria.

Sample "FM1911221315-05" was unable to be re-extracted because no back up volume was received. The sample results for PFODA may be biased low.

For sample "SW1911221320-05", PFODA was less than 40% in the OPR. The sample was re-extracted and the re-extraction met the acceptance criteria. For sample "SW1911221320-05" PFODA has been reported from the re-extraction and all other analytes have been reported from the original extraction.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1904149-01	FM1911221315-05	PFAS Isotope Dilution Method	13C3-PFBA	H	52.8
1904149-01	FM1911221315-05	PFAS Isotope Dilution Method	13C2-PFTeDA	H	17.4
1904149-01	FM1911221315-05	PFAS Isotope Dilution Method	13C2-PFHxDA	H	4.70
1904149-02	SW1911221320-05	PFAS Isotope Dilution Method	d5-EtFOSA	H	9.00

H = Recovery was outside laboratory acceptance criteria.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1904149-01	FM1911221315-05	22-Nov-19 13:15	26-Nov-19 08:55	HDPE Bottle, 250 mL
1904149-02	SW1911221320-05	22-Nov-19 13:20	26-Nov-19 08:55	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: PFAS Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9L0026-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
PFPrS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
3:3 FTCA	ND	1.60	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFPeA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFBS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-4:2 FTS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFHxA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFPeS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
HFPO-DA	ND	2.41	3.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
5:3 FTCA	ND	2.41	3.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFHpA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
ADONA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFHxS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
Br-PFHxS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
Total PFHxS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-6:2 FTS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFOA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
Br-PFOA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
Total PFOA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
PFecHS	ND	2.41	3.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFHpS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
7:3 FTCA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFNA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFOSA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFOS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
Br-PFOS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
Total PFOS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFDA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-8:2FTS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFNS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-MeFOSAA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
Total MeFOSAA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-EtFOSAA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
Total EtFOSAA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFUnA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: PFAS Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9L0026-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
10:2 FTS	ND	2.41	3.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFDoA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFTrDA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
PFDoS	ND	2.41	3.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFTeDA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-MeFOSA	ND	4.41	10.0	20.0		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-EtFOSA	ND	4.41	10.0	20.0		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-EtFOSE	ND	4.41	10.0	20.0		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-MeFOSE	ND	4.41	10.0	20.0		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFHxDA	ND	1.37	2.00	4.00		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
L-PFODA	ND	3.07	7.50	10.0		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	91.8	60 - 130		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C3-PFPeA	IS	97.5	60 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C3-PFBS	IS	94.1	60 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C2-4:2 FTS	IS	92.5	40 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C2-PFHxA	IS	97.6	70 - 130		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C4-PFHpA	IS	103	60 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C3-PFHxS	IS	93.5	60 - 130		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C2-6:2 FTS	IS	93.1	40 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C2-PFOA	IS	106	60 - 130		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C5-PFNA	IS	98.7	50 - 130		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C8-PFOSA	IS	66.9	20 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C8-PFOS	IS	92.0	60 - 130		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C2-PFDA	IS	95.5	60 - 130		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C2-8:2 FTS	IS	91.2	40 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
d3-MeFOSAA	IS	82.0	50 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
d5-EtFOSAA	IS	72.3	50 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C2-PFUnA	IS	80.4	60 - 130		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C2-PFDoA	IS	79.3	30 - 130		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
d3-MeFOSA	IS	26.6	10 - 130		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C2-PFTeDA	IS	78.9	20 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
d5-EtFOSA	IS	24.2	10 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
13C2-PFHxDA	IS	60.8	20 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
d7-MeFOSE	IS	44.7	10 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1
d9-EtFOSE	IS	44.9	10 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc. Matrix: Aqueous

Project: PFAS Foam Study

Laboratory Data

Lab Sample: B9L0026-BLK1 Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	95.3	50 - 150		B9L0026	05-Dec-19	0.250 L	16-Dec-19 23:54	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: PFAS Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9L0026-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	39.4	40.0	98.4	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
PFPrS	44.3	40.0	111	60 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
3:3 FTCA	43.0	40.0	108	60 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFPeA	40.3	40.0	101	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFBS	39.6	40.0	99.0	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-4:2 FTS	41.3	40.0	103	60 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFHxA	41.5	40.0	104	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFPeS	45.5	40.0	114	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
HFPO-DA	39.1	40.0	97.7	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
5:3 FTCA	39.3	40.0	98.2	60 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFHpA	42.0	40.0	105	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
ADONA	40.5	40.0	101	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
Total PFHxS	39.5	40.0	98.8	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-6:2 FTS	45.3	40.0	113	60 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
Total PFOA	39.4	40.0	98.6	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
PFecHS	43.1	40.0	108	60 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFHpS	36.8	40.0	92.0	60 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
7:3 FTCA	32.9	40.0	82.3	60 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFNA	43.2	40.0	108	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFOSA	37.7	40.0	94.2	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
Total PFOS	36.2	40.1	90.3	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
9Cl-PF3ONS	34.3	40.0	85.9	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFDA	41.2	40.0	103	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-8:2FTS	39.5	40.0	98.6	60 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFNS	30.7	40.0	76.8	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
Total MeFOSAA	42.4	40.0	106	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
Total EtFOSAA	41.2	40.0	103	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFUnA	39.1	40.0	97.9	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFDS	31.8	40.1	79.4	60 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
11Cl-PF3OUdS	41.9	40.0	105	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
10:2 FTS	34.1	40.0	85.2	60 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFDoA	38.6	40.0	96.6	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFTrDA	36.0	40.0	90.0	60 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
PFDoS	37.4	40.0	93.4	60 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: PFAS Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9L0026-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFTeDA	40.2	40.0	101	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-MeFOSA	205	200	102	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-EtFOSA	201	200	100	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-EtFOSE	203	200	101	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-MeFOSE	185	200	92.4	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFHxDA	42.7	40.0	107	70 - 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
L-PFODA	12.8	40.0	32.1	40 - 130	H	B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	89.7	60- 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C3-PFPeA	IS	94.3	60- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C3-PFBS	IS	97.9	60- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C2-4:2 FTS	IS	101	40- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C2-PFHxA	IS	96.1	70- 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C4-PFHpA	IS	93.6	60- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C3-PFHxS	IS	101	60- 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C2-6:2 FTS	IS	82.6	40- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C2-PFOA	IS	95.5	60- 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C5-PFNA	IS	89.9	50- 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C8-PFOSA	IS	64.1	20- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C8-PFOS	IS	102	60- 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C2-PFDA	IS	86.6	60- 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C2-8:2 FTS	IS	90.3	40- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
d3-MeFOSAA	IS	86.1	50- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
d5-EtFOSAA	IS	74.3	50- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C2-PFUnA	IS	84.5	60- 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C2-PFDoA	IS	83.0	30- 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
d3-MeFOSA	IS	25.8	10- 130		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C2-PFTeDA	IS	83.8	20- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
d5-EtFOSA	IS	25.7	10- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C2-PFHxDA	IS	62.9	20- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
d7-MeFOSE	IS	54.1	10- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
d9-EtFOSE	IS	50.8	10- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1
13C3-HFPO-DA	IS	90.3	50- 150		B9L0026	05-Dec-19	0.250 L	17-Dec-19 00:04	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: PFAS Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9L0177-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFODA	ND	3.07	7.50	10.0		B9L0177	16-Dec-19	0.250 L	18-Dec-19 16:40	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxDA	IS	47.7	20 - 150		B9L0177	16-Dec-19	0.250 L	18-Dec-19 16:40	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR — **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: PFAS Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9L0177-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFODA	28.2	40.0	70.6	40 - 130		B9L0177	16-Dec-19	0.250 L	18-Dec-19 16:51	1
Labeled Standards	**Type**		**% Rec**	**Limits**	**Qualifiers**	**Batch**	**Extracted**	**Samp Size**	**Analyzed**	**Dilution**
13C2-PFHxDA	IS		55.0	20- 150		B9L0177	16-Dec-19	0.250 L	18-Dec-19 16:51	1

Sample ID: FM1911221315-05

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: PFAS Foam Study
Location: Huron River-05

Matrix: Aqueous
Date Collected: 22-Nov-19 13:15

Laboratory Data

Lab Sample: 1904149-01
Date Received: 26-Nov-19 08:55

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
PFPrS	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
3:3 FTCA	ND	99.8	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFPeA	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFBS	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-4:2 FTS	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFHxA	381	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFPeS	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
HFPO-DA	ND	151	188	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
5:3 FTCA	ND	151	188	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFHpA	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
ADONA	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFHxS	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
Br-PFHxS	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
Total PFHxS	ND	85.7	125	250		B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-6:2 FTS	7890	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFOA	408	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
Br-PFOA	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
Total PFOA	439	85.7	125	250		B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
PFecHS	ND	151	188	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFHpS	160	85.7	125	250	D, J	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
7:3 FTCA	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFNA	3130	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFOSA	108	85.7	125	250	D, J	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFOS	84800	129	188	375	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:14	15
Br-PFOS	36100	129	188	375	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:14	15
Total PFOS	121000	129	188	375		B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:14	15
9Cl-PF3ONS	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFDA	6560	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-8:2FTS	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFNS	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-MeFOSAA	377	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
Br-MeFOSAA	660	85.7	125	250	D, Q	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
Total MeFOSAA	1040	85.7	125	250		B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-EtFOSAA	1320	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
Br-EtFOSAA	719	85.7	125	250	D, Q	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
Total EtFOSAA	2040	85.7	125	250		B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFUnA	945	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10

Sample ID: FM1911221315-05

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: PFAS Foam Study
Location: Huron River-05

Matrix: Aqueous
Date Collected: 22-Nov-19 13:15

Laboratory Data

Lab Sample: 1904149-01
Date Received: 26-Nov-19 08:55

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	166	85.7	125	250	D, J	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
11Cl-PF3OUdS	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
10:2 FTS	ND	151	188	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFDoA	115	85.7	125	250	D, J	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFTrDA	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
PFDoS	ND	151	188	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFTeDA	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-MeFOSA	ND	276	625	1250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-EtFOSA	ND	276	625	1250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-EtFOSE	ND	276	625	1250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-MeFOSE	ND	276	625	1250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFHxDA	ND	85.7	125	250	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
L-PFODA	ND	192	469	625	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	52.8	60 - 130	D, H	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C3-PFPeA	IS	84.9	60 - 150	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C3-PFBS	IS	93.6	60 - 150	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C2-4:2 FTS	IS	102	40 - 150	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C2-PFHxA	IS	92.0	70 - 130	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C4-PFHpA	IS	94.1	60 - 150	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C3-PFHxS	IS	113	60 - 130	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C2-6:2 FTS	IS	105	40 - 150	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C2-PFOA	IS	97.9	60 - 130	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C5-PFNA	IS	77.0	50 - 130	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C8-PFOSA	IS	55.2	20 - 150	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C8-PFOS	IS	98.4	60 - 130	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:14	15
13C2-PFDA	IS	81.6	60 - 130	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C2-8:2 FTS	IS	107	40 - 150	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
d3-MeFOSAA	IS	77.9	50 - 150	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
d5-EtFOSAA	IS	67.2	50 - 150	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C2-PFUnA	IS	74.0	60 - 130	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C2-PFDoA	IS	65.9	30 - 130	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
d3-MeFOSA	IS	37.4	10 - 130	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C2-PFTeDA	IS	17.4	20 - 150	D, H	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
d5-EtFOSA	IS	35.2	10 - 150	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
13C2-PFHxDA	IS	4.70	20 - 150	D, H	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
d7-MeFOSE	IS	48.3	10 - 150	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10
d9-EtFOSE	IS	37.4	10 - 150	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10

Sample ID: FM1911221315-05 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: PFAS Foam Study
Location: Huron River-05

Matrix: Aqueous
Date Collected: 22-Nov-19 13:15

Laboratory Data

Lab Sample: 1904149-01
Date Received: 26-Nov-19 08:55

Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	83.3	50 - 150	D	B9L0026	05-Dec-19	0.0400 L	15-Dec-19 22:25	10

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: SW1911221320-05 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: PFAS Foam Study
Location: Huron River-05

Matrix: Aqueous
Date Collected: 22-Nov-19 13:20

Laboratory Data

Lab Sample: 1904149-02
Date Received: 26-Nov-19 08:55

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	5.76	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
PFPrS	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
3:3 FTCA	ND	1.70	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFPeA	17.6	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFBS	2.96	1.46	2.13	4.26	J	B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-4:2 FTS	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFHxA	8.72	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFPeS	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
HFPO-DA	ND	2.57	3.19	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
5:3 FTCA	ND	2.57	3.19	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFHpA	13.4	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
ADONA	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFHxS	2.25	1.46	2.13	4.26	J	B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
Br-PFHxS	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
Total PFHxS	2.25	1.46	2.13	4.26	J	B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-6:2 FTS	103	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFOA	4.54	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
Br-PFOA	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
Total PFOA	4.54	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
PFecHS	ND	2.57	3.19	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFHpS	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
7:3 FTCA	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFNA	3.08	1.46	2.13	4.26	J	B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFOSA	3.63	1.46	2.13	4.26	J, Q	B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFOS	58.6	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
Br-PFOS	19.8	1.46	2.13	4.26	Q	B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
Total PFOS	78.4	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
9Cl-PF3ONS	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFDA	4.10	1.46	2.13	4.26	J	B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-8:2FTS	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFNS	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-MeFOSAA	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
Br-MeFOSAA	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
Total MeFOSAA	1.63	1.46	2.13	4.26	J	B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-EtFOSAA	1.93	1.46	2.13	4.26	J, Q	B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
Br-EtFOSAA	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
Total EtFOSAA	1.93	1.46	2.13	4.26	J	B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFUnA	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1

Sample ID: SW1911221320-05

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: PFAS Foam Study
Location: Huron River-05

Matrix: Aqueous
Date Collected: 22-Nov-19 13:20

Laboratory Data

Lab Sample: 1904149-02
Date Received: 26-Nov-19 08:55

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
11Cl-PF3OUdS	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
10:2 FTS	ND	2.57	3.19	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFDoA	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFTrDA	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
PFDoS	ND	2.57	3.19	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFTeDA	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-MeFOSA	ND	4.69	10.6	21.3		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-EtFOSA	ND	4.69	10.6	21.3		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-EtFOSE	ND	4.69	10.6	21.3		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-MeFOSE	ND	4.69	10.6	21.3		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFHxDA	ND	1.46	2.13	4.26		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
L-PFODA	ND	3.19	7.81	10.4		B9L0177	16-Dec-19	0.240 L	18-Dec-19 17:01	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	64.7	60 - 130		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C3-PFPeA	IS	95.8	60 - 150		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C3-PFBS	IS	81.0	60 - 150		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C2-4:2 FTS	IS	85.7	40 - 150		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C2-PFHxA	IS	97.5	70 - 130		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C4-PFHpA	IS	96.8	60 - 150		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C3-PFHxS	IS	87.4	60 - 130		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C2-6:2 FTS	IS	85.1	40 - 150		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C2-PFOA	IS	98.3	60 - 130		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C5-PFNA	IS	96.7	50 - 130		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C8-PFOSA	IS	74.7	20 - 150		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C8-PFOS	IS	98.9	60 - 130		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C2-PFDA	IS	95.4	60 - 130		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C2-8:2 FTS	IS	95.6	40 - 150		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
d3-MeFOSAA	IS	96.0	50 - 150		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
d5-EtFOSAA	IS	90.4	50 - 150		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C2-PFUnA	IS	92.2	60 - 130		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C2-PFDoA	IS	91.6	30 - 130		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
d3-MeFOSA	IS	11.9	10 - 130		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C2-PFTeDA	IS	55.5	20 - 150		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
d5-EtFOSA	IS	9.00	10 - 150	H	B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
13C2-PFHxDA	IS	22.6	20 - 150		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
d7-MeFOSE	IS	57.2	10 - 150		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1
d9-EtFOSE	IS	54.3	10 - 150		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1

Sample ID: SW1911221320-05 **PFAS Isotope Dilution Method**

Client Data

Name:	Merit Laboratories, Inc.	Matrix:	Aqueous
Project:	PFAS Foam Study	Date Collected:	22-Nov-19 13:20
Location:	Huron River-05		

Laboratory Data

Lab Sample:	1904149-02	Column:	BEH C18
Date Received:	26-Nov-19 08:55		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	99.8	50 - 150		B9L0026	05-Dec-19	0.235 L	17-Dec-19 00:15	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 1904149 Temp: 1.2 °C
Storage ID: F-13 | WR-332 AF 11/27/19 Storage Secured: Yes ☒ No ☐

Project ID: PFAS Foam Study PO#: 6061288 Sampler: Lauren McNeely / Jim Buzzell (name)

TAT (check one): Standard: ☒ 21 days; Rush (surcharge may apply): ☐ 14 days ☐ 7 days Specify: _____

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Mike Jury EGLE 401 Ketchum, Suite B Bay City MI 989-894-6255					
Jim Buzzell	11/25/19	17:00	Hayden Gana	11/26/19	08:55
Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

ATTN: _____

Method of Shipment: _____

Tracking No.: _____

Add Analysis(es) Requested

Sample ID	Date	Time	Location/ Sample Description	Quantity	Type	Matrix	PFAS by Isotope Dilution: PFOA/PFOS	UCMR3 PFAS List:6	537.1 List: 14 or 18 (Circle One)	EPA Draft List of 24	OTHER: Please attach analyte list (List of 41 Branched / Linear)	EPA Method 537 (DW only): PFOA/PFOS	UCMR3 PFAS List:6	537.1 List of 14	537.1 List of 18	Comments
FM1911221315-05	11/22/19	13:15	Huron River -05	1	P	AQ					X					Collapsed Foam Sample (High Results Expected)
SW1911221320-05	11/22/19	13:20	Huron River - 05	2	P	AQ					X					

Special Instructions/Comments:

Barry.Harding@Aecom.com
James.Buzzell@Aecom.com
JuryM1@Michigan.gov
Nic.Roposos@Aecom.com
Matt.VanderBeide@Aecom.com

SEND DOCUMENTATION AND RESULTS TO:

Name: Mike Jury
Company: EGLE
Address: 401 Ketchum, Suite B
City: Bay City MI 48708
Phone: 989-894-6255
Email: JuryM1@Michigan.gov

Container Types: P= HDPE, PJ= HDPE Jar, PY= Polypropylene, O = Other: _____

Bottle Preservation Type: TZ = Trizma: _____

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: _____

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1904149 TAT Std

Samples Arrival:	**Date/Time** 11/26/19 08:55		**Initials:** HOG		**Location:** WR-2 **Shelf/Rack:** NA		
Delivered By:	(FedEx)	UPS	On Trac	GSO	DHL	Hand Delivered	Other
Preservation:	(Ice)		Blue Ice		Dry Ice		None
Temp °C: 1.2 (uncorrected) **Temp °C:** 1.2 (corrected)			**Probe used:** Y / (N)		**Thermometer ID:** IR-3		

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Airbill — Trk # 4894 6696 3731	✓		
Shipping Documentation Present?	✓		
Shipping Container: Vista / (Client) / Retain / (Return) / Dispose			
Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	**Date/Time** 11/27/19 0914	**Initials:** AP	**Location:** R-13 / WR-2 **Shelf/Rack:** A1 / E3
COC Anomaly/Sample Acceptance Form completed?	✓		

Comments:

Vista Analytical Laboratory

ANOMALY FORM

Vista Work Order 1904149

Initial/Date — The following checked issues were noted during sample receipt and login:

_____ ☐ **1. The samples were received out of temperature at (WI-PHT):** _____
Was Ice present: Yes No Melted Blue Ice

_____ ☐ 2. The Chain-of-Custody (CoC) was not relinquished properly.

_____ ☐ 3. The CoC did not include collection time(s). 00:00 will be used unless notified otherwise.

_____ ☐ 4. The sample(s) did not include a sample collection time. All or Sample Name: _____

_____ ☐ 5. A sample ID discrepancy was found. See the Reconciliation report.
The CoC Sample ID will be used unless notified otherwise.

KP 11/27/19 ☑ 6. A sample date and/or time discrepancy was found. See the Reconciliation report.
The CoC Sample date/time will be used unless notified otherwise.

_____ ☐ **7. The CoC did not include a sample matrix. The following sample matrix will be used:** _____

_____ ☐ **8. Insufficent volume received for analysis. All or Sample Name:** _____

_____ ☐ 9. The backup bottle was received broken. Sample Name: _____

_____ ☐ **10. CoC not received, illegible or destroyed.**

_____ ☐ **11. The sample(s) were received out of holding time. All or Sample Name:** _____

_____ ☐ **12. The CoC did not include an analysis. All or Sample Name:** _____

_____ ☐ **13. Sample(s) received without collection date. All or Sample Name:** _____

_____ ☐ **14. Sample(s) not received. All or Sample Name:** _____

_____ ☐ **15. Sample(s) received broken. All or Sample Name:** _____

_____ ☐ **16. An incorrect container-type was used. All or Sample Name:** _____

_____ ☐ 17. Other:

Bolded items require sign-off

Client Contacted: _____

Date of Contact: _____

Vista Client Manager: _____

Resolution:

CoC/Label Reconciliation Report WO# 1904149

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	Sample BaseMatrix	Sample Comments
1904149-01	A FM1911221315-05	☑	Huron River-05	22-Nov-19 13:15	☑	HDPE Bottle, 250 mL	Aqueous	
1904149-02	A SW1911221320-05	☑	Huron River-05	✓ 22-Nov-19 13:20	☐ * 13:15	HDPE Bottle, 250 mL	Aqueous	
1904149-02	B SW1911221320-05	☑	Huron River-05	✓ 22-Nov-19 13:20	☐ * 13:15	HDPE Bottle, 250 mL	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		
Preservation Documented: Na2S2O3 Trizma (None) Other			✓
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓

Comments:

Verifed by/Date: UZ 11/27/19

January 07, 2020

Vista Work Order No. 1904263

Ms. Maya Murshak
Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on December 06, 2019 under your Project Name 'EGLE Foam Study'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Work Order No. 1904263
Case Narrative

Sample Condition on Receipt:

Three collapsed foam samples, three surface water samples and one aqueous sample were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A discrepancy on the collection time of sample "EB1912040910JLB" was noted upon sample receipt. The collection time listed as "0915" on the sample container label has been reported as "0910", as it was listed on the CoC.

Analytical Notes:

PFAS Isotope Dilution Method

Samples "FM1912031430-06", "FM1912031510-07" and "FM1912040935-08" contained particulate and were centrifuged prior to extraction.

The samples were extracted and analyzed for a selected list of PFAS using the PFAS Isotope Dilution Method (Modified EPA Method 537). The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers, reported separately. Results for all other analytes include the linear isomers only.

Holding Times

The samples were originally extracted and analyzed within the method hold times. Samples "SW1912031435-06", "SW1912031515-07", "EB1912040910JLB" and "SW1912040940-08" were re-extracted outside of the hold time for PFODA.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with each preparation batch. No analytes were detected in the Method Blanks above 1/2 the LOQ. The recovery of PFODA was less than 70% in the OPR associated with prep batch B9L0107, which was associated with the collapsed foam samples. Insufficient volume was submitted to perform re-extractions. The reported sample results for this analyte may be biased low. The recoveries of all other analytes were within the method acceptance criteria.

The result for PFHpS and PFOS in sample "FM1912031510-07"were reported from a 1:100 dilution of the extract. Additional internal standard solution was added for quantification.

The labeled standard recoveries outside the acceptance criteria are flagged with an "H" qualifier.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1904263-01	FM1912031430-06	03-Dec-19 14:30	06-Dec-19 09:19	HDPE Bottle, 250 mL
1904263-02	SW1912031435-06	03-Dec-19 14:35	06-Dec-19 09:19	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1904263-03	FM1912031510-07	03-Dec-19 15:10	06-Dec-19 09:19	HDPE Bottle, 250 mL
1904263-04	SW1912031515-07	03-Dec-19 15:15	06-Dec-19 09:19	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1904263-05	EB1912040910JLB	04-Dec-19 09:10	06-Dec-19 09:19	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1904263-06	FM1912040935-08	04-Dec-19 09:35	06-Dec-19 09:19	HDPE Bottle, 250 mL
1904263-07	SW1912040940-08	04-Dec-19 09:40	06-Dec-19 09:19	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data
Name: Merit Laboratories, Inc. Matrix: Aqueous
Project: EGLE Foam Study

Laboratory Data
Lab Sample: B9L0107-BLK1 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
PFPrS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
3:3 FTCA	ND	1.60	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFPeA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFBS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-4:2 FTS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFHxA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFPeS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
HFPO-DA	ND	2.41	3.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
5:3 FTCA	ND	2.41	3.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFHpA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
ADONA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFHxS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
Br-PFHxS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
Total PFHxS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-6:2 FTS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFOA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
Br-PFOA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
Total PFOA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
PFecHS	ND	2.41	3.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFHpS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
7:3 FTCA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFNA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFOSA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFOS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
Br-PFOS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
Total PFOS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFDA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-8:2FTS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFNS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-MeFOSAA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
Total MeFOSAA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9L0107-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-EtFOSAA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
Total EtFOSAA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFUnA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFDS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
10:2 FTS	ND	2.41	3.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFDoA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFTrDA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
PFDoS	ND	2.41	3.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFTeDA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-MeFOSA	ND	4.41	10.0	20.0		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-EtFOSA	ND	4.41	10.0	20.0		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-EtFOSE	ND	4.41	10.0	20.0		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-MeFOSE	ND	4.41	10.0	20.0		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFHxDA	ND	1.37	2.00	4.00		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
L-PFODA	ND	3.07	7.50	10.0		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	90.8	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C3-PFPeA	IS	91.5	60 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C3-PFBS	IS	93.2	60 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C2-4:2 FTS	IS	97.0	40 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C2-PFHxA	IS	91.7	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C4-PFHpA	IS	89.3	60 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C3-PFHxS	IS	86.7	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C2-6:2 FTS	IS	82.2	40 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C2-PFOA	IS	91.3	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C5-PFNA	IS	93.5	50 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C8-PFOSA	IS	86.1	20 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C8-PFOS	IS	90.7	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C2-PFDA	IS	95.5	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C2-8:2 FTS	IS	79.5	40 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
d3-MeFOSAA	IS	92.2	50 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
d5-EtFOSAA	IS	77.6	50 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C2-PFUnA	IS	82.8	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C2-PFDoA	IS	84.0	30 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc. Matrix: Aqueous

Project: EGLE Foam Study

Laboratory Data

Lab Sample: B9L0107-BLK1 Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d3-MeFOSA	IS	33.9	10 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C2-PFTeDA	IS	78.2	20 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
d5-EtFOSA	IS	31.2	10 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C2-PFHxDA	IS	48.8	20 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
d7-MeFOSE	IS	64.6	10 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
d9-EtFOSE	IS	64.2	10 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1
13C3-HFPO-DA	IS	95.1	50 - 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:03	1

DL - Detection Limit LOD - Limit of Detection LOQ - Limit of quantitation Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9L0107-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	39.6	40.0	99.1	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
PFPrS	42.5	40.0	106	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
3:3 FTCA	44.6	40.0	111	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFPeA	39.8	40.0	99.4	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFBS	37.1	40.0	92.7	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-4:2 FTS	40.6	40.0	102	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFHxA	40.6	40.0	101	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFPeS	43.1	40.0	108	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
HFPO-DA	39.8	40.0	99.4	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
5:3 FTCA	40.8	40.0	102	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFHpA	39.9	40.0	99.7	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
ADONA	39.7	40.0	99.4	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
Total PFHxS	39.2	40.0	98.1	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-6:2 FTS	44.0	40.0	110	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
Total PFOA	39.6	40.0	99.0	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
PFecHS	41.5	40.0	104	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFHpS	40.6	40.0	102	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
7:3 FTCA	34.9	40.0	87.4	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFNA	42.2	40.0	106	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFOSA	42.1	40.0	105	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
Total PFOS	37.6	40.1	93.9	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
9Cl-PF3ONS	41.1	40.0	103	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFDA	40.6	40.0	102	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-8:2FTS	37.0	40.0	92.6	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFNS	37.2	40.0	93.0	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
Total MeFOSAA	41.2	40.0	103	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
Total EtFOSAA	42.6	40.0	107	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFUnA	41.7	40.0	104	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFDS	35.1	40.1	87.6	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
11Cl-PF3OUdS	41.6	40.0	104	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
10:2 FTS	29.4	40.0	73.6	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFDoA	36.7	40.0	91.8	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFTrDA	36.1	40.0	90.2	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
PFDoS	39.8	40.0	99.4	60 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9L0107-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFTeDA	40.7	40.0	102	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-MeFOSA	200	200	99.9	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-EtFOSA	198	200	99.2	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-EtFOSE	211	200	105	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-MeFOSE	192	200	96.0	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFHxDA	40.2	40.0	101	70 - 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
L-PFODA	6.89	40.0	17.2	40 - 130	J, H	B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	88.4	60- 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C3-PFPeA	IS	91.6	60- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C3-PFBS	IS	95.5	60- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C2-4:2 FTS	IS	92.1	40- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C2-PFHxA	IS	96.6	70- 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C4-PFHpA	IS	95.7	60- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C3-PFHxS	IS	96.5	60- 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C2-6:2 FTS	IS	90.0	40- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C2-PFOA	IS	94.9	60- 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C5-PFNA	IS	94.1	50- 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C8-PFOSA	IS	76.1	20- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C8-PFOS	IS	90.5	60- 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C2-PFDA	IS	86.1	60- 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C2-8:2 FTS	IS	97.5	40- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
d3-MeFOSAA	IS	84.6	50- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
d5-EtFOSAA	IS	76.5	50- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C2-PFUnA	IS	82.0	60- 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C2-PFDoA	IS	86.5	30- 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
d3-MeFOSA	IS	37.6	10- 130		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C2-PFTeDA	IS	78.0	20- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
d5-EtFOSA	IS	35.9	10- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C2-PFHxDA	IS	38.8	20- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
d7-MeFOSE	IS	71.4	10- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
d9-EtFOSE	IS	68.8	10- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1
13C3-HFPO-DA	IS	90.6	50- 150		B9L0107	12-Dec-19	0.250 L	16-Dec-19 20:13	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9L0108-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
PFPrS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
3:3 FTCA	ND	1.60	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFPeA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFBS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-4:2 FTS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFHxA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFPeS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
HFPO-DA	ND	2.41	3.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
5:3 FTCA	ND	2.41	3.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFHpA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
ADONA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFHxS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
Br-PFHxS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
Total PFHxS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-6:2 FTS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFOA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
Br-PFOA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
Total PFOA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
PFecHS	ND	2.41	3.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFHpS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
7:3 FTCA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFNA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFOSA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFOS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
Br-PFOS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
Total PFOS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFDA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-8:2FTS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFNS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-MeFOSAA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
Total MeFOSAA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9L0108-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-EtFOSAA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
Total EtFOSAA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFUnA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFDS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
10:2 FTS	ND	2.41	3.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFDoA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFTrDA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
PFDoS	ND	2.41	3.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFTeDA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-MeFOSA	ND	4.41	10.0	20.0		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-EtFOSA	ND	4.41	10.0	20.0		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-EtFOSE	ND	4.41	10.0	20.0		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-MeFOSE	ND	4.41	10.0	20.0		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
L-PFHxDA	ND	1.37	2.00	4.00		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	93.4	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C3-PFPeA	IS	94.2	60 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C3-PFBS	IS	90.8	60 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C2-4:2 FTS	IS	112	40 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C2-PFHxA	IS	95.6	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C4-PFHpA	IS	96.2	60 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C3-PFHxS	IS	92.3	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C2-6:2 FTS	IS	107	40 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C2-PFOA	IS	90.3	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C5-PFNA	IS	93.6	50 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C8-PFOSA	IS	70.0	20 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C8-PFOS	IS	88.3	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C2-PFDA	IS	91.2	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C2-8:2 FTS	IS	109	40 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
d3-MeFOSAA	IS	94.2	50 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
d5-EtFOSAA	IS	83.9	50 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C2-PFUnA	IS	89.6	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C2-PFDoA	IS	90.8	30 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
d3-MeFOSA	IS	33.5	10 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc. Matrix: Aqueous

Project: EGLE Foam Study

Laboratory Data

Lab Sample: B9L0108-BLK1 Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFTeDA	IS	83.5	20 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
d5-EtFOSA	IS	30.3	10 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C2-PFHxDA	IS	62.5	20 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
d7-MeFOSE	IS	57.1	10 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
d9-EtFOSE	IS	54.5	10 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1
13C3-HFPO-DA	IS	90.0	50 - 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 20:55	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9L0108-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	39.4	40.0	98.5	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
PFPrS	43.6	40.0	109	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
3:3 FTCA	44.5	40.0	111	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFPeA	38.9	40.0	97.3	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFBS	40.8	40.0	102	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-4:2 FTS	39.1	40.0	97.9	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFHxA	43.0	40.0	108	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFPeS	43.1	40.0	108	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
HFPO-DA	39.3	40.0	98.2	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
5:3 FTCA	41.7	40.0	104	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFHpA	40.4	40.0	101	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
ADONA	41.9	40.0	105	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
Total PFHxS	40.5	40.0	101	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-6:2 FTS	42.6	40.0	107	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
Total PFOA	41.9	40.0	105	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
PFecHS	40.9	40.0	102	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFHpS	37.5	40.0	93.7	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
7:3 FTCA	35.2	40.0	87.9	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFNA	40.7	40.0	102	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFOSA	39.6	40.0	99.0	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
Total PFOS	34.4	40.1	85.7	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
9Cl-PF3ONS	38.2	40.0	95.4	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFDA	45.4	40.0	113	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-8:2FTS	40.3	40.0	101	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFNS	39.5	40.0	98.7	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
Total MeFOSAA	40.6	40.0	102	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
Total EtFOSAA	38.3	40.0	95.7	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFUnA	40.5	40.0	101	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFDS	36.7	40.1	91.6	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
11Cl-PF3OUdS	45.4	40.0	113	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
10:2 FTS	31.9	40.0	79.8	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFDoA	42.3	40.0	106	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFTrDA	39.7	40.0	99.2	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
PFDoS	42.4	40.0	106	60 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9L0108-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFTeDA	43.8	40.0	110	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-MeFOSA	220	200	110	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-EtFOSA	212	200	106	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-EtFOSE	213	200	107	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-MeFOSE	188	200	94.2	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
L-PFHxDA	38.7	40.0	96.8	70 - 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	93.2	60- 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C3-PFPeA	IS	96.5	60- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C3-PFBS	IS	96.3	60- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C2-4:2 FTS	IS	107	40- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C2-PFHxA	IS	97.8	70- 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C4-PFHpA	IS	97.7	60- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C3-PFHxS	IS	104	60- 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C2-6:2 FTS	IS	91.0	40- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C2-PFOA	IS	93.0	60- 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C5-PFNA	IS	91.4	50- 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C8-PFOSA	IS	81.2	20- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C8-PFOS	IS	98.4	60- 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C2-PFDA	IS	88.7	60- 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C2-8:2 FTS	IS	93.8	40- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
d3-MeFOSAA	IS	92.1	50- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
d5-EtFOSAA	IS	82.6	50- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C2-PFUnA	IS	91.3	60- 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C2-PFDoA	IS	90.4	30- 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
d3-MeFOSA	IS	39.4	10- 130		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C2-PFTeDA	IS	83.6	20- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
d5-EtFOSA	IS	37.0	10- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C2-PFHxDA	IS	60.0	20- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
d7-MeFOSE	IS	60.4	10- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
d9-EtFOSE	IS	57.7	10- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1
13C3-HFPO-DA	IS	95.7	50- 150		B9L0108	12-Dec-19	0.250 L	16-Dec-19 21:06	1

Sample ID: Method Blank — **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc. Matrix: Aqueous

Project: EGLE Foam Study

Laboratory Data

Lab Sample: B9L0218-BLK1 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFODA	ND	3.07	7.50	10.0		B9L0218	20-Dec-19	0.250 L	23-Dec-19 21:38	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxDA	IS	90.2	20 - 150		B9L0218	20-Dec-19	0.250 L	23-Dec-19 21:38	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR — **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B9L0218-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFODA	33.0	40.0	82.5	40 - 130		B9L0218	20-Dec-19	0.250 L	23-Dec-19 21:49	1
Labeled Standards	**Type**		**% Rec**	**Limits**	**Qualifiers**	**Batch**	**Extracted**	**Samp Size**	**Analyzed**	**Dilution**
13C2-PFHxDA	IS		82.0	20- 150		B9L0218	20-Dec-19	0.250 L	23-Dec-19 21:49	1

Sample ID: FM1912031430-06 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-06
Matrix: Foam
Date Collected: 03-Dec-19 14:30

Laboratory Data

Lab Sample: 1904263-01
Date Received: 06-Dec-19 09:19
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	3.22	2.25	3.29	6.58	J	B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
PFPrS	ND	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
3:3 FTCA	ND	2.62	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFPeA	ND	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFBS	3.73	2.25	3.29	6.58	J	B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-4:2 FTS	ND	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFHxA	4.32	2.25	3.29	6.58	J	B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFPeS	ND	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
HFPO-DA	ND	3.96	4.93	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
5:3 FTCA	ND	3.96	4.93	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFHpA	16.4	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
ADONA	ND	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFHxS	142	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
Br-PFHxS	11.1	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
Total PFHxS	153	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-6:2 FTS	20.3	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFOA	1470	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
Br-PFOA	156	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
Total PFOA	1630	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
PFecHS	142	3.96	4.93	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFHpS	1200	45.1	65.8	132	D	B9L0107	12-Dec-19	0.152 L	18-Dec-19 05:08	20
7:3 FTCA	2.68	2.25	3.29	6.58	J, Q	B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFNA	1190	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFOSA	851	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFOS	59800	45.1	65.8	132	D	B9L0107	12-Dec-19	0.152 L	18-Dec-19 05:08	20
Br-PFOS	37100	45.1	65.8	132	D	B9L0107	12-Dec-19	0.152 L	18-Dec-19 05:08	20
Total PFOS	97000	45.1	65.8	132		B9L0107	12-Dec-19	0.152 L	18-Dec-19 05:08	20
9Cl-PF3ONS	ND	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFDA	270	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-8:2FTS	15.7	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	25-Dec-19 09:31	1
L-PFNS	92.5	2.25	3.29	6.58	Q	B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-MeFOSAA	113	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1

Sample ID: FM1912031430-06

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-06
Matrix: Foam
Date Collected: 03-Dec-19 14:30

Laboratory Data

Lab Sample: 1904263-01
Date Received: 06-Dec-19 09:19
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	191	2.25	3.29	6.58	Q	B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
Total MeFOSAA	304	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-EtFOSAA	2890	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
Br-EtFOSAA	1910	2.25	3.29	6.58	Q	B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
Total EtFOSAA	4800	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFUnA	20.3	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFDS	25.0	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
11Cl-PF3OUdS	ND	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
10:2 FTS	ND	3.96	4.93	6.58		B9L0107	12-Dec-19	0.152 L	25-Dec-19 09:31	1
L-PFDoA	3.34	2.25	3.29	6.58	J, Q	B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFTrDA	ND	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
PFDoS	ND	3.96	4.93	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFTeDA	ND	2.25	3.29	6.58		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-MeFOSA	ND	7.25	16.4	32.9		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-EtFOSA	14.7	7.25	16.4	32.9	J	B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-EtFOSE	ND	7.25	16.4	32.9		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-MeFOSE	ND	7.25	16.4	32.9		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFHxDA	2.87	2.25	3.29	6.58	J	B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
L-PFODA	ND	5.05	12.3	16.4		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	69.9	60 - 130		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C3-PFPeA	IS	92.3	60 - 150		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C3-PFBS	IS	98.1	60 - 150		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C2-4:2 FTS	IS	88.6	40 - 150		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C2-PFHxA	IS	89.6	70 - 130		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C4-PFHpA	IS	82.1	60 - 150		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C3-PFHxS	IS	93.1	60 - 130		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C2-PFOA	IS	89.7	60 - 130		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C5-PFNA	IS	92.3	50 - 130		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C8-PFOSA	IS	62.0	20 - 150		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C8-PFOS	IS	85.9	60 - 130	D	B9L0107	12-Dec-19	0.152 L	18-Dec-19 05:08	20
13C2-PFDA	IS	80.4	60 - 130		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C2-8:2 FTS	IS	147	40 - 150		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
d3-MeFOSAA	IS	71.3	50 - 150		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1

Sample ID: FM1912031430-06 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-06
Matrix: Foam
Date Collected: 03-Dec-19 14:30

Laboratory Data

Lab Sample: 1904263-01
Date Received: 06-Dec-19 09:19
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d5-EtFOSAA	IS	58.6	50 - 150		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C2-PFUnA	IS	78.0	60 - 130		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C2-PFDoA	IS	49.6	30 - 130		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
d3-MeFOSA	IS	33.9	10 - 130		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C2-PFTeDA	IS	22.0	20 - 150		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
d5-EtFOSA	IS	30.3	10 - 150		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C2-PFHxDA	IS	9.30	20 - 150	H	B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
d7-MeFOSE	IS	79.2	10 - 150		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
d9-EtFOSE	IS	78.4	10 - 150		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1
13C3-HFPO-DA	IS	89.1	50 - 150		B9L0107	12-Dec-19	0.152 L	16-Dec-19 20:24	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: SW1912031435-06

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-06

Matrix: Surface Water
Date Collected: 03-Dec-19 14:35

Laboratory Data

Lab Sample: 1904263-02
Date Received: 06-Dec-19 09:19

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	3.01	1.42	2.07	4.16	J	B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
PFPrS	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
3:3 FTCA	ND	1.66	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFPeA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFBS	1.60	1.42	2.07	4.16	J	B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-4:2 FTS	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFHxA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFPeS	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
HFPO-DA	ND	2.50	3.11	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
5:3 FTCA	ND	2.50	3.11	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFHpA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
ADONA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFHxS	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
Br-PFHxS	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
Total PFHxS	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-6:2 FTS	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFOA	3.59	1.42	2.07	4.16	J	B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
Br-PFOA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
Total PFOA	4.30	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
PFecHS	ND	2.50	3.11	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFHpS	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
7:3 FTCA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFNA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFOSA	4.45	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFOS	19.6	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
Br-PFOS	10.3	1.42	2.07	4.16	Q	B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
Total PFOS	29.8	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
9Cl-PF3ONS	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFDA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-8:2FTS	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFNS	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-MeFOSAA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1

Sample ID: SW1912031435-06

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-06

Matrix: Surface Water
Date Collected: 03-Dec-19 14:35

Laboratory Data

Lab Sample: 1904263-02
Date Received: 06-Dec-19 09:19

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
Total MeFOSAA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-EtFOSAA	2.68	1.42	2.07	4.16	J, Q	B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
Br-EtFOSAA	1.70	1.42	2.07	4.16	J, Q	B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
Total EtFOSAA	4.39	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFUnA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFDS	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
11Cl-PF3OUdS	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
10:2 FTS	ND	2.50	3.11	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFDoA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFTrDA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
PFDoS	ND	2.50	3.11	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFTeDA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-MeFOSA	ND	4.58	10.4	20.8		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-EtFOSA	ND	4.58	10.4	20.8		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-EtFOSE	ND	4.58	10.4	20.8		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-MeFOSE	ND	4.58	10.4	20.8		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFHxDA	ND	1.42	2.07	4.16		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
L-PFODA	ND	3.27	8.01	10.7		B9L0218	20-Dec-19	0.234 L	23-Dec-19 21:59	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	82.1	60 - 130		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C3-PFPeA	IS	92.5	60 - 150		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C3-PFBS	IS	103	60 - 150		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C2-4:2 FTS	IS	108	40 - 150		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C2-PFHxA	IS	90.8	70 - 130		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C4-PFHpA	IS	87.9	60 - 150		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C3-PFHxS	IS	104	60 - 130		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C2-6:2 FTS	IS	89.1	40 - 150		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C2-PFOA	IS	96.3	60 - 130		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C5-PFNA	IS	89.0	50 - 130		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C8-PFOSA	IS	32.6	20 - 150		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C8-PFOS	IS	98.2	60 - 130		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C2-PFDA	IS	91.2	60 - 130		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C2-8:2 FTS	IS	101	40 - 150		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1

Sample ID: SW1912031435-06

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-06
Matrix: Surface Water
Date Collected: 03-Dec-19 14:35

Laboratory Data

Lab Sample: 1904263-02
Date Received: 06-Dec-19 09:19
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d3-MeFOSAA	IS	91.8	50 - 150		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
d5-EtFOSAA	IS	87.5	50 - 150		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C2-PFUnA	IS	88.1	60 - 130		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C2-PFDoA	IS	97.9	30 - 130		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
d3-MeFOSA	IS	1.10	10 - 130	H	B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C2-PFTeDA	IS	90.2	20 - 150		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
d5-EtFOSA	IS	1.10	10 - 150	H	B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C2-PFHxDA	IS	83.0	20 - 150		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
d7-MeFOSE	IS	23.7	10 - 150		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
d9-EtFOSE	IS	26.0	10 - 150		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1
13C3-HFPO-DA	IS	89.8	50 - 150		B9L0108	12-Dec-19	0.241 L	16-Dec-19 21:16	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: FM1912031510-07

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-07
Matrix: Foam
Date Collected: 03-Dec-19 15:10

Laboratory Data

Lab Sample: 1904263-03
Date Received: 06-Dec-19 09:19
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	4.43	3.43	5.00	10.0	J	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
PFPrS	ND	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
3:3 FTCA	ND	3.99	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFPeA	4.11	3.43	5.00	10.0	J	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFBS	3.72	3.43	5.00	10.0	J	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-4:2 FTS	ND	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFHxA	21.6	3.43	5.00	10.0	Q	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFPeS	5.14	3.43	5.00	10.0	J	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
HFPO-DA	ND	6.03	7.50	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
5:3 FTCA	ND	6.03	7.50	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFHpA	39.8	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
ADONA	ND	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFHxS	316	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
Br-PFHxS	35.6	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
Total PFHxS	352	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-6:2 FTS	43.7	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFOA	2570	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
Br-PFOA	349	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
Total PFOA	2920	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
PFecHS	318	6.03	7.50	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFHpS	1240	343	500	1000	D	B9L0107	12-Dec-19	0.1000 L	19-Dec-19 00:02	100
7:3 FTCA	3.96	3.43	5.00	10.0	J	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFNA	2730	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFOSA	951	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFOS	75100	343	500	1000	D	B9L0107	12-Dec-19	0.1000 L	19-Dec-19 00:02	100
Br-PFOS	48900	343	500	1000	D	B9L0107	12-Dec-19	0.1000 L	19-Dec-19 00:02	100
Total PFOS	124000	343	500	1000		B9L0107	12-Dec-19	0.1000 L	19-Dec-19 00:02	100
9Cl-PF3ONS	ND	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFDA	509	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-8:2FTS	11.1	3.43	5.00	10.0	Q	B9L0107	12-Dec-19	0.1000 L	25-Dec-19 09:52	1
L-PFNS	233	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-MeFOSAA	45.7	3.43	5.00	10.0	Q	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1

Sample ID: FM1912031510-07

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-07

Matrix: Foam
Date Collected: 03-Dec-19 15:10

Laboratory Data

Lab Sample: 1904263-03
Date Received: 06-Dec-19 09:19

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	99.7	3.43	5.00	10.0	Q	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
Total MeFOSAA	145	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-EtFOSAA	2270	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
Br-EtFOSAA	2110	3.43	5.00	10.0	Q	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
Total EtFOSAA	4380	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFUnA	63.1	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFDS	46.0	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
11Cl-PF3OUdS	ND	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
10:2 FTS	ND	6.03	7.50	10.0		B9L0107	12-Dec-19	0.1000 L	25-Dec-19 09:52	1
L-PFDoA	ND	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFTrDA	ND	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
PFDoS	ND	6.03	7.50	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFTeDA	ND	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-MeFOSA	ND	11.0	25.0	50.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-EtFOSA	ND	11.0	25.0	50.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-EtFOSE	ND	11.0	25.0	50.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-MeFOSE	ND	11.0	25.0	50.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFHxDA	ND	3.43	5.00	10.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
L-PFODA	ND	7.68	18.8	25.0		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	57.3	60 - 130	H	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C3-PFPeA	IS	80.5	60 - 150		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C3-PFBS	IS	99.9	60 - 150		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C2-4:2 FTS	IS	79.6	40 - 150		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C2-PFHxA	IS	77.4	70 - 130		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C4-PFHpA	IS	77.2	60 - 150		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C3-PFHxS	IS	96.1	60 - 130		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C2-PFOA	IS	85.8	60 - 130		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C5-PFNA	IS	83.4	50 - 130		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C8-PFOSA	IS	56.9	20 - 150		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C8-PFOS	IS	111	60 - 130	D	B9L0107	12-Dec-19	0.1000 L	19-Dec-19 00:02	100
13C2-PFDA	IS	76.5	60 - 130		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C2-8:2 FTS	IS	178	40 - 150	H	B9L0107	12-Dec-19	0.1000 L	25-Dec-19 09:52	1
d3-MeFOSAA	IS	44.6	50 - 150	H	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1

Sample ID: FM1912031510-07

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-07
Matrix: Foam
Date Collected: 03-Dec-19 15:10

Laboratory Data

Lab Sample: 1904263-03
Date Received: 06-Dec-19 09:19
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d5-EtFOSAA	IS	40.7	50 - 150	H	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C2-PFUnA	IS	58.7	60 - 130	H	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C2-PFDoA	IS	36.6	30 - 130		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
d3-MeFOSA	IS	13.7	10 - 130		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C2-PFTeDA	IS	17.0	20 - 150	H	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
d5-EtFOSA	IS	9.90	10 - 150	H	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C2-PFHxDA	IS	4.40	20 - 150	H	B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
d7-MeFOSE	IS	42.2	10 - 150		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
d9-EtFOSE	IS	38.8	10 - 150		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1
13C3-HFPO-DA	IS	69.8	50 - 150		B9L0107	12-Dec-19	0.1000 L	16-Dec-19 20:34	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: SW1912031515-07 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-07

Matrix: Surface Water
Date Collected: 03-Dec-19 15:15

Laboratory Data

Lab Sample: 1904263-04
Date Received: 06-Dec-19 09:19

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	2.71	1.45	2.11	4.22	J	B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
PFPrS	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
3:3 FTCA	ND	1.68	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFPeA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFBS	1.55	1.45	2.11	4.22	J	B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-4:2 FTS	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFHxA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFPeS	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
HFPO-DA	ND	2.54	3.16	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
5:3 FTCA	ND	2.54	3.16	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFHpA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
ADONA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFHxS	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
Br-PFHxS	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
Total PFHxS	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-6:2 FTS	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFOA	1.98	1.45	2.11	4.22	J	B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
Br-PFOA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
Total PFOA	1.98	1.45	2.11	4.22	J	B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
PFecHS	ND	2.54	3.16	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFHpS	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
7:3 FTCA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFNA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFOSA	3.79	1.45	2.11	4.22	J	B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFOS	13.1	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
Br-PFOS	5.38	1.45	2.11	4.22	Q	B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
Total PFOS	18.5	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
9Cl-PF3ONS	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFDA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-8:2FTS	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFNS	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-MeFOSAA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1

Sample ID: SW1912031515-07

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-07

Matrix: Surface Water
Date Collected: 03-Dec-19 15:15

Laboratory Data

Lab Sample: 1904263-04
Date Received: 06-Dec-19 09:19

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
Total MeFOSAA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-EtFOSAA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
Br-EtFOSAA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
Total EtFOSAA	2.40	1.45	2.11	4.22	J	B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFUnA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFDS	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
11Cl-PF3OUdS	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
10:2 FTS	ND	2.54	3.16	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFDoA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFTrDA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
PFDoS	ND	2.54	3.16	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFTeDA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-MeFOSA	ND	4.65	10.5	21.1		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-EtFOSA	ND	4.65	10.5	21.1		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-EtFOSE	ND	4.65	10.5	21.1		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-MeFOSE	ND	4.65	10.5	21.1		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFHxDA	ND	1.45	2.11	4.22		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
L-PFODA	ND	3.22	7.88	10.5		B9L0218	20-Dec-19	0.238 L	23-Dec-19 22:10	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	87.3	60 - 130		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C3-PFPeA	IS	91.5	60 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C3-PFBS	IS	88.7	60 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C2-4:2 FTS	IS	85.9	40 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C2-PFHxA	IS	91.1	70 - 130		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C4-PFHpA	IS	94.5	60 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C3-PFHxS	IS	89.6	60 - 130		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C2-6:2 FTS	IS	96.5	40 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C2-PFOA	IS	92.5	60 - 130		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C5-PFNA	IS	94.5	50 - 130		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C8-PFOSA	IS	88.0	20 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C8-PFOS	IS	92.6	60 - 130		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C2-PFDA	IS	93.2	60 - 130		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C2-8:2 FTS	IS	99.5	40 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1

Sample ID: SW1912031515-07

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Rogue River-07
Matrix: Surface Water
Date Collected: 03-Dec-19 15:15

Laboratory Data

Lab Sample: 1904263-04
Date Received: 06-Dec-19 09:19
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d3-MeFOSAA	IS	92.5	50 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
d5-EtFOSAA	IS	79.2	50 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C2-PFUnA	IS	89.8	60 - 130		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C2-PFDoA	IS	96.8	30 - 130		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
d3-MeFOSA	IS	54.9	10 - 130		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C2-PFTeDA	IS	84.6	20 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
d5-EtFOSA	IS	49.9	10 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C2-PFHxDA	IS	54.2	20 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
d7-MeFOSE	IS	83.2	10 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
d9-EtFOSE	IS	83.1	10 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1
13C3-HFPO-DA	IS	85.6	50 - 150		B9L0108	12-Dec-19	0.237 L	16-Dec-19 21:27	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: EB1912040910JLB **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: SS Dipper
Matrix: Aqueous
Date Collected: 04-Dec-19 09:10

Laboratory Data

Lab Sample: 1904263-05
Date Received: 06-Dec-19 09:19
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
PFPrS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
3:3 FTCA	ND	1.55	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFPeA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFBS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-4:2 FTS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFHxA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFPeS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
HFPO-DA	ND	2.34	2.92	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
5:3 FTCA	ND	2.34	2.92	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFHpA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
ADONA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFHxS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
Br-PFHxS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
Total PFHxS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-6:2 FTS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFOA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
Br-PFOA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
Total PFOA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
PFecHS	ND	2.34	2.92	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFHpS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
7:3 FTCA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFNA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFOSA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFOS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
Br-PFOS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
Total PFOS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
9Cl-PF3ONS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFDA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-8:2FTS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFNS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-MeFOSAA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1

Sample ID: EB1912040910JLB **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: SS Dipper
Matrix: Aqueous
Date Collected: 04-Dec-19 09:10

Laboratory Data

Lab Sample: 1904263-05
Date Received: 06-Dec-19 09:19
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
Total MeFOSAA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-EtFOSAA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
Br-EtFOSAA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
Total EtFOSAA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFUnA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFDS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
11Cl-PF3OUdS	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
10:2 FTS	ND	2.34	2.92	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFDoA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFTrDA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
PFDoS	ND	2.34	2.92	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFTeDA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-MeFOSA	ND	4.28	9.73	19.4		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-EtFOSA	ND	4.28	9.73	19.4		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-EtFOSE	ND	4.28	9.73	19.4		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-MeFOSE	ND	4.28	9.73	19.4		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFHxDA	ND	1.33	1.95	3.89		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
L-PFODA	ND	3.20	7.81	10.4		B9L0218	20-Dec-19	0.240 L	23-Dec-19 22:21	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.9	60 - 130		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C3-PFPeA	IS	95.6	60 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C3-PFBS	IS	91.6	60 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C2-4:2 FTS	IS	103	40 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C2-PFHxA	IS	91.9	70 - 130		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C4-PFHpA	IS	99.2	60 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C3-PFHxS	IS	95.0	60 - 130		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C2-6:2 FTS	IS	98.7	40 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C2-PFOA	IS	92.5	60 - 130		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C5-PFNA	IS	87.6	50 - 130		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C8-PFOSA	IS	75.5	20 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C8-PFOS	IS	97.4	60 - 130		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C2-PFDA	IS	88.7	60 - 130		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C2-8:2 FTS	IS	94.6	40 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1

Sample ID: EB1912040910JLB

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: SS Dipper
Matrix: Aqueous
Date Collected: 04-Dec-19 09:10

Laboratory Data

Lab Sample: 1904263-05
Date Received: 06-Dec-19 09:19
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d3-MeFOSAA	IS	85.1	50 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
d5-EtFOSAA	IS	90.3	50 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C2-PFUnA	IS	93.8	60 - 130		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C2-PFDoA	IS	92.4	30 - 130		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
d3-MeFOSA	IS	40.8	10 - 130		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C2-PFTeDA	IS	85.8	20 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
d5-EtFOSA	IS	39.5	10 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C2-PFHxDA	IS	68.0	20 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
d7-MeFOSE	IS	62.3	10 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
d9-EtFOSE	IS	63.4	10 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1
13C3-HFPO-DA	IS	99.3	50 - 150		B9L0108	12-Dec-19	0.257 L	16-Dec-19 21:37	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: FM1912040935-08 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-08
Matrix: Foam
Date Collected: 04-Dec-19 09:35

Laboratory Data

Lab Sample: 1904263-06
Date Received: 06-Dec-19 09:19
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	4.66	2.28	3.33	6.66	J	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
PFPrS	ND	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
3:3 FTCA	ND	2.66	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFPeA	ND	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFBS	ND	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-4:2 FTS	ND	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFHxA	30.1	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFPeS	ND	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
HFPO-DA	ND	4.01	5.00	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
5:3 FTCA	6.04	4.01	5.00	6.66	J	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFHpA	29.5	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
ADONA	ND	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFHxS	88.5	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
Br-PFHxS	10.0	2.28	3.33	6.66	Q	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
Total PFHxS	98.6	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-6:2 FTS	813	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFOA	1260	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
Br-PFOA	64.7	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
Total PFOA	1320	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
PFecHS	798	4.01	5.00	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFHpS	479	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
7:3 FTCA	40.4	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFNA	5510	11.4	16.7	33.3	D	B9L0107	12-Dec-19	0.150 L	18-Dec-19 05:29	5
L-PFOSA	110	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFOS	10100	34.2	50.0	99.9	D	B9L0107	12-Dec-19	0.150 L	18-Dec-19 04:58	15
Br-PFOS	17200	34.2	50.0	99.9	D	B9L0107	12-Dec-19	0.150 L	18-Dec-19 04:58	15
Total PFOS	27300	34.2	50.0	99.9		B9L0107	12-Dec-19	0.150 L	18-Dec-19 04:58	15
9Cl-PF3ONS	ND	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFDA	1710	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-8:2FTS	232	34.2	50.0	99.9	D	B9L0107	12-Dec-19	0.150 L	18-Dec-19 04:58	15
L-PFNS	ND	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-MeFOSAA	125	2.28	3.33	6.66	Q	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1

Sample ID: FM1912040935-08

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-08
Matrix: Foam
Date Collected: 04-Dec-19 09:35

Laboratory Data

Lab Sample: 1904263-06
Date Received: 06-Dec-19 09:19
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	252	2.28	3.33	6.66	Q	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
Total MeFOSAA	376	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-EtFOSAA	155	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
Br-EtFOSAA	176	2.28	3.33	6.66	Q	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
Total EtFOSAA	330	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFUnA	255	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFDS	ND	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
11Cl-PF3OUdS	ND	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
10:2 FTS	ND	4.01	5.00	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFDoA	42.5	2.28	3.33	6.66	Q	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFTrDA	ND	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
PFDoS	ND	4.01	5.00	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFTeDA	ND	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-MeFOSA	ND	7.33	16.7	33.3		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-EtFOSA	ND	7.33	16.7	33.3		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-EtFOSE	ND	7.33	16.7	33.3		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-MeFOSE	ND	7.33	16.7	33.3		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFHxDA	ND	2.28	3.33	6.66		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
L-PFODA	ND	5.11	12.5	16.7		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	56.6	60 - 130	H	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C3-PFPeA	IS	84.7	60 - 150		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C3-PFBS	IS	98.1	60 - 150		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C2-4:2 FTS	IS	59.9	40 - 150		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C2-PFHxA	IS	76.4	70 - 130		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C4-PFHpA	IS	59.7	60 - 150	H	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C3-PFHxS	IS	81.9	60 - 130		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C2-6:2 FTS	IS	96.2	40 - 150		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C2-PFOA	IS	80.8	60 - 130		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C5-PFNA	IS	68.7	50 - 130	D	B9L0107	12-Dec-19	0.150 L	18-Dec-19 05:29	5
13C8-PFOSA	IS	42.1	20 - 150		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C8-PFOS	IS	106	60 - 130	D	B9L0107	12-Dec-19	0.150 L	18-Dec-19 04:58	15
13C2-PFDA	IS	55.9	60 - 130	H	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C2-8:2 FTS	IS	118	40 - 150	D	B9L0107	12-Dec-19	0.150 L	18-Dec-19 04:58	15

Sample ID: FM1912040935-08

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-08
Matrix: Foam
Date Collected: 04-Dec-19 09:35

Laboratory Data

Lab Sample: 1904263-06
Date Received: 06-Dec-19 09:19
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d3-MeFOSAA	IS	17.7	50 - 150	H	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
d5-EtFOSAA	IS	24.2	50 - 150	H	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C2-PFUnA	IS	35.3	60 - 130	H	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C2-PFDoA	IS	27.3	30 - 130	H	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
d3-MeFOSA	IS	10.7	10 - 130		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C2-PFTeDA	IS	13.9	20 - 150	H	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
d5-EtFOSA	IS	5.40	10 - 150	H	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C2-PFHxDA	IS	4.00	20 - 150	H	B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
d7-MeFOSE	IS	32.4	10 - 150		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
d9-EtFOSE	IS	31.4	10 - 150		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1
13C3-HFPO-DA	IS	61.6	50 - 150		B9L0107	12-Dec-19	0.150 L	16-Dec-19 20:45	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: SW1912040940-08 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-08
Matrix: Surface Water
Date Collected: 04-Dec-19 09:40

Laboratory Data

Lab Sample: 1904263-07
Date Received: 06-Dec-19 09:19
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	2.58	1.44	2.10	4.21	J	B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
PFPrS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
3:3 FTCA	ND	1.68	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFPeA	2.00	1.44	2.10	4.21	J	B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFBS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-4:2 FTS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFHxA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFPeS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
HFPO-DA	ND	2.54	3.15	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
5:3 FTCA	ND	2.54	3.15	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFHpA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
ADONA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFHxS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
Br-PFHxS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
Total PFHxS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-6:2 FTS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFOA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
Br-PFOA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
Total PFOA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
PFecHS	ND	2.54	3.15	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFHpS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
7:3 FTCA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFNA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFOSA	5.17	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFOS	2.01	1.44	2.10	4.21	J, Q	B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
Br-PFOS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
Total PFOS	2.82	1.44	2.10	4.21	J	B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
9Cl-PF3ONS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFDA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-8:2FTS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFNS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-MeFOSAA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1

Sample ID: SW1912040940-08

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-08

Matrix: Surface Water
Date Collected: 04-Dec-19 09:40

Laboratory Data

Lab Sample: 1904263-07
Date Received: 06-Dec-19 09:19

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
Total MeFOSAA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-EtFOSAA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
Br-EtFOSAA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
Total EtFOSAA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFUnA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFDS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
11Cl-PF3OUdS	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
10:2 FTS	ND	2.54	3.15	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFDoA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFTrDA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
PFDoS	ND	2.54	3.15	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFTeDA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-MeFOSA	ND	4.64	10.5	21.0		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-EtFOSA	ND	4.64	10.5	21.0		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-EtFOSE	ND	4.64	10.5	21.0		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-MeFOSE	ND	4.64	10.5	21.0		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFHxDA	ND	1.44	2.10	4.21		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
L-PFODA	ND	3.18	7.78	10.4		B9L0218	20-Dec-19	0.241 L	23-Dec-19 22:31	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	82.6	60 - 130		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C3-PFPeA	IS	96.9	60 - 150		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C3-PFBS	IS	108	60 - 150		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C2-4:2 FTS	IS	105	40 - 150		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C2-PFHxA	IS	92.3	70 - 130		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C4-PFHpA	IS	96.4	60 - 150		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C3-PFHxS	IS	103	60 - 130		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C2-6:2 FTS	IS	88.7	40 - 150		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C2-PFOA	IS	99.1	60 - 130		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C5-PFNA	IS	92.8	50 - 130		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C8-PFOSA	IS	19.2	20 - 150	H	B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C8-PFOS	IS	94.4	60 - 130		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C2-PFDA	IS	93.1	60 - 130		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C2-8:2 FTS	IS	80.8	40 - 150		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1

Sample ID: SW1912040940-08

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-08

Matrix: Surface Water
Date Collected: 04-Dec-19 09:40

Laboratory Data

Lab Sample: 1904263-07
Date Received: 06-Dec-19 09:19

Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d3-MeFOSAA	IS	95.6	50 - 150		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
d5-EtFOSAA	IS	91.2	50 - 150		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C2-PFUnA	IS	93.7	60 - 130		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C2-PFDoA	IS	102	30 - 130		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
d3-MeFOSA	IS	2.10	10 - 130	H	B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C2-PFTeDA	IS	96.8	20 - 150		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
d5-EtFOSA	IS	2.10	10 - 150	H	B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C2-PFHxDA	IS	87.2	20 - 150		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
d7-MeFOSE	IS	22.5	10 - 150		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
d9-EtFOSE	IS	24.1	10 - 150		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1
13C3-HFPO-DA	IS	94.2	50 - 150		B9L0108	12-Dec-19	0.238 L	16-Dec-19 21:48	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

* REVISED COC RECEIVED VIA EMAIL 12/05/19 0928 - KE 12/08/19

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 1904263 Temp: 0.6 °C
Storage ID: R-13, WR-2 Storage Secured: Yes ☑ No ☐

Project ID: EGLE Foam Study PO#: 60612688 Sampler: Jim Buzzell (name)

TAT (check one): Standard: X 21 days; Rush (surcharge may apply): ☐ 14 days ☐ 7 days Specify:

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
Mike Jury	EGLE	401 Ketchum, Suite B	Bay City	MI	989-894-6255	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
			* SEE ORIGINAL COC FOR SIGNATURES *		
Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

ATTN: _____ Method of Shipment: _____ Tracking No.: _____

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	Mod. EPA Method 537: PFOA/ PFOS	UCMR3 PFAS List:6	537 List: 14	PFAS List of 24	Other: Please List Below	PFAS Full list of 41 Branch and Linear	EPA Method 537(DW only): PFOA/ PFOS	UCMR3 PFAS List:6	PFAS List: 14	Comments
FM1912031430-06	12/3/19	14:30	Rogue River-06	1	P	F						X				Collapsed foam sample (high results expected)
SW1912031435-06	12/3/19	14:35	Rogue River-06	2	P	WS						X				
FM1912031510-07	12/3/19	15:10	Rogue River-07	1	P	F						X				Collapsed foam sample (high results expected)
SW1912031515-07	12/3/19	15:15	Rogue River-07	2	P	WS						X				
EB1912040910JLB	12/4/19	9:10	SS Dipper	2	P	AQ						X				
FM1912040935-08	12/4/19	9:35	Thornapple River-08	1	P	F						X				Collapsed foam sample (high results expected)
SW1912040940-08	12/4/19	9:40	Thornapple River-08	2	P	WS						X				

Special Instructions/Comments:

Send Results and Acknowledgements to:
JuryM1@aecom.com Barry.Harding@aecom.com
Nic.Ropotos@aecom.com Dorin.Bogdan@aecom.com
Matt.Vandereide@aecom.com Robert.Kennedy@aecom.com
Geoffrey.Groff@aecom.com Jim.Carbone@aecom.com James.Buzzell@aecom.com

SEND DOCUMENTATION AND RESULTS TO:
Name: Mike Jury
Company: EGLE
Address: 401 Ketchum, Suite B
City: Bay City State: MI Zip: 48708
Phone: 989-894-6255 Fax:
Email: juryM1@michigan.gov

Container Types: P= HDPE, PJ= HDPE Jar, O = Other: _____

Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: _____

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: _____

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 1904263 Temp: 0.16 °C
Storage ID: R-13, WR-2 Storage Secured: Yes ☑ No ☐

Project ID: EGLE Foam Study PO#: 60612688 Sampler: Jim Buzzell (name)

TAT (check one): Standard: X 21 days; Rush (surcharge may apply): ☐ 14 days ☐ 7 days Specify:

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
Mike Jury	EGLE	401 Ketchum, Suite B	Bay City	MI	989-894-6255	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Jim Buzzell	12/5/19	17:00	Ashley Mason	12/06/19	0919
Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time

* USED REVISED COC RECEIVED VIA EMAIL 12/05/19 0928

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

Method of Shipment:

ATTN:

Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	Mod. EPA Method 537: PFOA/ PFOS	UCMR3 PFAS List:6	537 List: 14	PFAS List of 24	Other: Please List Below	PFAS Full list of 41 Branch and Linear	EPA Method 537(DW only): PFOA/ PFOS	UCMR3 PFAS List:6	PFAS List: 14	Comments
FM1912031430-06	12/3/19	14:30	Rogue River-06	1	P	O						X				Collapsed foam sample (high results expected)
SW1912031435-06	12/3/19	14:35	Rogue River-06	2	P	AQ						X				
FM1912031510-07	12/3/19	15:10	Rogue River-07	1	P	O						X				Collapsed foam sample (high results expected)
SW1912031515-07	12/3/19	15:15	Rogue River-07	2	P	AQ						X				
EB1912040910JLB	12/4/19	9:10	SS Dipper	2	P	AQ						X				
FM1912040935-08	12/4/19	9:35	Thornapple River-08	1	P	O						X				Collapsed foam sample (high results expected)
SW1912040940-08	12/4/19	9:40	Thornapple River-08	1	P	AQ						X				
												X				

Special Instructions/Comments:

Send Results and Acknowledgements to:
JuryM1@aecom.com Barry.Harding@aecom.com
Nic.Ropotos@aecom.com Dorin.Bogdan@aecom.com
Matt.Vandereide@aecom.com Robert.Kennedy@aecom.com
James.Buzzell@aecom.com

SEND DOCUMENTATION AND RESULTS TO:
Name: Mike Jury
Company: EGLE
Address: 401 Ketchum, Suite B
City: Bay City State: MI Zip: 48708
Phone: 989-894-6255 Fax:
Email: juryM1@michigan.gov

Container Types: P= HDPE, PJ= HDPE Jar, O = Other:

Bottle Preservation Type: T = Thiosulfate, TZ = Trizma:

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: Collapsed Foam

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1904263 TAT Std

Samples Arrival:	Date/Time 12/06/19 0919	Initials: ajm	Location: WR-2 Shelf/Rack: N/A

Delivered By:	(FedEx)	UPS	On Trac	GSO	DHL	Hand Delivered	Other
Preservation:	(Ice)	Blue Ice		Dry Ice			None

Temp °C: 0.6 (uncorrected)	Probe used: Y / (N)	Thermometer ID: IR-3
Temp °C: 0.6 (corrected)		

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Airbill / Trk # 4894 6696 3904	✓		
Shipping Documentation Present?	✓		

Shipping Container	Vista	(Client)	Retain	(Return)	Dispose

Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	Date/Time 12/07/19 1553	Initials: KE	Location: R-13 / WR-2 Shelf/Rack: A3 / F7

COC Anomaly/Sample Acceptance Form completed?	✓		

Comments: (SEE FORM FOLLOWING)

CoC/Label Reconciliation Report WO# 1904263

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
1904263-01	A FM1912031430-06	☑	Rogue River-06 ✓	03-Dec-19 14:30	☑	HDPE Bottle, 250 mL	Aqueous	
1904263-02	A SW1912031435-06	☑	Rogue River-06 ✓	03-Dec-19 14:35	☑	HDPE Bottle, 250 mL	Aqueous	
1904263-02	B SW1912031435-06	☑	Rogue River-06 ✓	03-Dec-19 14:35	☑	HDPE Bottle, 250 mL	Aqueous	
1904263-03	A FM1912031510-07	☑	Rogue River-07 ✓	03-Dec-19 15:10	☑	HDPE Bottle, 250 mL	Aqueous	
1904263-04	A SW1912031515-07	☑	Rogue River-07 ✓	03-Dec-19 15:15	☑	HDPE Bottle, 250 mL	Aqueous	
1904263-04	B SW1912031515-07	☑	Rogue River-07 ✓	03-Dec-19 15:15	☑	HDPE Bottle, 250 mL	Aqueous	
1904263-05	A EB1912040910JLB	* ☐	SS Dipper ✓	✓04-Dec-19 09:10 0915	☐ *	HDPE Bottle, 250 mL	Aqueous	
1904263-05	B EB1912040910JLB	* ☐	SS Dipper ✓	✓04-Dec-19 09:10 0915	☐ *	HDPE Bottle, 250 mL	Aqueous	
1904263-06	A FM1912040935-08	☑	Thornapple River-08 ✓	04-Dec-19 09:35	☑	HDPE Bottle, 250 mL	Aqueous	
1904263-07	A SW1912040940-08	☑	Thornapple River-08 ✓	04-Dec-19 09:40	☑	HDPE Bottle, 250 mL	Aqueous	
1904263-07	B SW1912040940-08	☑	Thornapple River-08 ✓	04-Dec-19 09:40	☑	HDPE Bottle, 250 mL	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		
Preservation Documented: Na2S2O3 Trizma (None) Other			✓
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓

Verifed by/Date: KE 12/08/19

Comments:
* SAMPLE ID & DATE/TIME DISCREPANCY

COC
EB1912040910JLB
12-04-19 0910

SAMPLE LABEL
EB1912040915JLB
12-04-19 0915

Vista Analytical Laboratory

ANOMALY FORM

Vista Work Order 1904263

Initial/Date — The following checked issues were noted during sample receipt and login:

_____ ☐ **1. The samples were received out of temperature at (WI-PHT):** _____
Was Ice present: Yes No Melted Blue Ice

_____ ☐ 2. The Chain-of-Custody (CoC) was not relinquished properly.

_____ ☐ 3. The CoC did not include collection time(s). 00:00 will be used unless notified otherwise.

_____ ☐ 4. The sample(s) did not include a sample collection time. All or Sample Name: _____

KE 12/08/19 ☑ 5. A sample ID discrepancy was found. See the Reconciliation report.
The CoC Sample ID will be used unless notified otherwise.

KE 12/08/19 ☑ 6. A sample date and/or time discrepancy was found. See the Reconciliation report.
The CoC Sample date/time will be used unless notified otherwise.

_____ ☐ **7. The CoC did not include a sample matrix. The following sample matrix will be used:** _____

_____ ☐ **8. Insufficent volume received for analysis. All or Sample Name:** _____

_____ ☐ 9. The backup bottle was received broken. Sample Name: _____

_____ ☐ **10. CoC not received, illegible or destroyed.**

_____ ☐ **11. The sample(s) were received out of holding time. All or Sample Name:** _____

_____ ☐ **12. The CoC did not include an analysis. All or Sample Name:** _____

_____ ☐ **13. Sample(s) received without collection date. All or Sample Name:** _____

_____ ☐ **14. Sample(s) not received. All or Sample Name:** _____

_____ ☐ **15. Sample(s) received broken. All or Sample Name:** _____

_____ ☐ **16. An incorrect container-type was used. All or Sample Name:** _____

_____ ☐ 17. Other:

Bolded items require sign-off

Client Contacted: _____

Date of Contact: _____

Vista Client Manager: _____

Resolution:

January 29, 2020

Vista Work Order No. 2000012

Ms. Maya Murshak
Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on January 07, 2020 under your Project Name 'EGLE Foam Study'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Work Order No. 2000012
Case Narrative

Sample Condition on Receipt:

Two aqueous (collapsed foam) samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

PFAS Isotope Dilution Method

Sample "FM2001030800-09" contained particulate and was centrifuged prior to extraction.

The samples were extracted and analyzed for a selected list of PFAS using the PFAS Isotope Dilution Method (Modified EPA Method 537). The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The samples were extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with each preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The recoveries of PFHxA, HFPO-DA and PFDoS were greater than 130% and PFODA was less than 40% in the original OPR (B0A0034). Sample "SW2001030805-09" was re-extracted. The recoveries of all other analytes in the OPRs were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
2000012-01	FM2001030800-09	PFAS Isotope Dilution Method	13C3-PFBS	H	161
2000012-01	FM2001030800-09	PFAS Isotope Dilution Method	d3-MeFOSAA	H	22.6
2000012-01	FM2001030800-09	PFAS Isotope Dilution Method	d5-EtFOSAA	H	28.2
2000012-01	FM2001030800-09	PFAS Isotope Dilution Method	13C2-PFUnA	H	41.2
2000012-01	FM2001030800-09	PFAS Isotope Dilution Method	13C2-PFDoA	H	18.5
2000012-01	FM2001030800-09	PFAS Isotope Dilution Method	d3-MeFOSA	H	9.20
2000012-01	FM2001030800-09	PFAS Isotope Dilution Method	13C2-PFTeDA	H	4.80
2000012-01	FM2001030800-09	PFAS Isotope Dilution Method	13C2-PFHxDA	H	1.20
B0A0109-BLK1	B0A0109-BLK1	PFAS Isotope Dilution Method	d3-MeFOSA	H	7.80
B0A0109-BLK1	B0A0109-BLK1	PFAS Isotope Dilution Method	d5-EtFOSA	H	9.50

H = Recovery was outside laboratory acceptance criteria.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2000012-01	FM2001030800-09	03-Jan-20 08:00	07-Jan-20 09:54	HDPE Bottle, 250 mL
2000012-02	SW2001030805-09	03-Jan-20 08:05	07-Jan-20 09:54	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data
Name: Merit Laboratories, Inc. Matrix: Aqueous
Project: EGLE Foam Study

Laboratory Data
Lab Sample: B0A0034-BLK1 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
PFPrS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	24-Jan-20 13:22	1
3:3 FTCA	ND	1.60	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFPeA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFBS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-4:2 FTS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFHxA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	24-Jan-20 13:22	1
L-PFPeS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
HFPO-DA	ND	2.41	3.00	4.00		B0A0034	10-Jan-20	0.250 L	16-Jan-20 02:09	1
5:3 FTCA	ND	2.41	3.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFHpA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
ADONA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFHxS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
Br-PFHxS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
Total PFHxS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-6:2 FTS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFOA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
Br-PFOA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
Total PFOA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
PFecHS	ND	2.41	3.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFHpS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
7:3 FTCA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFNA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFOSA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFOS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
Br-PFOS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
Total PFOS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFDA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-8:2FTS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	16-Jan-20 02:09	1
L-PFNS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-MeFOSAA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
Total MeFOSAA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-EtFOSAA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
Total EtFOSAA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFUnA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0A0034-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
10:2 FTS	ND	2.41	3.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFDoA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFTrDA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
PFDoS	ND	2.41	3.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFTeDA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-MeFOSA	ND	4.41	10.0	20.0		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-EtFOSA	ND	4.41	10.0	20.0		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-EtFOSE	ND	4.41	10.0	20.0		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-MeFOSE	ND	4.41	10.0	20.0		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFHxDA	ND	1.37	2.00	4.00		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
L-PFODA	ND	3.07	7.50	10.0		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	99.1	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C3-PFPeA	IS	101	60 - 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C3-PFBS	IS	96.6	60 - 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C2-4:2 FTS	IS	110	40 - 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C2-PFHxA	IS	102	70 - 130		B0A0034	10-Jan-20	0.250 L	24-Jan-20 13:22	1
13C4-PFHpA	IS	99.8	60 - 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C3-PFHxS	IS	105	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C2-6:2 FTS	IS	104	40 - 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C2-PFOA	IS	94.5	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C5-PFNA	IS	106	50 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C8-PFOSA	IS	57.5	20 - 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C8-PFOS	IS	93.2	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C2-PFDA	IS	97.1	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C2-8:2 FTS	IS	97.0	40 - 150		B0A0034	10-Jan-20	0.250 L	16-Jan-20 02:09	1
d3-MeFOSAA	IS	82.5	50 - 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
d5-EtFOSAA	IS	69.8	50 - 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C2-PFUnA	IS	74.7	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C2-PFDoA	IS	71.3	30 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
d3-MeFOSA	IS	21.4	10 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C2-PFTeDA	IS	51.6	20 - 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
d5-EtFOSA	IS	18.2	10 - 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
13C2-PFHxDA	IS	35.1	20 - 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
d7-MeFOSE	IS	35.7	10 - 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1
d9-EtFOSE	IS	38.6	10 - 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:17	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc. Matrix: Aqueous

Project: EGLE Foam Study

Laboratory Data

Lab Sample: B0A0034-BLK1 Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	72.6	50 - 150		B0A0034	10-Jan-20	0.250 L	16-Jan-20 02:09	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0A0034-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	48.5	40.0	121	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
PFPrS	48.8	40.0	122	60 - 130		B0A0034	10-Jan-20	0.250 L	24-Jan-20 13:32	1
3:3 FTCA	43.9	40.0	110	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-PFPeA	49.7	40.0	124	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-PFBS	44.0	40.0	110	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-4:2 FTS	46.1	40.0	115	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-PFHxA	59.8	40.0	149	70 - 130	H	B0A0034	10-Jan-20	0.250 L	24-Jan-20 13:32	1
L-PFPeS	43.5	40.0	109	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
HFPO-DA	65.5	40.0	164	70 - 130	H	B0A0034	10-Jan-20	0.250 L	16-Jan-20 02:19	1
5:3 FTCA	32.7	40.0	81.8	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-PFHpA	40.6	40.0	101	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
ADONA	46.7	40.0	117	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
Total PFHxS	50.0	40.0	125	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-6:2 FTS	50.0	40.0	125	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
Total PFOA	50.9	40.0	127	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
PFecHS	46.9	40.0	117	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-PFHpS	51.3	40.0	128	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
7:3 FTCA	30.5	40.0	76.4	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-PFNA	46.8	40.0	117	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-PFOSA	43.9	40.0	110	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
Total PFOS	48.5	40.1	121	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
9Cl-PF3ONS	43.3	40.0	108	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-PFDA	43.0	40.0	108	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-8:2FTS	46.6	40.0	117	60 - 130		B0A0034	10-Jan-20	0.250 L	16-Jan-20 02:19	1
L-PFNS	44.3	40.0	111	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
Total MeFOSAA	42.9	40.0	107	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
Total EtFOSAA	44.5	40.0	111	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-PFUnA	48.7	40.0	122	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-PFDS	40.7	40.1	102	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
11Cl-PF3OUdS	51.8	40.0	129	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
10:2 FTS	40.4	40.0	101	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-PFDoA	47.9	40.0	120	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-PFTrDA	49.5	40.0	124	60 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
PFDoS	54.9	40.0	137	60 - 130	H	B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0A0034-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFTeDA	49.2	40.0	123	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-MeFOSA	233	200	116	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-EtFOSA	244	200	122	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-EtFOSE	235	200	117	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-MeFOSE	257	200	129	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-PFHxDA	47.3	40.0	118	70 - 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
L-PFODA	10.7	40.0	26.7	40 - 130	H	B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	96.5	60- 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C3-PFPeA	IS	93.2	60- 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C3-PFBS	IS	100	60- 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C2-4:2 FTS	IS	99.8	40- 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C2-PFHxA	IS	96.6	70- 130		B0A0034	10-Jan-20	0.250 L	24-Jan-20 13:32	1
13C4-PFHpA	IS	104	60- 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C3-PFHxS	IS	101	60- 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C2-6:2 FTS	IS	87.2	40- 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C2-PFOA	IS	91.2	60- 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C5-PFNA	IS	97.3	50- 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C8-PFOSA	IS	64.0	20- 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C8-PFOS	IS	86.7	60- 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C2-PFDA	IS	94.2	60- 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C2-8:2 FTS	IS	84.8	40- 150		B0A0034	10-Jan-20	0.250 L	16-Jan-20 02:19	1
d3-MeFOSAA	IS	94.5	50- 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
d5-EtFOSAA	IS	88.6	50- 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C2-PFUnA	IS	80.6	60- 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C2-PFDoA	IS	66.4	30- 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
d3-MeFOSA	IS	24.4	10- 130		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C2-PFTeDA	IS	60.3	20- 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
d5-EtFOSA	IS	21.3	10- 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C2-PFHxDA	IS	36.1	20- 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
d7-MeFOSE	IS	41.1	10- 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
d9-EtFOSE	IS	41.9	10- 150		B0A0034	10-Jan-20	0.250 L	13-Jan-20 23:28	1
13C3-HFPO-DA	IS	73.9	50- 150		B0A0034	10-Jan-20	0.250 L	16-Jan-20 02:19	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0A0109-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
PFPrS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
3:3 FTCA	ND	1.60	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFPeA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFBS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-4:2 FTS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFHxA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFPeS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
HFPO-DA	ND	2.41	3.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
5:3 FTCA	ND	2.41	3.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFHpA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
ADONA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFHxS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
Br-PFHxS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
Total PFHxS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-6:2 FTS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFOA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
Br-PFOA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
Total PFOA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
PFecHS	ND	2.41	3.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFHpS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
7:3 FTCA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFNA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFOSA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFOS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
Br-PFOS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
Total PFOS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFDA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-8:2FTS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFNS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-MeFOSAA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
Total MeFOSAA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-EtFOSAA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
Total EtFOSAA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFUnA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0A0109-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
10:2 FTS	ND	2.41	3.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFDoA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFTrDA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
PFDoS	ND	2.41	3.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFTeDA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-MeFOSA	ND	4.41	10.0	20.0		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-EtFOSA	ND	4.41	10.0	20.0		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-EtFOSE	ND	4.41	10.0	20.0		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-MeFOSE	ND	4.41	10.0	20.0		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFHxDA	ND	1.37	2.00	4.00		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
L-PFODA	ND	3.07	7.50	10.0		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	84.9	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C3-PFPeA	IS	80.4	60 - 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C3-PFBS	IS	84.6	60 - 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C2-4:2 FTS	IS	93.5	40 - 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C2-PFHxA	IS	86.8	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C4-PFHpA	IS	87.5	60 - 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C3-PFHxS	IS	87.3	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C2-6:2 FTS	IS	88.4	40 - 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C2-PFOA	IS	84.4	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C5-PFNA	IS	79.6	50 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C8-PFOSA	IS	46.5	20 - 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C8-PFOS	IS	90.7	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C2-PFDA	IS	73.4	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C2-8:2 FTS	IS	71.7	40 - 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
d3-MeFOSAA	IS	68.7	50 - 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
d5-EtFOSAA	IS	60.1	50 - 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C2-PFUnA	IS	76.0	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C2-PFDoA	IS	54.4	30 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
d3-MeFOSA	IS	7.80	10 - 130	H	B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C2-PFTeDA	IS	66.3	20 - 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
d5-EtFOSA	IS	9.50	10 - 150	H	B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
13C2-PFHxDA	IS	68.1	20 - 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
d7-MeFOSE	IS	51.1	10 - 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1
d9-EtFOSE	IS	51.2	10 - 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc. Matrix: Aqueous

Project: EGLE Foam Study

Laboratory Data

Lab Sample: B0A0109-BLK1 Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	79.6	50 - 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:14	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0A0109-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	44.7	40.0	112	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
PFPrS	51.5	40.0	129	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
3:3 FTCA	40.7	40.0	102	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFPeA	43.3	40.0	108	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFBS	38.7	40.0	96.7	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-4:2 FTS	37.3	40.0	93.2	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFHxA	39.3	40.0	98.2	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFPeS	39.5	40.0	98.9	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
HFPO-DA	40.2	40.0	101	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
5:3 FTCA	39.7	40.0	99.1	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFHpA	43.2	40.0	108	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
ADONA	41.9	40.0	105	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
Total PFHxS	49.4	40.0	123	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-6:2 FTS	47.2	40.0	118	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
Total PFOA	41.9	40.0	105	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
PFecHS	41.0	40.0	102	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFHpS	42.3	40.0	106	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
7:3 FTCA	34.3	40.0	85.8	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFNA	41.4	40.0	103	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFOSA	40.1	40.0	100	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
Total PFOS	41.2	40.0	103	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
9Cl-PF3ONS	34.0	40.0	85.1	70 - 130	Q	B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFDA	42.0	40.0	105	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-8:2FTS	36.5	40.0	91.2	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFNS	40.6	40.0	101	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
Total MeFOSAA	42.2	40.0	105	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
Total EtFOSAA	45.3	40.0	113	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFUnA	40.0	40.0	100	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFDS	36.7	40.0	91.8	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
11Cl-PF3OUdS	46.4	40.0	116	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
10:2 FTS	39.7	40.0	99.3	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFDoA	45.2	40.0	113	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFTrDA	43.8	40.0	110	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
PFDoS	39.9	40.0	99.8	60 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0A0109-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFTeDA	42.9	40.0	107	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-MeFOSA	245	200	123	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-EtFOSA	216	200	108	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-EtFOSE	202	200	101	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-MeFOSE	209	200	105	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFHxDA	43.7	40.0	109	70 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
L-PFODA	28.2	40.0	70.4	40 - 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	84.1	60- 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C3-PFPeA	IS	83.1	60- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C3-PFBS	IS	92.1	60- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C2-4:2 FTS	IS	86.6	40- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C2-PFHxA	IS	88.7	70- 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C4-PFHpA	IS	89.7	60- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C3-PFHxS	IS	81.0	60- 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C2-6:2 FTS	IS	76.8	40- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C2-PFOA	IS	78.8	60- 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C5-PFNA	IS	79.6	50- 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C8-PFOSA	IS	45.1	20- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C8-PFOS	IS	77.0	60- 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C2-PFDA	IS	76.8	60- 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C2-8:2 FTS	IS	82.8	40- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
d3-MeFOSAA	IS	62.8	50- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
d5-EtFOSAA	IS	64.1	50- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C2-PFUnA	IS	72.3	60- 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C2-PFDoA	IS	59.0	30- 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
d3-MeFOSA	IS	10.4	10- 130		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C2-PFTeDA	IS	67.8	20- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
d5-EtFOSA	IS	10.3	10- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C2-PFHxDA	IS	62.1	20- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
d7-MeFOSE	IS	48.6	10- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
d9-EtFOSE	IS	53.2	10- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1
13C3-HFPO-DA	IS	70.5	50- 150		B0A0109	17-Jan-20	0.250 L	25-Jan-20 02:24	1

Sample ID: FM2001030800-09 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River- 09
Matrix: Aqueous
Date Collected: 03-Jan-20 08:00

Laboratory Data

Lab Sample: 2000012-01
Date Received: 07-Jan-20 09:54
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
PFPrS	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	24-Jan-20 13:43	1
3:3 FTCA	ND	1.65	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFPeA	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFBS	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-4:2 FTS	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFHxA	9.19	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	24-Jan-20 13:43	1
L-PFPeS	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
HFPO-DA	ND	2.50	3.11	4.14		B0A0034	10-Jan-20	0.241 L	16-Jan-20 02:30	1
5:3 FTCA	ND	2.50	3.11	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFHpA	16.1	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
ADONA	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFHxS	58.7	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
Br-PFHxS	8.41	1.42	2.07	4.14	Q	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
Total PFHxS	67.1	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-6:2 FTS	345	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFOA	616	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
Br-PFOA	29.1	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
Total PFOA	645	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
PFecHS	299	2.50	3.11	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFHpS	186	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
7:3 FTCA	17.9	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFNA	2940	7.09	10.4	20.7	D	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:56	5
L-PFOSA	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFOS	4150	7.09	10.4	20.7	D	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:56	5
Br-PFOS	5440	7.09	10.4	20.7	D	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:56	5
Total PFOS	9590	7.09	10.4	20.7		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:56	5
9Cl-PF3ONS	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFDA	729	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-8:2FTS	156	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	16-Jan-20 02:30	1
L-PFNS	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-MeFOSAA	40.0	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
Br-MeFOSAA	86.3	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
Total MeFOSAA	126	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-EtFOSAA	89.4	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
Br-EtFOSAA	72.3	1.42	2.07	4.14	Q	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
Total EtFOSAA	162	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFUnA	124	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1

Sample ID: FM2001030800-09

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River- 09

Matrix: Aqueous
Date Collected: 03-Jan-20 08:00

Laboratory Data

Lab Sample: 2000012-01
Date Received: 07-Jan-20 09:54

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
11Cl-PF3OUdS	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
10:2 FTS	ND	2.50	3.11	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFDoA	29.9	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFTrDA	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
PFDoS	ND	2.50	3.11	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFTeDA	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-MeFOSA	ND	4.56	10.4	20.7		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-EtFOSA	ND	4.56	10.4	20.7		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-EtFOSE	ND	4.56	10.4	20.7		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-MeFOSE	ND	4.56	10.4	20.7		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFHxDA	ND	1.42	2.07	4.14		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
L-PFODA	ND	3.18	7.78	10.4		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	73.2	60 - 130		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
13C3-PFPeA	IS	124	60 - 150		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
13C3-PFBS	IS	161	60 - 150	H	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
13C2-4:2 FTS	IS	86.6	40 - 150		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
13C2-PFHxA	IS	89.4	70 - 130		B0A0034	10-Jan-20	0.241 L	24-Jan-20 13:43	1
13C4-PFHpA	IS	72.0	60 - 150		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
13C3-PFHxS	IS	90.3	60 - 130		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
13C2-6:2 FTS	IS	111	40 - 150		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
13C2-PFOA	IS	86.6	60 - 130		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
13C5-PFNA	IS	82.2	50 - 130	D	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:56	5
13C8-PFOSA	IS	36.8	20 - 150		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
13C8-PFOS	IS	68.4	60 - 130	D	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:56	5
13C2-PFDA	IS	77.7	60 - 130		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
13C2-8:2 FTS	IS	90.1	40 - 150		B0A0034	10-Jan-20	0.241 L	16-Jan-20 02:30	1
d3-MeFOSAA	IS	22.6	50 - 150	H	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
d5-EtFOSAA	IS	28.2	50 - 150	H	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
13C2-PFUnA	IS	41.2	60 - 130	H	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
13C2-PFDoA	IS	18.5	30 - 130	H	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
d3-MeFOSA	IS	9.20	10 - 130	H	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
13C2-PFTeDA	IS	4.80	20 - 150	H	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
d5-EtFOSA	IS	10.3	10 - 150		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
13C2-PFHxDA	IS	1.20	20 - 150	H	B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
d7-MeFOSE	IS	27.3	10 - 150		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1
d9-EtFOSE	IS	30.4	10 - 150		B0A0034	10-Jan-20	0.241 L	15-Jan-20 05:35	1

Sample ID: FM2001030800-09 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River- 09

Matrix: Aqueous
Date Collected: 03-Jan-20 08:00

Laboratory Data

Lab Sample: 2000012-01
Date Received: 07-Jan-20 09:54

Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	56.8	50 - 150		B0A0034	10-Jan-20	0.241 L	16-Jan-20 02:30	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: SW2001030805-09 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River- 09

Matrix: Aqueous
Date Collected: 03-Jan-20 08:05

Laboratory Data

Lab Sample: 2000012-02
Date Received: 07-Jan-20 09:54

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	2.28	1.64	2.40	4.80	J	B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
PFPrS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
3:3 FTCA	ND	1.91	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFPeA	6.42	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFBS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-4:2 FTS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFHxA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFPeS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
HFPO-DA	ND	2.89	3.61	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
5:3 FTCA	ND	2.89	3.61	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFHpA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
ADONA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFHxS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
Br-PFHxS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
Total PFHxS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-6:2 FTS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFOA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
Br-PFOA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
Total PFOA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
PFecHS	ND	2.89	3.61	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFHpS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
7:3 FTCA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFNA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFOSA	12.4	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFOS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
Br-PFOS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
Total PFOS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
9Cl-PF3ONS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFDA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-8:2FTS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFNS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-MeFOSAA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
Br-MeFOSAA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
Total MeFOSAA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-EtFOSAA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
Br-EtFOSAA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
Total EtFOSAA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFUnA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1

Sample ID: SW2001030805-09

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River- 09

Matrix: Aqueous
Date Collected: 03-Jan-20 08:05

Laboratory Data

Lab Sample: 2000012-02
Date Received: 07-Jan-20 09:54

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
11Cl-PF3OUdS	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
10:2 FTS	ND	2.89	3.61	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFDoA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFTrDA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
PFDoS	ND	2.89	3.61	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFTeDA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-MeFOSA	ND	5.28	12.0	24.0		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-EtFOSA	ND	5.28	12.0	24.0		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-EtFOSE	ND	5.28	12.0	24.0		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-MeFOSE	ND	5.28	12.0	24.0		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFHxDA	ND	1.64	2.40	4.80		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
L-PFODA	ND	3.68	9.01	12.0		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	76.0	60 - 130		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C3-PFPeA	IS	82.6	60 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C3-PFBS	IS	97.9	60 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C2-4:2 FTS	IS	100	40 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C2-PFHxA	IS	84.9	70 - 130		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C4-PFHpA	IS	84.9	60 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C3-PFHxS	IS	92.0	60 - 130		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C2-6:2 FTS	IS	90.8	40 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C2-PFOA	IS	87.0	60 - 130		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C5-PFNA	IS	81.3	50 - 130		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C8-PFOSA	IS	64.8	20 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C8-PFOS	IS	85.6	60 - 130		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C2-PFDA	IS	84.6	60 - 130		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C2-8:2 FTS	IS	84.3	40 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
d3-MeFOSAA	IS	79.9	50 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
d5-EtFOSAA	IS	84.1	50 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C2-PFUnA	IS	86.4	60 - 130		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C2-PFDoA	IS	66.8	30 - 130		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
d3-MeFOSA	IS	32.4	10 - 130		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C2-PFTeDA	IS	57.2	20 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
d5-EtFOSA	IS	32.8	10 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
13C2-PFHxDA	IS	47.2	20 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
d7-MeFOSE	IS	65.3	10 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1
d9-EtFOSE	IS	71.9	10 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1

Sample ID: SW2001030805-09 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River- 09

Matrix: Aqueous
Date Collected: 03-Jan-20 08:05

Laboratory Data

Lab Sample: 2000012-02
Date Received: 07-Jan-20 09:54

Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	92.7	50 - 150		B0A0109	17-Jan-20	0.208 L	25-Jan-20 02:35	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 2000012 Temp: 3.0 °C
Storage ID: R-13, WR-2 Storage Secured: Yes ☑ No ☐

Project ID: **EGLE Foam Study** PO#: **60612688** Sampler: **George Austin & Rachel Lopez** (name)

TAT (check one): Standard: [X] 21 days; Rush (surcharge may apply): [ ] 14 days [ ] 7 days Specify:

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
Mike Jury	**EGLE**	**401 Ketchum, Suite B**	**Bay City**	**MI**	**989-894-6255**	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
George Austin	**01.06.2020**	**1700**	Conor Maher	01/07/20	0954
Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

Method of Shipment:

ATTN: Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	Mod. EPA Method 537: PFOA/ PFOS	UCMR3 PFAS List:6	537 List: 14	PFAS List of 24	Other: Please List Below	PFAS Full list of 41 Branch and Linear	EPA Method 537(DW only): PFOA/ PFOS	UCMR3 PFAS List:6	PFAS List: 14	Comments
FM2001030800-09	**1/3/20**	**0800**	**Thornapple River - 09**	**1**	**P**	**AQ**						**x**				**Collapsed foam sample (high results expected)**
SW2001030805-09	**1/3/20**	**0805**	**Thornapple River - 09**	**1**	**P**	**AQ**						**X**				**Collapsed foam sample (high results expected)**

Special Instructions/Comments:

Send Results and Acknowledgements to:
JuryM1@aecom.com; Barry.Harding@aecom.com; Nic.Ropotos@aecom.com; Dorin.Bogdan@aecom.com; Matt.Vandereide@aecom.com; Robert.Kennedy@aecom.com; James.Buzzell@aecom.com

SEND DOCUMENTATION AND RESULTS TO:
Name: **Mike Jury**
Company: **EGLE**
Address: **401 Ketchum, Suite B**
City: **Bay City** State: MI Zip: 48708
Phone: **989-894-6255** Fax:
Email: juryM1@michigan.gov

Container Types: P= HDPE, PJ= HDPE Jar, O = Other:

Bottle Preservation Type: T = Thiosulfate, TZ = Trizma:

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 2000012 TAT Std

Samples Arrival:	**Date/Time** 01/07/20 0954		**Initials:** GM		**Location:** WR-2 **Shelf/Rack:** NA		
Delivered By:	(FedEx)	UPS	On Trac	GSO	DHL	Hand Delivered	Other
Preservation:	(Ice)		Blue Ice		Dry Ice		None
Temp °C: 3.0 (uncorrected)			**Probe used:** Y / (N)		**Thermometer ID:** IR-4		
Temp °C: 3.0 (corrected)							

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Airbill — Trk # 4894 6696 4495	✓		
Shipping Documentation Present?	✓		
Shipping Container: Vista / (Client) / Retain / (Return) / Dispose			
Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	**Date/Time** 01/07/20 1144	**Initials:** MWS	**Location:** R-13, WR-2 **Shelf/Rack:** 2-2, 2-3
COC Anomaly/Sample Acceptance Form completed?			NA ✓

Comments:

CoC/Label Reconciliation Report WO# 2000012

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container ✓	✓ BaseMatrix	Sample Comments ✓
* 2000012-01	A FM2001030800-09	☑	Thornapple River- 09 ✓	03-Jan-20 08:00	☑	HDPE Bottle, 250 mL	Aqueous	
(*) 2000012-02	A SW2001030805-09	☑	Thornapple River- 09 ✓	03-Jan-20 08:05	☑	HDPE Bottle, 250 mL	Aqueous	
(*) 2000012-02	B SW2001030805-09	☑	Thornapple River- 09 ✓	03-Jan-20 08:05	☑	HDPE Bottle, 250 mL	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		
Preservation Documented: Na2S2O3 Trizma (None) Other			✓
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓

Comments: * foam, no backup received
(*) COC notes 1 bottle, received 2

Verifed by/Date: MWS 01/07/20

February 12, 2020

Vista Work Order No. 2000137

Ms. Maya Murshak
Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on January 23, 2020 under your Project Name 'EGLE Foam Study'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Work Order No. 2000137
Case Narrative

Sample Condition on Receipt:

Three foam samples and two surface water samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

PFAS Isotope Dilution Method

The following samples contained particulate and were centrifuged prior to extraction:

Laboratory ID	Sample Name
2000137-01	FM2001161320-10
2000137-02	FM2001161320-10-FD
2000137-04	FM2001161435-11

The samples were extracted and analyzed for a selected list of PFAS using the PFAS Isotope Dilution Method (Modified EPA Method 537). The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The samples were extracted and analyzed within the method hold times. Sample "FM2001161435-11" was re-extracted outside of the hold time.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with each preparation batch. No analytes were detected in the Method Blanks above 1/2 the LOQ.

The OPR recoveries flagged with an "H" qualifier in batch B0A0167 were above the method acceptance criteria. The spike solution was tested and confirmed. The high concentrations were determined to be due to a spiking error. Sample "FM2001161435-11" was re-extracted, however, insufficient volume of samples "FM2001161320-10" and "FM2001161320-10-FD" was submitted to perform re-extractions.

The recoveries of PFPrS and HFPO-DA were greater than 130% in batch B0B0003. These analytes were not detected in the associated sample, "FM2001161435-11". The recoveries of all other analytes were within the acceptance criteria in the OPRs.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
2000137-01	FM2001161320-10	PFAS Isotope Dilution Method	13C2-PFTeDA	H	9.70
2000137-01	FM2001161320-10	PFAS Isotope Dilution Method	13C2-PFHxDA	H	3.80
2000137-02	FM2001161320-10-FD	PFAS Isotope Dilution Method	13C2-PFTeDA	H	7.60
2000137-02	FM2001161320-10-FD	PFAS Isotope Dilution Method	13C2-PFHxDA	H	3.10
2000137-04	FM2001161435-11	PFAS Isotope Dilution Method	d3-MeFOSAA	H	49.6
2000137-04	FM2001161435-11	PFAS Isotope Dilution Method	13C2-PFTeDA	H	9.90
2000137-04	FM2001161435-11	PFAS Isotope Dilution Method	13C2-PFHxDA	H	4.40
B0A0167-BS1	B0A0167-BS1	PFAS Isotope Dilution Method	d3-MeFOSA	H	8.70
B0A0167-BS1	B0A0167-BS1	PFAS Isotope Dilution Method	d5-EtFOSA	H	9.30

H = Recovery was outside laboratory acceptance criteria.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2000137-01	FM2001161320-10	16-Jan-20 13:20	23-Jan-20 08:55	HDPE Bottle, 250 mL
2000137-02	FM2001161320-10-FD	16-Jan-20 13:20	23-Jan-20 08:55	HDPE Bottle, 250 mL
2000137-03	SW2001161325-10	16-Jan-20 13:25	23-Jan-20 08:55	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2000137-04	FM2001161435-11	16-Jan-20 14:35	23-Jan-20 08:55	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2000137-05	SW2001161450-11	16-Jan-20 14:50	23-Jan-20 08:55	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL

Vista Project: 2000137

Client Project: EGLE Foam Study

ANALYTICAL RESULTS

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data
Name: Merit Laboratories, Inc. Matrix: Aqueous
Project: EGLE Foam Study

Laboratory Data
Lab Sample: B0A0166-BLK1 Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
PFPrS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
3:3 FTCA	ND	1.60	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFPeA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFBS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-4:2 FTS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFHxA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFPeS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
HFPO-DA	ND	2.41	3.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
5:3 FTCA	ND	2.41	3.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFHpA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
ADONA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFHxS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
Br-PFHxS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
Total PFHxS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-6:2 FTS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFOA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
Br-PFOA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
Total PFOA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
PFecHS	ND	2.41	3.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFHpS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
7:3 FTCA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFNA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFOSA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFOS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
Br-PFOS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
Total PFOS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFDA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-8:2FTS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFNS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-MeFOSAA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
Total MeFOSAA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-EtFOSAA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
Total EtFOSAA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFUnA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0A0166-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
10:2 FTS	ND	2.41	3.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFDoA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFTrDA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
PFDoS	ND	2.41	3.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFTeDA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-MeFOSA	ND	4.41	10.0	20.0		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-EtFOSA	ND	4.41	10.0	20.0		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-EtFOSE	ND	4.41	10.0	20.0		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-MeFOSE	ND	4.41	10.0	20.0		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFHxDA	ND	1.37	2.00	4.00		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
L-PFODA	ND	3.07	7.50	10.0		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	119	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C3-PFPeA	IS	117	60 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C3-PFBS	IS	121	60 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C2-4:2 FTS	IS	117	40 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C2-PFHxA	IS	119	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C4-PFHpA	IS	114	60 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C3-PFHxS	IS	122	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C2-6:2 FTS	IS	116	40 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C2-PFOA	IS	121	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C5-PFNA	IS	120	50 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C8-PFOSA	IS	67.5	20 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C8-PFOS	IS	129	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C2-PFDA	IS	127	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C2-8:2 FTS	IS	114	40 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
d3-MeFOSAA	IS	112	50 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
d5-EtFOSAA	IS	113	50 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C2-PFUnA	IS	108	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C2-PFDoA	IS	87.9	30 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
d3-MeFOSA	IS	28.0	10 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C2-PFTeDA	IS	73.2	20 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
d5-EtFOSA	IS	24.4	10 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
13C2-PFHxDA	IS	47.9	20 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
d7-MeFOSE	IS	32.9	10 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1
d9-EtFOSE	IS	29.3	10 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc. Matrix: Aqueous

Project: EGLE Foam Study

Laboratory Data

Lab Sample: B0A0166-BLK1 Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	116	50 - 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:47	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0A0166-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	37.2	40.0	93.1	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
PFPrS	37.0	40.0	92.6	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
3:3 FTCA	35.1	40.0	87.8	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFPeA	40.9	40.0	102	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFBS	39.2	40.0	97.9	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-4:2 FTS	41.3	40.0	103	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFHxA	41.5	40.0	104	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFPeS	38.5	40.0	96.3	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
HFPO-DA	40.0	40.0	99.9	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
5:3 FTCA	30.8	40.0	77.0	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFHpA	41.3	40.0	103	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
ADONA	36.0	40.0	90.1	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
Total PFHxS	40.1	40.0	100	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-6:2 FTS	37.5	40.0	93.8	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
Total PFOA	39.3	40.0	98.2	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
PFecHS	40.4	40.0	101	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFHpS	43.4	40.0	109	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
7:3 FTCA	27.3	40.0	68.4	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFNA	40.1	40.0	100	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFOSA	42.4	40.0	106	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
Total PFOS	38.3	40.0	95.7	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
9Cl-PF3ONS	41.6	40.0	104	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFDA	38.6	40.0	96.6	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-8:2FTS	39.3	40.0	98.1	60 - 130	Q	B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFNS	37.4	40.0	93.6	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
Total MeFOSAA	42.3	40.0	106	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
Total EtFOSAA	35.2	40.0	87.9	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFUnA	39.0	40.0	97.4	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFDS	43.5	40.0	109	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
11Cl-PF3OUdS	49.5	40.0	124	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
10:2 FTS	36.8	40.0	91.9	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFDoA	41.7	40.0	104	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFTrDA	39.3	40.0	98.1	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
PFDoS	42.5	40.0	106	60 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0A0166-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFTeDA	39.5	40.0	98.8	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-MeFOSA	217	200	108	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-EtFOSA	238	200	119	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-EtFOSE	212	200	106	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-MeFOSE	213	200	107	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFHxDA	40.4	40.0	101	70 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
L-PFODA	38.8	40.0	96.9	40 - 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	122	60- 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C3-PFPeA	IS	118	60- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C3-PFBS	IS	125	60- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C2-4:2 FTS	IS	109	40- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C2-PFHxA	IS	115	70- 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C4-PFHpA	IS	117	60- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C3-PFHxS	IS	117	60- 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C2-6:2 FTS	IS	118	40- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C2-PFOA	IS	114	60- 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C5-PFNA	IS	108	50- 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C8-PFOSA	IS	67.0	20- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C8-PFOS	IS	120	60- 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C2-PFDA	IS	122	60- 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C2-8:2 FTS	IS	117	40- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
d3-MeFOSAA	IS	104	50- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
d5-EtFOSAA	IS	106	50- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C2-PFUnA	IS	106	60- 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C2-PFDoA	IS	94.0	30- 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
d3-MeFOSA	IS	29.6	10- 130		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C2-PFTeDA	IS	89.1	20- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
d5-EtFOSA	IS	27.4	10- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C2-PFHxDA	IS	65.9	20- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
d7-MeFOSE	IS	34.3	10- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
d9-EtFOSE	IS	34.7	10- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1
13C3-HFPO-DA	IS	110	50- 150		B0A0166	27-Jan-20	0.250 L	28-Jan-20 21:58	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0A0167-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
PFPrS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
3:3 FTCA	ND	1.60	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFPeA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFBS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-4:2 FTS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFHxA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFPeS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
HFPO-DA	ND	2.41	3.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
5:3 FTCA	ND	2.41	3.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFHpA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
ADONA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFHxS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
Br-PFHxS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
Total PFHxS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-6:2 FTS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFOA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
Br-PFOA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
Total PFOA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
PFecHS	ND	2.41	3.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFHpS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
7:3 FTCA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFNA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFOSA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFOS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
Br-PFOS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
Total PFOS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFDA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-8:2FTS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFNS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-MeFOSAA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
Total MeFOSAA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-EtFOSAA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
Total EtFOSAA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFUnA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0A0167-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
10:2 FTS	ND	2.41	3.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFDoA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFTrDA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
PFDoS	ND	2.41	3.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFTeDA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-MeFOSA	ND	4.41	10.0	20.0		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-EtFOSA	ND	4.41	10.0	20.0		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-EtFOSE	ND	4.41	10.0	20.0		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-MeFOSE	ND	4.41	10.0	20.0		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFHxDA	ND	1.37	2.00	4.00		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
L-PFODA	ND	3.07	7.50	10.0		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	111	60 - 130		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C3-PFPeA	IS	103	60 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C3-PFBS	IS	103	60 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C2-4:2 FTS	IS	93.0	40 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C2-PFHxA	IS	111	70 - 130		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C4-PFHpA	IS	115	60 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C3-PFHxS	IS	102	60 - 130		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C2-6:2 FTS	IS	98.0	40 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C2-PFOA	IS	103	60 - 130		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C5-PFNA	IS	104	50 - 130		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C8-PFOSA	IS	69.7	20 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C8-PFOS	IS	104	60 - 130		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C2-PFDA	IS	112	60 - 130		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C2-8:2 FTS	IS	94.3	40 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
d3-MeFOSAA	IS	91.4	50 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
d5-EtFOSAA	IS	98.9	50 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C2-PFUnA	IS	86.1	60 - 130		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C2-PFDoA	IS	88.1	30 - 130		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
d3-MeFOSA	IS	26.2	10 - 130		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C2-PFTeDA	IS	88.5	20 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
d5-EtFOSA	IS	23.7	10 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
13C2-PFHxDA	IS	66.9	20 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
d7-MeFOSE	IS	52.7	10 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1
d9-EtFOSE	IS	52.9	10 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc. Matrix: Aqueous

Project: EGLE Foam Study

Laboratory Data

Lab Sample: B0A0167-BLK1 Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	99.8	50 - 150		B0A0167	27-Jan-20	0.250 L	28-Jan-20 20:55	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0A0167-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	49.0	40.0	123	70 - 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
PFPrS	54.8	40.0	137	60 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
3:3 FTCA	31.7	40.0	79.3	60 - 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFPeA	52.9	40.0	132	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFBS	54.1	40.0	135	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-4:2 FTS	54.2	40.0	136	60 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFHxA	53.5	40.0	134	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFPeS	49.6	40.0	124	70 - 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
HFPO-DA	54.1	40.0	135	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
5:3 FTCA	27.5	40.0	68.8	60 - 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFHpA	53.6	40.0	134	70 - 130	Q, H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
ADONA	49.2	40.0	123	70 - 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
Total PFHxS	54.8	40.0	137	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-6:2 FTS	50.7	40.0	127	60 - 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
Total PFOA	51.2	40.0	128	70 - 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
PFecHS	54.9	40.0	137	60 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFHpS	49.7	40.0	124	60 - 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
7:3 FTCA	26.3	40.0	65.9	60 - 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFNA	56.9	40.0	142	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFOSA	55.8	40.0	140	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
Total PFOS	50.2	40.0	125	70 - 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
9Cl-PF3ONS	51.2	40.0	128	70 - 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFDA	50.6	40.0	127	70 - 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-8:2FTS	51.6	40.0	129	60 - 130	Q	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFNS	53.3	40.0	133	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
Total MeFOSAA	49.2	40.0	123	70 - 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
Total EtFOSAA	52.7	40.0	132	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFUnA	53.7	40.0	134	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFDS	49.6	40.0	124	60 - 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
11Cl-PF3OUdS	61.3	40.0	153	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
10:2 FTS	65.5	40.0	164	60 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFDoA	53.8	40.0	134	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFTrDA	49.2	40.0	123	60 - 130	Q	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
PFDoS	56.6	40.0	141	60 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0A0167-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFTeDA	52.9	40.0	132	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-MeFOSA	645	200	322	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-EtFOSA	651	200	326	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-EtFOSE	539	200	270	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-MeFOSE	510	200	255	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFHxDA	56.1	40.0	140	70 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
L-PFODA	14.3	40.0	35.7	40 - 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	99.9	60- 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C3-PFPeA	IS	97.2	60- 150		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C3-PFBS	IS	99.5	60- 150		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C2-4:2 FTS	IS	94.7	40- 150		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C2-PFHxA	IS	97.6	70- 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C4-PFHpA	IS	104	60- 150		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C3-PFHxS	IS	105	60- 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C2-6:2 FTS	IS	89.8	40- 150		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C2-PFOA	IS	97.2	60- 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C5-PFNA	IS	111	50- 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C8-PFOSA	IS	56.3	20- 150		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C8-PFOS	IS	98.4	60- 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C2-PFDA	IS	100	60- 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C2-8:2 FTS	IS	94.1	40- 150		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
d3-MeFOSAA	IS	99.1	50- 150		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
d5-EtFOSAA	IS	90.2	50- 150		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C2-PFUnA	IS	99.7	60- 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C2-PFDoA	IS	85.8	30- 130		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
d3-MeFOSA	IS	8.70	10- 130	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C2-PFTeDA	IS	85.6	20- 150		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
d5-EtFOSA	IS	9.30	10- 150	H	B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C2-PFHxDA	IS	61.1	20- 150		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
d7-MeFOSE	IS	23.8	10- 150		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
d9-EtFOSE	IS	22.3	10- 150		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1
13C3-HFPO-DA	IS	88.3	50- 150		B0A0167	27-Jan-20	0.250 L	30-Jan-20 17:42	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0B0003-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
PFPrS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
3:3 FTCA	ND	1.60	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFPeA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFBS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-4:2 FTS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFHxA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFPeS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
HFPO-DA	ND	2.41	3.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
5:3 FTCA	ND	2.41	3.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFHpA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
ADONA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFHxS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
Br-PFHxS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
Total PFHxS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-6:2 FTS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFOA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
Br-PFOA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
Total PFOA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
PFecHS	ND	2.41	3.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFHpS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
7:3 FTCA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFNA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFOSA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFOS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
Br-PFOS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
Total PFOS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFDA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-8:2FTS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFNS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-MeFOSAA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
Total MeFOSAA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-EtFOSAA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
Total EtFOSAA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFUnA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0B0003-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
10:2 FTS	ND	2.41	3.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFDoA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFTrDA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
PFDoS	ND	2.41	3.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFTeDA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-MeFOSA	ND	4.41	10.0	20.0		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-EtFOSA	ND	4.41	10.0	20.0		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-EtFOSE	ND	4.41	10.0	20.0		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-MeFOSE	ND	4.41	10.0	20.0		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFHxDA	ND	1.37	2.00	4.00		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
L-PFODA	ND	3.07	7.50	10.0		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	99.0	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C3-PFPeA	IS	99.7	60 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C3-PFBS	IS	106	60 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C2-4:2 FTS	IS	98.4	40 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C2-PFHxA	IS	97.4	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C4-PFHpA	IS	103	60 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C3-PFHxS	IS	98.7	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C2-6:2 FTS	IS	95.3	40 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C2-PFOA	IS	89.2	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C5-PFNA	IS	85.8	50 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C8-PFOSA	IS	51.1	20 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C8-PFOS	IS	91.6	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C2-PFDA	IS	72.8	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C2-8:2 FTS	IS	94.0	40 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
d3-MeFOSAA	IS	72.2	50 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
d5-EtFOSAA	IS	78.7	50 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C2-PFUnA	IS	76.7	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C2-PFDoA	IS	60.2	30 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
d3-MeFOSA	IS	20.2	10 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C2-PFTeDA	IS	58.3	20 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
d5-EtFOSA	IS	20.0	10 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
13C2-PFHxDA	IS	36.4	20 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
d7-MeFOSE	IS	43.7	10 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1
d9-EtFOSE	IS	42.4	10 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc. Matrix: Aqueous

Project: EGLE Foam Study

Laboratory Data

Lab Sample: B0B0003-BLK1 Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	110	50 - 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 20:55	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0B0003-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	36.8	40.0	91.9	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
PFPrS	57.5	40.0	144	60 - 130	H	B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
3:3 FTCA	33.7	40.0	84.2	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFPeA	38.0	40.0	95.0	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFBS	35.1	40.0	87.7	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-4:2 FTS	39.1	40.0	97.9	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFHxA	35.9	40.0	89.8	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFPeS	31.5	40.0	78.7	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
HFPO-DA	52.3	40.0	131	70 - 130	H	B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
5:3 FTCA	34.3	40.0	85.9	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFHpA	42.6	40.0	106	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
ADONA	42.7	40.0	107	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
Total PFHxS	35.9	40.0	89.8	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-6:2 FTS	41.2	40.0	103	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
Total PFOA	35.4	40.0	88.4	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
PFecHS	35.5	40.0	88.9	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFHpS	40.0	40.0	99.9	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
7:3 FTCA	26.1	40.0	65.3	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFNA	36.7	40.0	91.7	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFOSA	45.8	40.0	114	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
Total PFOS	34.6	40.0	86.5	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
9Cl-PF3ONS	36.2	40.0	90.5	70 - 130	Q	B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFDA	40.7	40.0	102	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-8:2FTS	42.4	40.0	106	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFNS	38.4	40.0	96.1	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
Total MeFOSAA	42.4	40.0	106	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
Total EtFOSAA	38.5	40.0	96.3	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFUnA	38.7	40.0	96.9	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFDS	34.2	40.0	85.4	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
11Cl-PF3OUdS	37.7	40.0	94.2	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
10:2 FTS	34.8	40.0	87.0	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFDoA	38.5	40.0	96.2	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFTrDA	34.8	40.0	87.0	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
PFDoS	39.3	40.0	98.4	60 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0B0003-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFTeDA	40.5	40.0	101	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-MeFOSA	211	200	105	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-EtFOSA	174	200	86.8	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-EtFOSE	207	200	104	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-MeFOSE	192	200	96.0	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFHxDA	39.8	40.0	99.5	70 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
L-PFODA	44.9	40.0	112	40 - 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	103	60- 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C3-PFPeA	IS	102	60- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C3-PFBS	IS	120	60- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C2-4:2 FTS	IS	120	40- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C2-PFHxA	IS	99.0	70- 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C4-PFHpA	IS	88.7	60- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C3-PFHxS	IS	109	60- 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C2-6:2 FTS	IS	103	40- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C2-PFOA	IS	109	60- 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C5-PFNA	IS	99.7	50- 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C8-PFOSA	IS	52.6	20- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C8-PFOS	IS	102	60- 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C2-PFDA	IS	88.9	60- 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C2-8:2 FTS	IS	103	40- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
d3-MeFOSAA	IS	73.9	50- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
d5-EtFOSAA	IS	87.8	50- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C2-PFUnA	IS	86.6	60- 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C2-PFDoA	IS	68.8	30- 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
d3-MeFOSA	IS	14.5	10- 130		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C2-PFTeDA	IS	65.7	20- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
d5-EtFOSA	IS	18.7	10- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C2-PFHxDA	IS	39.9	20- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
d7-MeFOSE	IS	47.5	10- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
d9-EtFOSE	IS	43.5	10- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1
13C3-HFPO-DA	IS	68.3	50- 150		B0B0003	04-Feb-20	0.250 L	06-Feb-20 21:05	1

Sample ID: FM2001161320-10 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-10
Matrix: Foam
Date Collected: 16-Jan-20 13:20

Laboratory Data

Lab Sample: 2000137-01
Date Received: 23-Jan-20 08:55
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	2.03	1.42	2.07	4.15	J	B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
PFPrS	ND	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
3:3 FTCA	ND	1.66	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFPeA	ND	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFBS	ND	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-4:2 FTS	ND	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFHxA	12.1	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFPeS	ND	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
HFPO-DA	ND	2.50	3.11	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
5:3 FTCA	ND	2.50	3.11	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFHpA	4.90	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
ADONA	ND	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFHxS	7.63	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
Br-PFHxS	ND	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
Total PFHxS	7.63	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-6:2 FTS	22.7	14.2	20.7	41.5	D, J	B0A0167	27-Jan-20	0.241 L	30-Jan-20 17:53	10
L-PFOA	50.9	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
Br-PFOA	3.80	1.42	2.07	4.15	J	B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
Total PFOA	54.7	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
PFecHS	18.1	2.50	3.11	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFHpS	42.2	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
7:3 FTCA	4.06	1.42	2.07	4.15	J	B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFNA	1010	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFOSA	23.6	1.42	2.07	4.15	Q	B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFOS	3470	14.2	20.7	41.5	D	B0A0167	27-Jan-20	0.241 L	30-Jan-20 17:53	10
Br-PFOS	3780	14.2	20.7	41.5	D	B0A0167	27-Jan-20	0.241 L	30-Jan-20 17:53	10
Total PFOS	7250	14.2	20.7	41.5		B0A0167	27-Jan-20	0.241 L	30-Jan-20 17:53	10
9Cl-PF3ONS	ND	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFDA	408	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-8:2FTS	53.0	14.2	20.7	41.5	D, Q	B0A0167	27-Jan-20	0.241 L	30-Jan-20 17:53	10
L-PFNS	ND	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-MeFOSAA	26.8	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
Br-MeFOSAA	33.9	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
Total MeFOSAA	60.6	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-EtFOSAA	47.8	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
Br-EtFOSAA	33.6	1.42	2.07	4.15	Q	B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
Total EtFOSAA	81.5	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFUnA	59.0	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1

Sample ID: FM2001161320-10

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-10
Matrix: Foam
Date Collected: 16-Jan-20 13:20

Laboratory Data

Lab Sample: 2000137-01
Date Received: 23-Jan-20 08:55
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
11Cl-PF3OUdS	ND	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
10:2 FTS	ND	2.50	3.11	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFDoA	10.9	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFTrDA	ND	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
PFDoS	ND	2.50	3.11	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFTeDA	ND	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-MeFOSA	ND	4.57	10.4	20.8		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-EtFOSA	ND	4.57	10.4	20.8		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-EtFOSE	ND	4.57	10.4	20.8		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-MeFOSE	ND	4.57	10.4	20.8		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFHxDA	ND	1.42	2.07	4.15		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
L-PFODA	ND	3.19	7.78	10.4		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	91.8	60 - 130		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C3-PFPeA	IS	105	60 - 150		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C3-PFBS	IS	101	60 - 150		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C2-4:2 FTS	IS	75.4	40 - 150		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C2-PFHxA	IS	98.6	70 - 130		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C4-PFHpA	IS	96.6	60 - 150		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C3-PFHxS	IS	98.3	60 - 130		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C2-6:2 FTS	IS	105	40 - 150	D	B0A0167	27-Jan-20	0.241 L	30-Jan-20 17:53	10
13C2-PFOA	IS	100	60 - 130		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C5-PFNA	IS	97.2	50 - 130		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C8-PFOSA	IS	74.4	20 - 150		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C8-PFOS	IS	91.0	60 - 130	D	B0A0167	27-Jan-20	0.241 L	30-Jan-20 17:53	10
13C2-PFDA	IS	94.5	60 - 130		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C2-8:2 FTS	IS	149	40 - 150	D	B0A0167	27-Jan-20	0.241 L	30-Jan-20 17:53	10
d3-MeFOSAA	IS	58.7	50 - 150		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
d5-EtFOSAA	IS	55.2	50 - 150		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C2-PFUnA	IS	78.5	60 - 130		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C2-PFDoA	IS	39.7	30 - 130		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
d3-MeFOSA	IS	30.9	10 - 130		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C2-PFTeDA	IS	9.70	20 - 150	H	B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
d5-EtFOSA	IS	24.9	10 - 150		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
13C2-PFHxDA	IS	3.80	20 - 150	H	B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
d7-MeFOSE	IS	60.9	10 - 150		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1
d9-EtFOSE	IS	51.3	10 - 150		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1

Sample ID: FM2001161320-10 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-10
Matrix: Foam
Date Collected: 16-Jan-20 13:20

Laboratory Data

Lab Sample: 2000137-01
Date Received: 23-Jan-20 08:55
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	89.3	50 - 150		B0A0167	27-Jan-20	0.241 L	28-Jan-20 21:16	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: FM2001161320-10-FD **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-10
Matrix: Foam
Date Collected: 16-Jan-20 13:20

Laboratory Data

Lab Sample: 2000137-02
Date Received: 23-Jan-20 08:55
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	2.18	1.36	1.99	3.98	J	B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
PFPrS	ND	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
3:3 FTCA	ND	1.59	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFPeA	ND	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFBS	ND	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-4:2 FTS	ND	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFHxA	12.3	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFPeS	ND	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
HFPO-DA	ND	2.40	2.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
5:3 FTCA	ND	2.40	2.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFHpA	5.81	1.36	1.99	3.98	Q	B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
ADONA	ND	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFHxS	8.88	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
Br-PFHxS	ND	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
Total PFHxS	8.88	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-6:2 FTS	28.2	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFOA	53.7	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
Br-PFOA	3.51	1.36	1.99	3.98	J	B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
Total PFOA	57.2	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
PFecHS	21.0	2.40	2.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFHpS	40.8	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
7:3 FTCA	4.63	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFNA	981	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFOSA	28.6	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFOS	2520	13.6	19.9	39.8	D	B0A0167	27-Jan-20	0.251 L	30-Jan-20 18:14	10
Br-PFOS	2990	13.6	19.9	39.8	D	B0A0167	27-Jan-20	0.251 L	30-Jan-20 18:14	10
Total PFOS	5500	13.6	19.9	39.8		B0A0167	27-Jan-20	0.251 L	30-Jan-20 18:14	10
9Cl-PF3ONS	ND	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFDA	432	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-8:2FTS	39.9	1.36	1.99	3.98	Q	B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFNS	ND	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-MeFOSAA	23.8	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
Br-MeFOSAA	31.5	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
Total MeFOSAA	55.4	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-EtFOSAA	40.9	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
Br-EtFOSAA	29.5	1.36	1.99	3.98	Q	B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
Total EtFOSAA	70.4	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFUnA	59.2	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1

Sample ID: FM2001161320-10-FD

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-10
Matrix: Foam
Date Collected: 16-Jan-20 13:20

Laboratory Data

Lab Sample: 2000137-02
Date Received: 23-Jan-20 08:55
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
11Cl-PF3OUdS	ND	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
10:2 FTS	ND	2.40	2.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFDoA	13.1	1.36	1.99	3.98	Q	B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFTrDA	ND	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
PFDoS	ND	2.40	2.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFTeDA	ND	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-MeFOSA	ND	4.39	9.96	19.9		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-EtFOSA	ND	4.39	9.96	19.9		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-EtFOSE	ND	4.39	9.96	19.9		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-MeFOSE	ND	4.39	9.96	19.9		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFHxDA	ND	1.36	1.99	3.98		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
L-PFODA	ND	3.06	7.47	9.96		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	88.7	60 - 130		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C3-PFPeA	IS	103	60 - 150		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C3-PFBS	IS	105	60 - 150		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C2-4:2 FTS	IS	76.6	40 - 150		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C2-PFHxA	IS	91.8	70 - 130		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C4-PFHpA	IS	90.4	60 - 150		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C3-PFHxS	IS	94.6	60 - 130		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C2-6:2 FTS	IS	134	40 - 150		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C2-PFOA	IS	94.9	60 - 130		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C5-PFNA	IS	98.1	50 - 130		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C8-PFOSA	IS	69.0	20 - 150		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C8-PFOS	IS	121	60 - 130	D	B0A0167	27-Jan-20	0.251 L	30-Jan-20 18:14	10
13C2-PFDA	IS	93.3	60 - 130		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C2-8:2 FTS	IS	105	40 - 150		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
d3-MeFOSAA	IS	63.3	50 - 150		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
d5-EtFOSAA	IS	51.4	50 - 150		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C2-PFUnA	IS	69.3	60 - 130		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C2-PFDoA	IS	35.9	30 - 130		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
d3-MeFOSA	IS	24.4	10 - 130		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C2-PFTeDA	IS	7.60	20 - 150	H	B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
d5-EtFOSA	IS	20.4	10 - 150		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
13C2-PFHxDA	IS	3.10	20 - 150	H	B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
d7-MeFOSE	IS	52.4	10 - 150		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1
d9-EtFOSE	IS	44.9	10 - 150		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1

Sample ID: FM2001161320-10-FD

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-10
Matrix: Foam
Date Collected: 16-Jan-20 13:20

Laboratory Data

Lab Sample: 2000137-02
Date Received: 23-Jan-20 08:55
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	84.9	50 - 150		B0A0167	27-Jan-20	0.251 L	28-Jan-20 21:26	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: SW2001161325-10

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-10
Matrix: Surface Water
Date Collected: 16-Jan-20 13:25

Laboratory Data

Lab Sample: 2000137-03
Date Received: 23-Jan-20 08:55
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	1.66	1.35	1.97	3.93	J	B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
PFPrS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
3:3 FTCA	ND	1.57	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFPeA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFBS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-4:2 FTS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFHxA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFPeS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
HFPO-DA	ND	2.37	2.95	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
5:3 FTCA	ND	2.37	2.95	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFHpA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
ADONA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFHxS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
Br-PFHxS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
Total PFHxS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-6:2 FTS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFOA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
Br-PFOA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
Total PFOA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
PFecHS	ND	2.37	2.95	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFHpS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
7:3 FTCA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFNA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFOSA	3.30	1.35	1.97	3.93	J, Q	B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFOS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
Br-PFOS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
Total PFOS	1.67	1.35	1.97	3.93	J	B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
9Cl-PF3ONS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFDA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-8:2FTS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFNS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-MeFOSAA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
Br-MeFOSAA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
Total MeFOSAA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-EtFOSAA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
Br-EtFOSAA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
Total EtFOSAA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFUnA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1

Sample ID: SW2001161325-10

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-10

Matrix: Surface Water
Date Collected: 16-Jan-20 13:25

Laboratory Data

Lab Sample: 2000137-03
Date Received: 23-Jan-20 08:55

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
11Cl-PF3OUdS	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
10:2 FTS	ND	2.37	2.95	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFDoA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFTrDA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
PFDoS	ND	2.37	2.95	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFTeDA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-MeFOSA	ND	4.33	9.84	19.7		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-EtFOSA	ND	4.33	9.84	19.7		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-EtFOSE	ND	4.33	9.84	19.7		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-MeFOSE	ND	4.33	9.84	19.7		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFHxDA	ND	1.35	1.97	3.93		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
L-PFODA	ND	3.02	7.38	9.83		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	98.1	60 - 130		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C3-PFPeA	IS	118	60 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C3-PFBS	IS	128	60 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C2-4:2 FTS	IS	116	40 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C2-PFHxA	IS	115	70 - 130		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C4-PFHpA	IS	117	60 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C3-PFHxS	IS	130	60 - 130		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C2-6:2 FTS	IS	122	40 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C2-PFOA	IS	115	60 - 130		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C5-PFNA	IS	115	50 - 130		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C8-PFOSA	IS	98.7	20 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C8-PFOS	IS	116	60 - 130		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C2-PFDA	IS	128	60 - 130		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C2-8:2 FTS	IS	111	40 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
d3-MeFOSAA	IS	109	50 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
d5-EtFOSAA	IS	123	50 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C2-PFUnA	IS	110	60 - 130		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C2-PFDoA	IS	104	30 - 130		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
d3-MeFOSA	IS	46.7	10 - 130		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C2-PFTeDA	IS	84.8	20 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
d5-EtFOSA	IS	45.4	10 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
13C2-PFHxDA	IS	51.2	20 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
d7-MeFOSE	IS	61.5	10 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1
d9-EtFOSE	IS	61.9	10 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1

Sample ID: SW2001161325-10 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-10
Matrix: Surface Water
Date Collected: 16-Jan-20 13:25

Laboratory Data

Lab Sample: 2000137-03
Date Received: 23-Jan-20 08:55
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	111	50 - 150		B0A0166	27-Jan-20	0.254 L	28-Jan-20 22:09	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: FM2001161435-11 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-11
Matrix: Foam
Date Collected: 16-Jan-20 14:35

Laboratory Data

Lab Sample: 2000137-04
Date Received: 23-Jan-20 08:55
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
PFPrS	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
3:3 FTCA	ND	2.46	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFPeA	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFBS	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-4:2 FTS	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFHxA	11.7	2.11	3.09	6.17	Q	B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFPeS	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
HFPO-DA	ND	3.72	4.63	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
5:3 FTCA	ND	3.72	4.63	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFHpA	18.7	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
ADONA	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFHxS	41.2	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
Br-PFHxS	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
Total PFHxS	41.2	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-6:2 FTS	329	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFOA	656	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
Br-PFOA	26.0	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
Total PFOA	682	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
PFecHS	787	3.72	4.63	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFHpS	291	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
7:3 FTCA	18.9	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFNA	3250	21.1	30.9	61.7	D	B0B0003	04-Feb-20	0.162 L	08-Feb-20 00:18	10
L-PFOSA	26.3	2.11	3.09	6.17	Q	B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFOS	5130	21.1	30.9	61.7	D	B0B0003	04-Feb-20	0.162 L	08-Feb-20 00:18	10
Br-PFOS	8300	21.1	30.9	61.7	D	B0B0003	04-Feb-20	0.162 L	08-Feb-20 00:18	10
Total PFOS	13400	21.1	30.9	61.7		B0B0003	04-Feb-20	0.162 L	08-Feb-20 00:18	10
9Cl-PF3ONS	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFDA	574	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-8:2FTS	78.8	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFNS	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-MeFOSAA	21.2	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
Br-MeFOSAA	33.5	2.11	3.09	6.17	Q	B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
Total MeFOSAA	54.6	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-EtFOSAA	11.8	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
Br-EtFOSAA	15.3	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
Total EtFOSAA	27.1	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFUnA	73.5	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1

Sample ID: FM2001161435-11

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-11

Matrix: Foam
Date Collected: 16-Jan-20 14:35

Laboratory Data

Lab Sample: 2000137-04
Date Received: 23-Jan-20 08:55

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
11Cl-PF3OUdS	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
10:2 FTS	ND	3.72	4.63	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFDoA	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFTrDA	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
PFDoS	ND	3.72	4.63	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFTeDA	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-MeFOSA	ND	6.79	15.4	30.8		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-EtFOSA	ND	6.79	15.4	30.8		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-EtFOSE	ND	6.79	15.4	30.8		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-MeFOSE	ND	6.79	15.4	30.8		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFHxDA	ND	2.11	3.09	6.17		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
L-PFODA	ND	4.73	11.6	15.4		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	70.4	60 - 130		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C3-PFPeA	IS	117	60 - 150		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C3-PFBS	IS	110	60 - 150		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C2-4:2 FTS	IS	79.4	40 - 150		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C2-PFHxA	IS	84.4	70 - 130		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C4-PFHpA	IS	72.5	60 - 150		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C3-PFHxS	IS	82.4	60 - 130		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C2-6:2 FTS	IS	105	40 - 150		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C2-PFOA	IS	92.9	60 - 130		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C5-PFNA	IS	87.1	50 - 130	D	B0B0003	04-Feb-20	0.162 L	08-Feb-20 00:18	10
13C8-PFOSA	IS	70.3	20 - 150		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C8-PFOS	IS	104	60 - 130	D	B0B0003	04-Feb-20	0.162 L	08-Feb-20 00:18	10
13C2-PFDA	IS	84.6	60 - 130		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C2-8:2 FTS	IS	94.1	40 - 150		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
d3-MeFOSAA	IS	49.6	50 - 150	H	B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
d5-EtFOSAA	IS	52.7	50 - 150		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C2-PFUnA	IS	61.9	60 - 130		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C2-PFDoA	IS	33.5	30 - 130		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
d3-MeFOSA	IS	41.8	10 - 130		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C2-PFTeDA	IS	9.90	20 - 150	H	B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
d5-EtFOSA	IS	29.1	10 - 150		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
13C2-PFHxDA	IS	4.40	20 - 150	H	B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
d7-MeFOSE	IS	94.4	10 - 150		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1
d9-EtFOSE	IS	87.0	10 - 150		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1

Sample ID: FM2001161435-11 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-11
Matrix: Foam
Date Collected: 16-Jan-20 14:35

Laboratory Data

Lab Sample: 2000137-04
Date Received: 23-Jan-20 08:55
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	70.2	50 - 150		B0B0003	04-Feb-20	0.162 L	06-Feb-20 21:15	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: SW2001161450-11 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-11
Matrix: Surface Water
Date Collected: 16-Jan-20 14:50

Laboratory Data

Lab Sample: 2000137-05
Date Received: 23-Jan-20 08:55
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	1.78	1.39	2.02	4.05	J	B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
PFPrS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
3:3 FTCA	ND	1.61	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFPeA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFBS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-4:2 FTS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFHxA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFPeS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
HFPO-DA	ND	2.44	3.04	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
5:3 FTCA	ND	2.44	3.04	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFHpA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
ADONA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFHxS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
Br-PFHxS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
Total PFHxS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-6:2 FTS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFOA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
Br-PFOA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
Total PFOA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
PFecHS	ND	2.44	3.04	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFHpS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
7:3 FTCA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFNA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFOSA	2.67	1.39	2.02	4.05	J	B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFOS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
Br-PFOS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
Total PFOS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
9Cl-PF3ONS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFDA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-8:2FTS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFNS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-MeFOSAA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
Br-MeFOSAA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
Total MeFOSAA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-EtFOSAA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
Br-EtFOSAA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
Total EtFOSAA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFUnA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1

Sample ID: SW2001161450-11

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-11

Matrix: Surface Water
Date Collected: 16-Jan-20 14:50

Laboratory Data

Lab Sample: 2000137-05
Date Received: 23-Jan-20 08:55

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
11Cl-PF3OUdS	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
10:2 FTS	ND	2.44	3.04	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFDoA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFTrDA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
PFDoS	ND	2.44	3.04	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFTeDA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-MeFOSA	ND	4.46	10.1	20.2		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-EtFOSA	ND	4.46	10.1	20.2		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-EtFOSE	ND	4.46	10.1	20.2		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-MeFOSE	ND	4.46	10.1	20.2		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFHxDA	ND	1.39	2.02	4.05		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
L-PFODA	ND	3.11	7.59	10.1		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	88.5	60 - 130		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C3-PFPeA	IS	113	60 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C3-PFBS	IS	114	60 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C2-4:2 FTS	IS	101	40 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C2-PFHxA	IS	110	70 - 130		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C4-PFHpA	IS	122	60 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C3-PFHxS	IS	108	60 - 130		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C2-6:2 FTS	IS	113	40 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C2-PFOA	IS	116	60 - 130		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C5-PFNA	IS	110	50 - 130		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C8-PFOSA	IS	91.2	20 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C8-PFOS	IS	104	60 - 130		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C2-PFDA	IS	125	60 - 130		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C2-8:2 FTS	IS	114	40 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
d3-MeFOSAA	IS	120	50 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
d5-EtFOSAA	IS	110	50 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C2-PFUnA	IS	104	60 - 130		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C2-PFDoA	IS	106	30 - 130		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
d3-MeFOSA	IS	41.0	10 - 130		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C2-PFTeDA	IS	77.5	20 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
d5-EtFOSA	IS	39.1	10 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
13C2-PFHxDA	IS	58.4	20 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
d7-MeFOSE	IS	66.8	10 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1
d9-EtFOSE	IS	65.8	10 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1

Sample ID: SW2001161450-11 **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: EGLE Foam Study
Location: Thornapple River-11
Matrix: Surface Water
Date Collected: 16-Jan-20 14:50

Laboratory Data

Lab Sample: 2000137-05
Date Received: 23-Jan-20 08:55
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	105	50 - 150		B0A0166	27-Jan-20	0.247 L	28-Jan-20 22:40	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 2000137 Temp: 5.4 °C
Storage ID: R-13, WR-2 Storage Secured: Yes ☑ No ☐

Project ID: **EGLE Foam Study** PO#: **60612688** Sampler: **Jim Buzzell** (name)

TAT (check one): Standard: [X] 21 days Rush (surcharge may apply) [ ] 14 days [ ] 7 days Specify:

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
Mike Jury	**EGLE**	**401 Ketchum, Suite B**	**Bay City**	**MI**	**989-894-6255**	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Jim Buzzell	**1/22/2020**	**15:00**	**Sara Thurkettle** Sara Thurkettle	**1/22/2020**	**15:00**
Sara Thurkettle Sara Thurkettle	**1/22/2020**	**17:00**	Conor Maher Conor Maher	01/23/20	0855

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

Method of Shipment:

ATTN:

Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Container(s) Type	Container(s) Matrix	Mod. EPA Method 537: PFOA/ PFOS	Mod. EPA Method 537: UCMR3 PFAS List:6	Mod. EPA Method 537: 537 List: 14	Mod. EPA Method 537: PFAS List of 24	Mod. EPA Method 537: Other: Please List Below	Mod. EPA Method 537: PFAS Full list of 41 Branch and Linear	EPA Method 537(DW only): PFOA/ PFOS	EPA Method 537(DW only): UCMR3 PFAS List:6	EPA Method 537(DW only): PFAS List: 14	Comments
FM2001161320-10	1/16/20	13:20	Thornapple River - 10	1	P	FM						X				Collapsed foam sample (high results expected)
FM2001161320-10-FD	1/16/20	13:20	Thornapple River - 10	1	P	FM						X				Collapsed foam sample (high results expected)
SW2001161325-10	1/16/20	13:25	Thornapple River - 10	2	P	WS						X				
FM2001161435-11	1/16/20	14:35	Thornapple River - 11	2	P	FM						X				Collapsed foam sample (high results expected)
SW2001161450-11	1/16/20	14:50	Thornapple River - 11	2	P	WS						X				

Special Instructions/Comments:

Send Results and Acknowledgements to:

JuryM1@aecom.com Barry.Harding@aecom.com
Nic.Ropotos@aecom.com Dorin.Bogdan@aecom.com
Matt.Vandereide@aecom.com bert.Kennedy@aecom.com
Geoffrey.Groff@aecom.com Jim.Carbone@aecom.com James.Buzzell@aecom.co

SEND DOCUMENTATION AND RESULTS TO:

Name: **Mike Jury**
Company: **EGLE**
Address: **401 Ketchum, Suite B**
City: **Bay City** State: MI Zip: 48708
Phone: **989-894-6255** Fax:
Email: juryM1@michigan.gov

Container Types: P= HDPE, PJ= HDPE Jar
O = Other:

Bottle Preservation Type: T = Thiosulfate,
TZ = Trizma:

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 2000137 TAT std

Samples Arrival:	**Date/Time** 01/23/20 0855		**Initials:** CM		**Location:** WR-2 **Shelf/Rack:** N/A		
Delivered By:	(FedEx)	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	(Ice)		Blue Ice		Dry Ice		None
Temp °C: 5.4 (uncorrected) **Temp °C:** 5.4 (corrected)			**Probe used:** Y / (N)		**Thermometer ID:** IR-4		

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Airbill — Trk # 4894 6696 4820	✓		
Shipping Documentation Present?	✓		
Shipping Container: Vista / (Client) / Retain / (Return)		Dispose	
Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	**Date/Time** 01/23/20 1043	**Initials:** WWS	**Location:** R-13, WR-2 **Shelf/Rack:** d-2, G-4		
COC Anomaly/Sample Acceptance Form completed?				✓	✓

Comments:

CoC/Label Reconciliation Report WO# 2000137

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
2000137-01	A FM2001161320-10 *	☑	Thornapple River-10	16-Jan-20 13:20	☑	HDPE Bottle, 250 mL	Aqueous	
2000137-02	A FM2001161320-10-FD *	☑	Thornapple River-10	16-Jan-20 13:20	☑	HDPE Bottle, 250 mL	Aqueous	
2000137-03	A SW2001161325-10	☑	Thornapple River-10	16-Jan-20 13:25	☑	HDPE Bottle, 250 mL	Aqueous	
2000137-03	B SW2001161325-10	☑	Thornapple River-10	16-Jan-20 13:25	☑	HDPE Bottle, 250 mL	Aqueous	
2000137-04	A FM2001161435-11 *	☑	Thornapple River-11	16-Jan-20 14:35	☑	HDPE Bottle, 250 mL	Aqueous	
2000137-04	B FM2001161435-11 *	☑	Thornapple River-11	16-Jan-20 14:35	☑	HDPE Bottle, 250 mL	Aqueous	
2000137-05	A SW2001161450-11	☑	Thornapple River-11	16-Jan-20 14:50	☑	HDPE Bottle, 250 mL	Aqueous	
2000137-05	B SW2001161450-11	☑	Thornapple River-11	16-Jan-20 14:50	☑	HDPE Bottle, 250 mL	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		
Preservation Documented: Na2S2O3 Trizma None Other			✓
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓

Comments: * foam samples

Verifed by/Date: WDS 01/23/20

May 05, 2020

Vista Work Order No. 2000736

Mr. Dorin Bogdan
AECOM
3950 Sparks Drive SE
Grand Rapids, MI 49546

Dear Mr. Bogdan,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on April 02, 2020 under your Project Name 'EGLE Foam Study'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Work Order No. 2000736
Case Narrative

Sample Condition on Receipt:

Three surface water samples and three collapsed foam samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. The collapsed foam samples were assigned to Vista Work Order No. 2000756.

Analytical Notes:

PFAS Isotope Dilution Method

Samples "SW2003311530-12" and "SW2003311719-14" contained particulate and were centrifuged prior to extraction.

The samples were extracted and analyzed for a selected list of PFAS using Vista's PFAS Isotope Dilution Method (Modified EPA Method 537). The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The samples were originally extracted and analyzed within the method hold times. The samples were re-extracted outside of the hold time for PFDS and PFODA due to low internal standard recoveries.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with each preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The recovery of PFPrS was greater than 130% and the recovery of 7:3 FTCA was less than 60% in the OPR associated with preparation batch B0D0048. The reported results for 7:3 FTCA may be biased low. The recoveries of all other analytes were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
2000736-01	SW2003311530-12	PFAS Isotope Dilution Method	13C3-PFBA	H	51.6

H = Recovery was outside laboratory acceptance criteria.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2000736-01	SW2003311530-12	31-Mar-20 15:30	02-Apr-20 09:58	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2000736-02	SW2003311630-13	31-Mar-20 16:30	02-Apr-20 09:58	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
2000736-03	SW2003311710-14	31-Mar-20 17:10	02-Apr-20 09:58	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL

Vista Project: 2000736

Client Project: EGLE Foam Study

ANALYTICAL RESULTS

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data
Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data
Lab Sample: B0D0048-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
PFPrS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
3:3 FTCA	ND	1.60	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFPeA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFBS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-4:2 FTS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFHxA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFPeS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
HFPO-DA	ND	2.41	3.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
5:3 FTCA	ND	2.41	3.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFHpA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
ADONA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFHxS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
Br-PFHxS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
Total PFHxS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-6:2 FTS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFOA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
Br-PFOA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
Total PFOA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
PFecHS	ND	2.41	3.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFHpS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
7:3 FTCA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFNA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFOSA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFOS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
Br-PFOS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
Total PFOS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFDA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-8:2FTS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFNS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-MeFOSAA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
Total MeFOSAA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0048-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-EtFOSAA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
Total EtFOSAA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFUnA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
10:2 FTS	ND	2.41	3.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFDoA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFTrDA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
PFDoS	ND	2.41	3.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFTeDA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-MeFOSA	ND	4.41	10.0	20.0		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-EtFOSA	ND	4.41	10.0	20.0		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-EtFOSE	ND	4.41	10.0	20.0		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-MeFOSE	ND	4.41	10.0	20.0		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
L-PFHxDA	ND	1.37	2.00	4.00		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	106	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C3-PFPeA	IS	132	60 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C3-PFBS	IS	101	60 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C2-4:2 FTS	IS	97.3	40 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C2-PFHxA	IS	110	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C4-PFHpA	IS	116	60 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C3-PFHxS	IS	91.0	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C2-6:2 FTS	IS	120	40 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C2-PFOA	IS	102	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C5-PFNA	IS	110	50 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C8-PFOSA	IS	51.2	20 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C8-PFOS	IS	93.3	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C2-PFDA	IS	99.9	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C2-8:2 FTS	IS	101	40 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
d3-MeFOSAA	IS	90.9	50 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
d5-EtFOSAA	IS	76.3	50 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C2-PFUnA	IS	87.6	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C2-PFDoA	IS	79.9	30 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
d3-MeFOSA	IS	14.2	10 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C2-PFTeDA	IS	78.3	20 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0048-BLK1
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d5-EtFOSA	IS	14.5	10 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C2-PFHxDA	IS	68.0	20 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
d7-MeFOSE	IS	27.7	10 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
d9-EtFOSE	IS	30.5	10 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1
13C3-HFPO-DA	IS	114	50 - 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:04	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0048-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	34.0	40.0	84.9	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
PFPrS	69.7	40.0	174	60 - 130	H	B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
3:3 FTCA	31.5	40.0	78.8	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFPeA	36.2	40.0	90.5	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFBS	38.6	40.0	96.5	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-4:2 FTS	29.7	40.0	74.3	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFHxA	37.2	40.0	92.9	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFPeS	36.9	40.0	92.4	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
HFPO-DA	30.5	40.0	76.2	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
5:3 FTCA	27.1	40.0	67.8	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFHpA	34.4	40.0	85.9	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
ADONA	35.6	40.0	89.1	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
Total PFHxS	28.3	40.0	70.7	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-6:2 FTS	37.6	40.0	93.9	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
Total PFOA	39.9	40.0	99.7	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
PFecHS	31.4	40.0	78.5	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFHpS	36.9	40.0	92.4	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
7:3 FTCA	22.5	40.0	56.1	60 - 130	H	B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFNA	33.4	40.0	83.5	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFOSA	33.0	40.0	82.5	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
Total PFOS	41.7	40.0	104	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
9Cl-PF3ONS	46.3	40.0	116	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFDA	33.9	40.0	84.7	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-8:2FTS	38.0	40.0	95.1	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFNS	45.0	40.0	113	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
Total MeFOSAA	31.3	40.0	78.3	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
Total EtFOSAA	33.4	40.0	83.5	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFUnA	33.0	40.0	82.5	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
11Cl-PF3OUdS	41.1	40.0	103	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
10:2 FTS	37.9	40.0	94.7	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFDoA	39.1	40.0	97.8	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFTrDA	38.1	40.0	95.2	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
PFDoS	34.9	40.0	87.3	60 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFTeDA	31.9	40.0	79.8	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study

Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0048-BS1 Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-MeFOSA	180	200	90.2	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-EtFOSA	178	200	89.1	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-EtFOSE	216	200	108	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-MeFOSE	187	200	93.7	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
L-PFHxDA	35.9	40.0	89.8	70 - 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
Labeled Standards	**Type**		**% Rec**	**Limits**	**Qualifiers**	**Batch**	**Extracted**	**Samp Size**	**Analyzed**	**Dilution**
13C3-PFBA	IS		107	60- 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C3-PFPeA	IS		130	60- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C3-PFBS	IS		129	60- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C2-4:2 FTS	IS		113	40- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C2-PFHxA	IS		106	70- 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C4-PFHpA	IS		101	60- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C3-PFHxS	IS		128	60- 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C2-6:2 FTS	IS		118	40- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C2-PFOA	IS		114	60- 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C5-PFNA	IS		110	50- 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C8-PFOSA	IS		52.2	20- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C8-PFOS	IS		99.8	60- 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C2-PFDA	IS		90.3	60- 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C2-8:2 FTS	IS		103	40- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
d3-MeFOSAA	IS		94.2	50- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
d5-EtFOSAA	IS		79.4	50- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C2-PFUnA	IS		102	60- 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C2-PFDoA	IS		78.1	30- 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
d3-MeFOSA	IS		15.1	10- 130		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C2-PFTeDA	IS		79.3	20- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
d5-EtFOSA	IS		14.2	10- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C2-PFHxDA	IS		51.6	20- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
d7-MeFOSE	IS		38.0	10- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
d9-EtFOSE	IS		36.0	10- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1
13C3-HFPO-DA	IS		111	50- 150		B0D0048	10-Apr-20	0.250 L	16-Apr-20 05:14	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0263-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.37	2.00	4.00		B0D0263	25-Apr-20	0.250 L	27-Apr-20 15:08	1
L-PFODA	ND	3.07	7.50	10.0		B0D0263	25-Apr-20	0.250 L	27-Apr-20 15:08	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0263-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	44.0	40.0	110	60 - 130		B0D0263	25-Apr-20	0.250 L	27-Apr-20 15:18	1
L-PFODA	30.2	40.0	75.5	40 - 130		B0D0263	25-Apr-20	0.250 L	27-Apr-20 15:18	1

Sample ID: SW2003311530-12 **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-12
Matrix: Surface Water
Date Collected: 31-Mar-20 15:30

Laboratory Data

Lab Sample: 2000736-01
Date Received: 02-Apr-20 09:58
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	2.70	1.44	2.10	4.20	J	B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
PFPrS	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
3:3 FTCA	ND	1.68	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFPeA	10.6	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFBS	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-4:2 FTS	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFHxA	8.77	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFPeS	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
HFPO-DA	ND	2.53	3.15	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
5:3 FTCA	ND	2.53	3.15	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFHpA	4.29	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
ADONA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFHxS	32.8	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
Br-PFHxS	4.44	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
Total PFHxS	37.3	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-6:2 FTS	1.82	1.44	2.10	4.20	J	B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFOA	7.31	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
Br-PFOA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
Total PFOA	7.58	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
PFecHS	ND	2.53	3.15	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFHpS	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
7:3 FTCA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFNA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFOSA	5.59	1.44	2.10	4.20	Q	B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFOS	8.80	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
Br-PFOS	10.0	1.44	2.10	4.20	Q	B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
Total PFOS	18.8	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
9Cl-PF3ONS	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFDA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-8:2FTS	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFNS	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-MeFOSAA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1

Sample ID: SW2003311530-12

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-12

Matrix: Surface Water
Date Collected: 31-Mar-20 15:30

Laboratory Data

Lab Sample: 2000736-01
Date Received: 02-Apr-20 09:58

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
Total MeFOSAA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-EtFOSAA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
Br-EtFOSAA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
Total EtFOSAA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFUnA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFDS	ND	1.40	2.04	4.08		B0D0263	25-Apr-20	0.245 L	27-Apr-20 15:28	1
11Cl-PF3OUdS	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
10:2 FTS	ND	2.53	3.15	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFDoA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFTrDA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
PFDoS	ND	2.53	3.15	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFTeDA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-MeFOSA	ND	4.63	10.5	21.0		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-EtFOSA	ND	4.63	10.5	21.0		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-EtFOSE	ND	4.63	10.5	21.0		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-MeFOSE	ND	4.63	10.5	21.0		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFHxDA	ND	1.44	2.10	4.20		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
L-PFODA	ND	3.13	7.65	10.2		B0D0263	25-Apr-20	0.245 L	27-Apr-20 15:28	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	51.6	60 - 130	H	B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C3-PFPeA	IS	128	60 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C3-PFBS	IS	111	60 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C2-4:2 FTS	IS	95.8	40 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C2-PFHxA	IS	102	70 - 130		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C4-PFHpA	IS	113	60 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C3-PFHxS	IS	109	60 - 130		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C2-6:2 FTS	IS	116	40 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C2-PFOA	IS	96.6	60 - 130		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C5-PFNA	IS	105	50 - 130		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C8-PFOSA	IS	78.7	20 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C8-PFOS	IS	119	60 - 130		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C2-PFDA	IS	108	60 - 130		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C2-8:2 FTS	IS	114	40 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1

Sample ID: SW2003311530-12

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-12

Matrix: Surface Water
Date Collected: 31-Mar-20 15:30

Laboratory Data

Lab Sample: 2000736-01
Date Received: 02-Apr-20 09:58

Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d3-MeFOSAA	IS	108	50 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
d5-EtFOSAA	IS	102	50 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C2-PFUnA	IS	86.5	60 - 130		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C2-PFDoA	IS	81.2	30 - 130		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
d3-MeFOSA	IS	22.0	10 - 130		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C2-PFTeDA	IS	71.8	20 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
d5-EtFOSA	IS	23.5	10 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C2-PFHxDA	IS	43.4	20 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
d7-MeFOSE	IS	55.7	10 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
d9-EtFOSE	IS	56.3	10 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1
13C3-HFPO-DA	IS	123	50 - 150		B0D0048	10-Apr-20	0.238 L	16-Apr-20 05:24	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: SW2003311630-13 **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-13

Matrix: Surface Water
Date Collected: 31-Mar-20 16:30

Laboratory Data

Lab Sample: 2000736-02
Date Received: 02-Apr-20 09:58

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
PFPrS	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
3:3 FTCA	ND	1.72	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFPeA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFBS	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-4:2 FTS	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFHxA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFPeS	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
HFPO-DA	ND	2.60	3.23	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
5:3 FTCA	ND	2.60	3.23	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFHpA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
ADONA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFHxS	5.53	1.48	2.16	4.32	Q	B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
Br-PFHxS	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
Total PFHxS	5.53	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-6:2 FTS	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFOA	2.11	1.48	2.16	4.32	J, Q	B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
Br-PFOA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
Total PFOA	2.11	1.48	2.16	4.32	J	B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
PFecHS	ND	2.60	3.23	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFHpS	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
7:3 FTCA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFNA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFOSA	7.08	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFOS	3.86	1.48	2.16	4.32	J	B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
Br-PFOS	2.86	1.48	2.16	4.32	J	B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
Total PFOS	6.72	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
9Cl-PF3ONS	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFDA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-8:2FTS	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFNS	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-MeFOSAA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1

Sample ID: SW2003311630-13

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-13

Matrix: Surface Water
Date Collected: 31-Mar-20 16:30

Laboratory Data

Lab Sample: 2000736-02
Date Received: 02-Apr-20 09:58

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
Total MeFOSAA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-EtFOSAA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
Br-EtFOSAA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
Total EtFOSAA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFUnA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFDS	ND	1.42	2.07	4.14		B0D0263	25-Apr-20	0.241 L	27-Apr-20 15:39	1
11Cl-PF3OUdS	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
10:2 FTS	ND	2.60	3.23	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFDoA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFTrDA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
PFDoS	ND	2.60	3.23	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFTeDA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-MeFOSA	ND	4.76	10.8	21.6		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-EtFOSA	ND	4.76	10.8	21.6		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-EtFOSE	ND	4.76	10.8	21.6		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-MeFOSE	ND	4.76	10.8	21.6		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFHxDA	ND	1.48	2.16	4.32		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
L-PFODA	ND	3.18	7.78	10.4		B0D0263	25-Apr-20	0.241 L	27-Apr-20 15:39	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	83.0	60 - 130		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C3-PFPeA	IS	135	60 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C3-PFBS	IS	115	60 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C2-4:2 FTS	IS	85.4	40 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C2-PFHxA	IS	105	70 - 130		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C4-PFHpA	IS	107	60 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C3-PFHxS	IS	98.7	60 - 130		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C2-6:2 FTS	IS	111	40 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C2-PFOA	IS	119	60 - 130		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C5-PFNA	IS	120	50 - 130		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C8-PFOSA	IS	69.1	20 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C8-PFOS	IS	116	60 - 130		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C2-PFDA	IS	90.9	60 - 130		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C2-8:2 FTS	IS	80.1	40 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1

Sample ID: SW2003311630-13

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-13

Matrix: Surface Water
Date Collected: 31-Mar-20 16:30

Laboratory Data

Lab Sample: 2000736-02
Date Received: 02-Apr-20 09:58

Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d3-MeFOSAA	IS	103	50 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
d5-EtFOSAA	IS	95.7	50 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C2-PFUnA	IS	101	60 - 130		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C2-PFDoA	IS	60.4	30 - 130		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
d3-MeFOSA	IS	16.9	10 - 130		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C2-PFTeDA	IS	57.0	20 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
d5-EtFOSA	IS	17.6	10 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C2-PFHxDA	IS	69.3	20 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
d7-MeFOSE	IS	42.3	10 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
d9-EtFOSE	IS	51.4	10 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1
13C3-HFPO-DA	IS	128	50 - 150		B0D0048	10-Apr-20	0.232 L	16-Apr-20 05:35	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: SW2003311710-14 **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-14

Matrix: Surface Water
Date Collected: 31-Mar-20 17:10

Laboratory Data

Lab Sample: 2000736-03
Date Received: 02-Apr-20 09:58

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
PFPrS	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
3:3 FTCA	ND	1.70	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFPeA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFBS	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-4:2 FTS	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFHxA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFPeS	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
HFPO-DA	ND	2.58	3.21	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
5:3 FTCA	ND	2.58	3.21	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFHpA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
ADONA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFHxS	7.69	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
Br-PFHxS	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
Total PFHxS	8.36	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-6:2 FTS	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFOA	3.06	1.46	2.14	4.28	J	B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
Br-PFOA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
Total PFOA	3.06	1.46	2.14	4.28	J	B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
PFecHS	ND	2.58	3.21	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFHpS	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
7:3 FTCA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFNA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFOSA	7.67	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFOS	4.43	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
Br-PFOS	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
Total PFOS	4.43	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
9Cl-PF3ONS	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFDA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-8:2FTS	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFNS	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-MeFOSAA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1

Sample ID: SW2003311710-14

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-14

Matrix: Surface Water
Date Collected: 31-Mar-20 17:10

Laboratory Data

Lab Sample: 2000736-03
Date Received: 02-Apr-20 09:58

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
Total MeFOSAA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-EtFOSAA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
Br-EtFOSAA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
Total EtFOSAA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFUnA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFDS	ND	1.42	2.07	4.15		B0D0263	25-Apr-20	0.241 L	27-Apr-20 15:49	1
11Cl-PF3OUdS	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
10:2 FTS	ND	2.58	3.21	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFDoA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFTrDA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
PFDoS	ND	2.58	3.21	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFTeDA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-MeFOSA	ND	4.71	10.7	21.4		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-EtFOSA	ND	4.71	10.7	21.4		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-EtFOSE	ND	4.71	10.7	21.4		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-MeFOSE	ND	4.71	10.7	21.4		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFHxDA	ND	1.46	2.14	4.28		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
L-PFODA	ND	3.18	7.78	10.4		B0D0263	25-Apr-20	0.241 L	27-Apr-20 15:49	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	67.0	60 - 130		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C3-PFPeA	IS	141	60 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C3-PFBS	IS	119	60 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C2-4:2 FTS	IS	100	40 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C2-PFHxA	IS	114	70 - 130		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C4-PFHpA	IS	122	60 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C3-PFHxS	IS	106	60 - 130		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C2-6:2 FTS	IS	97.8	40 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C2-PFOA	IS	109	60 - 130		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C5-PFNA	IS	106	50 - 130		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C8-PFOSA	IS	81.9	20 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C8-PFOS	IS	100	60 - 130		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C2-PFDA	IS	119	60 - 130		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C2-8:2 FTS	IS	96.9	40 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1

Sample ID: SW2003311710-14

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-14

Matrix: Surface Water
Date Collected: 31-Mar-20 17:10

Laboratory Data

Lab Sample: 2000736-03
Date Received: 02-Apr-20 09:58

Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d3-MeFOSAA	IS	125	50 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
d5-EtFOSAA	IS	103	50 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C2-PFUnA	IS	124	60 - 130		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C2-PFDoA	IS	95.5	30 - 130		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
d3-MeFOSA	IS	27.3	10 - 130		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C2-PFTeDA	IS	74.7	20 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
d5-EtFOSA	IS	25.7	10 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C2-PFHxDA	IS	65.8	20 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
d7-MeFOSE	IS	56.8	10 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
d9-EtFOSE	IS	60.8	10 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1
13C3-HFPO-DA	IS	117	50 - 150		B0D0048	10-Apr-20	0.234 L	16-Apr-20 05:45	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 2000736 Temp: 1.6 °C
Storage ID: WR-2/A-13 Storage Secured: Yes ☑ No ☐

Project ID: **EGLE Foam Study** PO#: **60612688** Sampler: **Kelly Moss / Stan Krenz** (name)

TAT (check one): Standard: [X] 21 days Rush (surcharge may apply) [ ] 14 days [ ] 7 days Specify:

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
Mike Jury	**EGLE**	**401 Ketchum, Suite B**	**Bay City**	**MI**	**989-894-6255**	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Kelly Moss Kelly Moss	**3/31/2020**	**17:00**	Conor Maher	04/02/20	0958
Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

Method of Shipment: FedEx

ATTN:

Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	Mod. EPA Method 537: PFOA/ PFOS	UCMR3 PFAS List 6	537 List 14	PFAS List of 24	Other: Please List Below	PFAS Full list of 41 Branch and Linear	EPA Method 537(DW only): PFOA/ PFOS	UCMR3 PFAS List 6	PFAS List 14	Comments
SW2003311530-12	**3/31/20**	**15:30**	**VAN ETTEN LK - 12**	**2**	**P**	**WS**						**X**				**Park: Surface Water**
(A) **FM2003311545-12**	**3/31/20**	**15:45**	**VAN ETTEN LK - 12**	**1**	**P**	**FM**						**X**				**Park: Collapsed foam sample (high results expected) Sample contains ~ 130 mL of liquid**
SW2003311630-13	**3/31/20**	**16:30**	**VAN ETTEN LK - 13**	**2**	**P**	**WS**						**X**				**Cole's: Surface Water**
(A) **FM2003311645-13**	**3/31/20**	**16:45**	**VAN ETTEN LK - 13**	**1**	**P**	**FM**						**X**				**Cole's: Collapsed foam sample (high results expected) Sample contains ~ 1 oz of liquid**
SW2003311710-14	**3/31/20**	**17:10**	**VAN ETTEN LK - 14**	**2**	**P**	**WS**						**X**				**Boat Launch: Surface Water**
(A) **FM2003311725-14**	**3/31/20**	**17:25**	**VAN ETTEN LK - 14**	**1**	**P**	**FM**						**X**				**Boat Launch: Collapsed foam sample (high results expected) Sample contains ~ 1 oz of liquid**

Special Instructions/Comments: (A) on WO 2000756

Send Results and Acknowledgements to:
JuryM1@aecom.com Barry.Harding@aecom.com
Nic.Ropotos@aecom.com Dorin.Bogdan@aecom.com
Matt.Vandereide@aecom.com Robert.Kennedy@aecom.com
Geoffrey.Groff@aecom.com Jim.Carbone@aecom.com James.Buzzell@aecom.com

SEND DOCUMENTATION AND RESULTS TO:
Name: **Mike Jury**
Company: **EGLE**
Address: **401 Ketchum, Suite B**
City: **Bay City** State: **MI** Zip: **48708**
Phone: **989-894-6255** Fax:
Email: juryM1@michigan.gov

Container Types: P= HDPE, PJ= HDPE Jar, O = Other:

Bottle Preservation Type: T = Thiosulfate, TZ = Trizma:

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 2000736 TAT 21

Samples Arrival:	**Date/Time** 04/02/20 0958		**Initials:** CM		**Location:** WR-2 **Shelf/Rack:** N/A		
Delivered By:	FedEx	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	Ice		Blue Ice		Dry Ice		None
Temp °C: 1.6 (uncorrected) **Temp °C:** 1.6 (corrected)			**Probe used:** Y / (N)		**Thermometer ID:** IR-4		

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Airbill — Trk # 1708 7193 6349	✓		
Shipping Documentation Present?	✓		
Shipping Container: Vista / (Client) / Retain / (Return)		Dispose	
Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?			
Holding Time Acceptable?			

Logged In:	**Date/Time** 04/02/20 1209	**Initials:** CM	**Location:** WR-2 / R-13 **Shelf/Rack:** F-4 / A-2	
COC Anomaly/Sample Acceptance Form completed?			✓	✓

Comments:

CoC/Label Reconciliation Report WO# 2000736

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
2000736-01	A SW2003311530-12	☑	VAN ETTEN LK-12	31-Mar-20 15:30	☑	HDPE Bottle, 250 mL	Aqueous	
2000736-01	B SW2003311530-12	☑	VAN ETTEN LK-12	31-Mar-20 15:30	☑	HDPE Bottle, 250 mL	Aqueous	
2000736-02	A SW2003311630-13	☑	VAN ETTEN LK-13	31-Mar-20 16:30	☑	HDPE Bottle, 250 mL	Aqueous	
2000736-02	B SW2003311630-13	☑	VAN ETTEN LK-13	31-Mar-20 16:30	☑	HDPE Bottle, 250 mL	Aqueous	
2000736-03	A SW2003311710-14	☑	VAN ETTEN LK-14	31-Mar-20 17:10	☑	HDPE Bottle, 250 mL	Aqueous	
2000736-03	B SW2003311710-14	☑	VAN ETTEN LK-14	31-Mar-20 17:10	☑	HDPE Bottle, 250 mL	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	√		
Sample Custody Seals Intact?			√
Adequate Sample Volume?	√		
Container Type Appropriate for Analysis(es)	√		
Preservation Documented: Na2S2O3 Trizma None Other		√	√
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			√

Comments:

Verifed by/Date: CM 04/02/20

April 27, 2020

Vista Work Order No. 2000756

Mr. Dorin Bogdan
AECOM
3950 Sparks Drive SE
Grand Rapids, MI 49546

Dear Mr. Bogdan,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on April 02, 2020 under your Project Name 'EGLE Foam Study'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Work Order No. 2000756
Case Narrative

Sample Condition on Receipt:

Three surface water samples and three collapsed foam samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. The surface water samples were assigned to Vista Work Order No. 2000736.

Analytical Notes:

PFAS Isotope Dilution Method

Sample "FM2003311545-12" contained particulate and was centrifuged prior to extraction.

The samples were extracted and analyzed for a selected list of PFAS using Vista's PFAS Isotope Dilution Method (Modified EPA Method 537). The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers, reported separately. Results for all other analytes include the linear isomers only.

Holding Times

The samples were extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are flagged with an "H" qualifier.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2000756-01	FM2003311545-12	31-Mar-20 15:45	02-Apr-20 09:58	HDPE Bottle, 250 mL
2000756-02	FM2003311645-13	31-Mar-20 16:45	02-Apr-20 09:58	HDPE Bottle, 250 mL
2000756-03	FM2003311725-14	31-Mar-20 17:25	02-Apr-20 09:58	HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data
Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data
Lab Sample: B0D0037-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:08	1
PFPrS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:08	1
3:3 FTCA	ND	1.60	2.00	4.00		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:08	1
L-PFPeA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:08	1
L-PFBS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-4:2 FTS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFHxA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFPeS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
HFPO-DA	ND	2.41	3.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
5:3 FTCA	ND	2.41	3.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFHpA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
ADONA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFHxS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
Br-PFHxS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
Total PFHxS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-6:2 FTS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFOA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
Br-PFOA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
Total PFOA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
PFecHS	ND	2.41	3.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFHpS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:08	1
7:3 FTCA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFNA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFOSA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFOS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
Br-PFOS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
Total PFOS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFDA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-8:2FTS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFNS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-MeFOSAA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
Total MeFOSAA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-EtFOSAA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
Total EtFOSAA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFUnA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0037-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:08	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
10:2 FTS	ND	2.41	3.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFDoA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFTrDA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
PFDoS	ND	2.41	3.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFTeDA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-MeFOSA	ND	4.41	10.0	20.0		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-EtFOSA	ND	4.41	10.0	20.0		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-EtFOSE	ND	4.41	10.0	20.0		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-MeFOSE	ND	4.41	10.0	20.0		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFHxDA	ND	1.37	2.00	4.00		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
L-PFODA	ND	3.07	7.50	10.0		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	76.4	60 - 130		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:08	1
13C3-PFPeA	IS	80.0	60 - 150		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:08	1
13C3-PFBS	IS	95.4	60 - 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C2-4:2 FTS	IS	97.4	40 - 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C2-PFHxA	IS	89.9	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C4-PFHpA	IS	93.4	60 - 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C3-PFHxS	IS	89.3	60 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C2-6:2 FTS	IS	81.2	40 - 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C2-PFOA	IS	91.8	60 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C5-PFNA	IS	93.8	50 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C8-PFOSA	IS	46.5	20 - 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C8-PFOS	IS	68.0	60 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C2-PFDA	IS	95.4	60 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C2-8:2 FTS	IS	81.2	40 - 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
d3-MeFOSAA	IS	74.7	50 - 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
d5-EtFOSAA	IS	71.5	50 - 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C2-PFUnA	IS	78.1	60 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C2-PFDoA	IS	65.0	30 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
d3-MeFOSA	IS	24.4	10 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C2-PFTeDA	IS	68.9	20 - 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
d5-EtFOSA	IS	24.9	10 - 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
13C2-PFHxDA	IS	60.4	20 - 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
d7-MeFOSE	IS	29.8	10 - 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1
d9-EtFOSE	IS	30.6	10 - 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0037-BLK1
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	99.7	50 - 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 05:55	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0037-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	35.5	40.0	88.8	70 - 130		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:19	1
PFPrS	41.6	40.0	104	60 - 130		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:19	1
3:3 FTCA	30.2	40.0	75.4	60 - 130		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:19	1
L-PFPeA	37.3	40.0	93.3	70 - 130		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:19	1
L-PFBS	41.1	40.0	103	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-4:2 FTS	40.4	40.0	101	60 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-PFHxA	39.0	40.0	97.4	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-PFPeS	33.4	40.0	83.5	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
HFPO-DA	34.1	40.0	85.2	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
5:3 FTCA	24.9	40.0	62.2	60 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-PFHpA	35.9	40.0	89.7	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
ADONA	34.7	40.0	86.9	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
Total PFHxS	29.4	40.0	73.5	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-6:2 FTS	48.2	40.0	121	60 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
Total PFOA	40.9	40.0	102	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
PFecHS	37.5	40.0	93.8	60 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-PFHpS	33.1	40.0	82.7	60 - 130		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:19	1
7:3 FTCA	25.1	40.0	62.8	60 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-PFNA	36.5	40.0	91.3	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-PFOSA	39.0	40.0	97.6	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
Total PFOS	35.3	40.0	88.2	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
9Cl-PF3ONS	32.1	40.0	80.2	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-PFDA	40.1	40.0	100	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-8:2FTS	32.7	40.0	81.8	60 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-PFNS	38.5	40.0	96.3	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
Total MeFOSAA	36.7	40.0	91.6	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
Total EtFOSAA	44.5	40.0	111	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-PFUnA	35.2	40.0	88.1	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-PFDS	39.4	40.0	98.4	60 - 130		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:19	1
11Cl-PF3OUdS	38.1	40.0	95.3	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
10:2 FTS	40.8	40.0	102	60 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-PFDoA	37.9	40.0	94.6	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-PFTrDA	35.0	40.0	87.4	60 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
PFDoS	40.9	40.0	102	60 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study

Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0037-BS1 Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFTeDA	34.5	40.0	86.3	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-MeFOSA	201	200	101	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-EtFOSA	195	200	97.6	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-EtFOSE	191	200	95.7	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-MeFOSE	259	200	130	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-PFHxDA	35.9	40.0	89.8	70 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
L-PFODA	16.4	40.0	41.0	40 - 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	80.4	60- 130		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:19	1
13C3-PFPeA	IS	81.1	60- 150		B0D0037	09-Apr-20	0.250 L	23-Apr-20 06:19	1
13C3-PFBS	IS	87.8	60- 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C2-4:2 FTS	IS	81.5	40- 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C2-PFHxA	IS	84.8	70- 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C4-PFHpA	IS	96.3	60- 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C3-PFHxS	IS	81.9	60- 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C2-6:2 FTS	IS	80.1	40- 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C2-PFOA	IS	82.5	60- 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C5-PFNA	IS	84.1	50- 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C8-PFOSA	IS	44.3	20- 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C8-PFOS	IS	102	60- 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C2-PFDA	IS	98.9	60- 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C2-8:2 FTS	IS	95.0	40- 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
d3-MeFOSAA	IS	88.1	50- 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
d5-EtFOSAA	IS	64.2	50- 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C2-PFUnA	IS	80.2	60- 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C2-PFDoA	IS	88.3	30- 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
d3-MeFOSA	IS	25.8	10- 130		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C2-PFTeDA	IS	69.1	20- 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
d5-EtFOSA	IS	26.1	10- 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C2-PFHxDA	IS	56.6	20- 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
d7-MeFOSE	IS	28.7	10- 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
d9-EtFOSE	IS	31.1	10- 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1
13C3-HFPO-DA	IS	94.4	50- 150		B0D0037	09-Apr-20	0.250 L	16-Apr-20 06:06	1

Sample ID: FM2003311545-12 **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-12

Matrix: Foam
Date Collected: 31-Mar-20 15:45

Laboratory Data

Lab Sample: 2000756-01
Date Received: 02-Apr-20 09:58

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	27.1	39.7	79.1	D	B0D0037	09-Apr-20	0.126 L	23-Apr-20 06:29	10
PFPrS	ND	27.1	39.7	79.1	D	B0D0037	09-Apr-20	0.126 L	23-Apr-20 06:29	10
3:3 FTCA	ND	31.5	39.7	79.1	D	B0D0037	09-Apr-20	0.126 L	23-Apr-20 06:29	10
L-PFPeA	ND	27.1	39.7	79.1	D	B0D0037	09-Apr-20	0.126 L	23-Apr-20 06:29	10
L-PFBS	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-4:2 FTS	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFHxA	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFPeS	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
HFPO-DA	ND	95.3	119	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
5:3 FTCA	ND	95.3	119	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFHpA	258	54.2	79.4	158	D, Q	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
ADONA	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFHxS	2340	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
Br-PFHxS	210	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
Total PFHxS	2550	54.2	79.4	158		B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-6:2 FTS	354	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFOA	1730	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
Br-PFOA	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
Total PFOA	1730	54.2	79.4	158		B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
PFecHS	ND	95.3	119	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFHpS	697	27.1	39.7	79.1	D	B0D0037	09-Apr-20	0.126 L	23-Apr-20 06:29	10
7:3 FTCA	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFNA	523	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFOSA	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFOS	20400	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
Br-PFOS	22600	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
Total PFOS	43100	54.2	79.4	158		B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
9Cl-PF3ONS	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFDA	269	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-8:2FTS	126	54.2	79.4	158	D, J, Q	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFNS	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-MeFOSAA	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
Br-MeFOSAA	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
Total MeFOSAA	ND	54.2	79.4	158		B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-EtFOSAA	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
Br-EtFOSAA	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
Total EtFOSAA	ND	54.2	79.4	158		B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFUnA	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20

Sample ID: FM2003311545-12

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-12

Matrix: Foam
Date Collected: 31-Mar-20 15:45

Laboratory Data

Lab Sample: 2000756-01
Date Received: 02-Apr-20 09:58

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	27.1	39.7	79.1	D	B0D0037	09-Apr-20	0.126 L	23-Apr-20 06:29	10
11Cl-PF3OUdS	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
10:2 FTS	ND	95.3	119	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFDoA	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFTrDA	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
PFDoS	ND	95.3	119	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFTeDA	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-MeFOSA	ND	174	395	791	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-EtFOSA	ND	174	395	791	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-EtFOSE	ND	174	395	791	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-MeFOSE	ND	174	395	791	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFHxDA	ND	54.2	79.4	158	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
L-PFODA	ND	121	297	395	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	23.0	60 - 130	D, H	B0D0037	09-Apr-20	0.126 L	23-Apr-20 06:29	10
13C3-PFPeA	IS	69.7	60 - 150	D	B0D0037	09-Apr-20	0.126 L	23-Apr-20 06:29	10
13C3-PFBS	IS	56.0	60 - 150	D, H	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C2-4:2 FTS	IS	78.1	40 - 150	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C2-PFHxA	IS	85.2	70 - 130	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C4-PFHpA	IS	39.7	60 - 150	D, H	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C3-PFHxS	IS	90.6	60 - 130	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C2-6:2 FTS	IS	54.1	40 - 150	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C2-PFOA	IS	69.1	60 - 130	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C5-PFNA	IS	83.0	50 - 130	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C8-PFOSA	IS	13.5	20 - 150	D, H	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C8-PFOS	IS	35.1	60 - 130	D, H	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C2-PFDA	IS	40.0	60 - 130	D, H	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C2-8:2 FTS	IS	32.4	40 - 150	D, H	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
d3-MeFOSAA	IS	36.1	50 - 150	D, H	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
d5-EtFOSAA	IS	40.2	50 - 150	D, H	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C2-PFUnA	IS	39.8	60 - 130	D, H	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C2-PFDoA	IS	27.2	30 - 130	D, H	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
d3-MeFOSA	IS	25.5	10 - 130	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C2-PFTeDA	IS	8.70	20 - 150	D, H	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
d5-EtFOSA	IS	14.5	10 - 150	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
13C2-PFHxDA	IS	2.90	20 - 150	D, H	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
d7-MeFOSE	IS	15.5	10 - 150	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20
d9-EtFOSE	IS	15.7	10 - 150	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20

Sample ID: FM2003311545-12 **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-12

Matrix: Foam
Date Collected: 31-Mar-20 15:45

Laboratory Data

Lab Sample: 2000756-01
Date Received: 02-Apr-20 09:58

Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	72.2	50 - 150	D	B0D0037	09-Apr-20	0.126 L	16-Apr-20 06:16	20

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: FM2003311645-13 **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-13

Matrix: Foam
Date Collected: 31-Mar-20 16:45

Laboratory Data

Lab Sample: 2000756-02
Date Received: 02-Apr-20 09:58

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	197	288	576	D	B0D0037	09-Apr-20	0.0260 L	23-Apr-20 06:50	15
PFPrS	ND	197	288	576	D	B0D0037	09-Apr-20	0.0260 L	23-Apr-20 06:50	15
3:3 FTCA	ND	230	288	576	D	B0D0037	09-Apr-20	0.0260 L	23-Apr-20 06:50	15
L-PFPeA	ND	197	288	576	D	B0D0037	09-Apr-20	0.0260 L	23-Apr-20 06:50	15
L-PFBS	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-4:2 FTS	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFHxA	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFPeS	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
HFPO-DA	ND	463	576	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
5:3 FTCA	ND	463	576	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFHpA	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
ADONA	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFHxS	1190	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
Br-PFHxS	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
Total PFHxS	1190	263	384	769		B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-6:2 FTS	2650	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFOA	2730	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
Br-PFOA	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
Total PFOA	2730	263	384	769		B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
PFecHS	ND	463	576	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFHpS	3670	197	288	576	D	B0D0037	09-Apr-20	0.0260 L	23-Apr-20 06:50	15
7:3 FTCA	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFNA	6010	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFOSA	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFOS	108000	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
Br-PFOS	115000	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
Total PFOS	222000	263	384	769		B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
9Cl-PF3ONS	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFDA	1880	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-8:2FTS	1030	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFNS	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-MeFOSAA	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
Br-MeFOSAA	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
Total MeFOSAA	ND	263	384	769		B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-EtFOSAA	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
Br-EtFOSAA	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
Total EtFOSAA	ND	263	384	769		B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFUnA	1270	263	384	769	D, Q	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20

Sample ID: FM2003311645-13

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-13

Matrix: Foam
Date Collected: 31-Mar-20 16:45

Laboratory Data

Lab Sample: 2000756-02
Date Received: 02-Apr-20 09:58

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	197	288	576	D	B0D0037	09-Apr-20	0.0260 L	23-Apr-20 06:50	15
11Cl-PF3OUdS	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
10:2 FTS	ND	463	576	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFDoA	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFTrDA	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
PFDoS	ND	463	576	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFTeDA	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-MeFOSA	ND	846	1920	3840	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-EtFOSA	ND	846	1920	3840	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-EtFOSE	ND	846	1920	3840	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-MeFOSE	ND	846	1920	3840	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFHxDA	ND	263	384	769	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
L-PFODA	ND	590	1440	1920	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	69.2	60 - 130	D	B0D0037	09-Apr-20	0.0260 L	23-Apr-20 06:50	15
13C3-PFPeA	IS	72.3	60 - 150	D	B0D0037	09-Apr-20	0.0260 L	23-Apr-20 06:50	15
13C3-PFBS	IS	84.2	60 - 150	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C2-4:2 FTS	IS	84.7	40 - 150	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C2-PFHxA	IS	87.2	70 - 130	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C4-PFHpA	IS	84.0	60 - 150	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C3-PFHxS	IS	86.5	60 - 130	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C2-6:2 FTS	IS	62.7	40 - 150	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C2-PFOA	IS	60.3	60 - 130	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C5-PFNA	IS	63.5	50 - 130	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C8-PFOSA	IS	23.4	20 - 150	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C8-PFOS	IS	75.0	60 - 130	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C2-PFDA	IS	78.3	60 - 130	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C2-8:2 FTS	IS	70.7	40 - 150	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
d3-MeFOSAA	IS	52.8	50 - 150	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
d5-EtFOSAA	IS	43.5	50 - 150	D, H	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C2-PFUnA	IS	50.4	60 - 130	D, H	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C2-PFDoA	IS	48.2	30 - 130	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
d3-MeFOSA	IS	19.4	10 - 130	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C2-PFTeDA	IS	17.0	20 - 150	D, H	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
d5-EtFOSA	IS	19.8	10 - 150	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
13C2-PFHxDA	IS	8.60	20 - 150	D, H	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
d7-MeFOSE	IS	31.4	10 - 150	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20
d9-EtFOSE	IS	32.6	10 - 150	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20

Sample ID: FM2003311645-13 **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-13

Matrix: Foam
Date Collected: 31-Mar-20 16:45

Laboratory Data

Lab Sample: 2000756-02
Date Received: 02-Apr-20 09:58

Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	61.1	50 - 150	D	B0D0037	09-Apr-20	0.0260 L	16-Apr-20 06:37	20

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: FM2003311725-14 **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-14

Matrix: Foam
Date Collected: 31-Mar-20 17:25

Laboratory Data

Lab Sample: 2000756-03
Date Received: 02-Apr-20 09:58

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	56.4	82.5	165	D	B0D0037	09-Apr-20	0.0303 L	23-Apr-20 07:31	5
PFPrS	ND	56.4	82.5	165	D	B0D0037	09-Apr-20	0.0303 L	23-Apr-20 07:31	5
3:3 FTCA	ND	65.7	82.5	165	D	B0D0037	09-Apr-20	0.0303 L	23-Apr-20 07:31	5
L-PFPeA	ND	56.4	82.5	165	D	B0D0037	09-Apr-20	0.0303 L	23-Apr-20 07:31	5
L-PFBS	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-4:2 FTS	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFHxA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFPeS	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
HFPO-DA	ND	397	494	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
5:3 FTCA	ND	397	494	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFHpA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
ADONA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFHxS	1610	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
Br-PFHxS	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
Total PFHxS	1610	226	330	659		B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-6:2 FTS	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFOA	869	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
Br-PFOA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
Total PFOA	869	226	330	659		B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
PFecHS	ND	397	494	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFHpS	390	56.4	82.5	165	D, Q	B0D0037	09-Apr-20	0.0303 L	23-Apr-20 07:31	5
7:3 FTCA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFNA	400	226	330	659	D, J	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFOSA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFOS	17800	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
Br-PFOS	13700	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
Total PFOS	31500	226	330	659		B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
9Cl-PF3ONS	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFDA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-8:2FTS	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFNS	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-MeFOSAA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
Br-MeFOSAA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
Total MeFOSAA	ND	226	330	659		B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-EtFOSAA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
Br-EtFOSAA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
Total EtFOSAA	ND	226	330	659		B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFUnA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20

Sample ID: FM2003311725-14

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-14

Matrix: Foam
Date Collected: 31-Mar-20 17:25

Laboratory Data

Lab Sample: 2000756-03
Date Received: 02-Apr-20 09:58

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	56.4	82.5	165	D	B0D0037	09-Apr-20	0.0303 L	23-Apr-20 07:31	5
11Cl-PF3OUdS	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
10:2 FTS	ND	397	494	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFDoA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFTrDA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
PFDoS	ND	397	494	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFTeDA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-MeFOSA	ND	726	1650	3300	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-EtFOSA	ND	726	1650	3300	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-EtFOSE	ND	726	1650	3300	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-MeFOSE	ND	726	1650	3300	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFHxDA	ND	226	330	659	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
L-PFODA	ND	506	1240	1650	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	67.4	60 - 130	D	B0D0037	09-Apr-20	0.0303 L	23-Apr-20 07:31	5
13C3-PFPeA	IS	69.0	60 - 150	D	B0D0037	09-Apr-20	0.0303 L	23-Apr-20 07:31	5
13C3-PFBS	IS	78.2	60 - 150	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C2-4:2 FTS	IS	94.5	40 - 150	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C2-PFHxA	IS	95.4	70 - 130	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C4-PFHpA	IS	78.7	60 - 150	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C3-PFHxS	IS	75.5	60 - 130	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C2-6:2 FTS	IS	120	40 - 150	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C2-PFOA	IS	83.6	60 - 130	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C5-PFNA	IS	97.9	50 - 130	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C8-PFOSA	IS	23.2	20 - 150	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C8-PFOS	IS	93.5	60 - 130	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C2-PFDA	IS	53.3	60 - 130	D, H	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C2-8:2 FTS	IS	73.0	40 - 150	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
d3-MeFOSAA	IS	46.3	50 - 150	D, H	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
d5-EtFOSAA	IS	40.9	50 - 150	D, H	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C2-PFUnA	IS	39.6	60 - 130	D, H	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C2-PFDoA	IS	48.6	30 - 130	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
d3-MeFOSA	IS	12.2	10 - 130	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C2-PFTeDA	IS	17.4	20 - 150	D, H	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
d5-EtFOSA	IS	22.2	10 - 150	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
13C2-PFHxDA	IS	6.50	20 - 150	D, H	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
d7-MeFOSE	IS	22.1	10 - 150	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20
d9-EtFOSE	IS	19.9	10 - 150	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20

Sample ID: FM2003311725-14 **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: VAN ETTEN LK-14
Matrix: Foam
Date Collected: 31-Mar-20 17:25

Laboratory Data

Lab Sample: 2000756-03
Date Received: 02-Apr-20 09:58
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	76.6	50 - 150	D	B0D0037	09-Apr-20	0.0303 L	16-Apr-20 06:58	20

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Vista Analytical Laboratory

CHAIN OF CUSTODY

EXACT COPY OF THE ORIGINAL INIT CM 04/02/20

For Laboratory Use Only on 04/02/20
Work Order #: 2000736 2000756 Temp: 1.6 °C
Storage ID: WR-2 / A-13 Storage Secured: Yes ☑ No ☐

Project ID: **EGLE Foam Study** PO#: **60612688** Sampler: **Kelly Moss / Stan Krenz** (name)

TAT (check one): Standard: X 21 days; Rush (surcharge may apply): ☐ 14 days ☐ 7 days Specify:

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
Mike Jury	**EGLE**	**401 Ketchum, Suite B**	**Bay City**	**MI**	**989-894-6255**	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Kelly Moss Kelly Moss	**3/31/2020**	**17:00**	Conor Maher	04/02/20	0958
Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

ATTN:

Method of Shipment: FedEx
Tracking No.:

Add Analysis(es) Requested

	Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	Mod. EPA Method 537: PFOA/ PFOS	UCMR3 PFAS List:6	537 List: 14	PFAS List of 24	Other: Please List Below	PFAS Full list of 41 Branch and Linear	EPA Method 537(DW only): PFOA/ PFOS	UCMR3 PFAS List:6	PFAS List: 14	Comments
(A)	**SW2003311530-12**	**3/31/20**	**15:30**	**VAN ETTEN LK - 12**	**2**	**P**	**WS**						**X**				**Park: Surface Water**
	FM2003311545-12	**3/31/20**	**15:45**	**VAN ETTEN LK - 12**	**1**	**P**	**FM**						**X**				**Park: Collapsed foam sample (high results expected) Sample contains ~ 130 mL of liquid**
(A)	**SW2003311630-13**	**3/31/20**	**16:30**	**VAN ETTEN LK - 13**	**2**	**P**	**WS**						**X**				**Cole's: Surface Water**
	FM2003311645-13	**3/31/20**	**16:45**	**VAN ETTEN LK - 13**	**1**	**P**	**FM**						**X**				**Cole's: Collapsed foam sample (high results expected) Sample contains ~ 1 oz of liquid**
(A)	**SW2003311710-14**	**3/31/20**	**17:10**	**VAN ETTEN LK - 14**	**2**	**P**	**WS**						**X**				**Boat Launch: Surface Water**
	FM2003311725-14	**3/31/20**	**17:25**	**VAN ETTEN LK - 14**	**1**	**P**	**FM**						**X**				**Boat Launch: Collapsed foam sample (high results expected) Sample contains ~ 1 oz of liquid**

Special Instructions/Comments: (A) on WO 2000736

Send Results and Acknowledgements to:
JuryM1@aecom.com Barry.Harding@aecom.com
Nic.Ropotos@aecom.com Dorin.Bogdan@aecom.com
Matt.Vandereide@aecom.com Robert.Kennedy@aecom.com
Geoffrey.Groff@aecom.com Jim.Carbone@aecom.com James.Buzzell@aecom.com

SEND DOCUMENTATION AND RESULTS TO:
Name: **Mike Jury**
Company: **EGLE**
Address: **401 Ketchum, Suite B**
City: **Bay City** State: **MI** Zip: **48708**
Phone: **989-894-6255** Fax:
Email: juryM1@michigan.gov

Container Types: P= HDPE, PJ= HDPE Jar
O = Other:

Bottle Preservation Type: T = Thiosulfate,
TZ = Trizma:

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:

Vista Analytical Laboratory

Sample Log-In Checklist

Vista Work Order #: 2000756 Page # 1 of 1 TAT 21

Samples Arrival:	**Date/Time** 04/02/20 0958		**Initials:** GM		**Location:** WR-2 **Shelf/Rack:** N/A		
Delivered By:	(FedEx)	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	(Ice)		Blue Ice		Dry Ice		None
Temp °C: 1.6 (uncorrected)			**Probe used:** Y / (N)		**Thermometer ID:** IR-4		
Temp °C: 1.6 (corrected)							

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Airbill — Trk # 1708 7183 6349	✓		
Shipping Documentation Present?	✓		

Shipping Container	Vista	(Client)	Retain	(Return)	Dispose

Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	**Date/Time** 04/02/20 1603	**Initials:** CM	**Location:** ~~WR-2~~ / R-13 (CM 4/02/20) **Shelf/Rack:** ~~F-4~~ / A-2		
COC Anomaly/Sample Acceptance Form completed?				✓	✓

Comments:

CoC/Label Reconciliation Report WO# 2000756

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
2000756-01	A FM2003311545-12	☑ (A)	VAN ETTEN LK-12	31-Mar-20 15:45	☑	HDPE Bottle, 250 mL	Aqueous	
2000756-02	A FM2003311645-13	☑ (B)	VAN ETTEN LK-13	31-Mar-20 16:45	☑	HDPE Bottle, 250 mL	Aqueous	
2000756-03	A FM2003311725-14	☑ (B)	VAN ETTEN LK-14	31-Mar-20 17:25	☑	HDPE Bottle, 250 mL	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	√		
Sample Custody Seals Intact?			√
Adequate Sample Volume?	√ (A) (B)		
Container Type Appropriate for Analysis(es)	√		
Preservation Documented: Na2S2O3 Trizma None Other		√	√
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			√

Comments:

(A) Sample volume ~ 130 mL

(B) Sample volume ~ 25 mL

Verifed by/Date: AM 04/02/20

May 05, 2020

Vista Work Order No. 2000791

Mr. Dorin Bogdan
AECOM
3950 Sparks Drive SE
Grand Rapids, MI 49546

Dear Mr. Bogdan,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on April 07, 2020 under your Project Name 'EGLE Foam Study'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Work Order No. 2000791
Case Narrative

Sample Condition on Receipt:

One collapsed foam sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

PFAS Isotope Dilution Method

The sample contained particulate and was centrifuged prior to extraction.

The sample was extracted and analyzed for a selected list of PFAS using Vista's PFAS Isotope Dilution Method (Modified EPA Method 537). The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers, reported separately. Results for all other analytes include the linear isomers only.

Holding Times

The sample was extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The recoveries of PFPrS and PFDoS were greater than 130% in the OPR. These analytes were not detected in the sample. The recovery of 7:3 FTCA was less than 60% in the OPR. The reported sample results for this analyte may be biased low. The recoveries for all other analytes were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
2000791-01	FM2004011210-15	PFAS Isotope Dilution Method	13C3-PFBA	H	53.7
2000791-01	FM2004011210-15	PFAS Isotope Dilution Method	13C3-PFPeA	H	154
2000791-01	FM2004011210-15	PFAS Isotope Dilution Method	d3-MeFOSAA	H	42.9
2000791-01	FM2004011210-15	PFAS Isotope Dilution Method	d5-EtFOSAA	H	41.0
2000791-01	FM2004011210-15	PFAS Isotope Dilution Method	13C2-PFUnA	H	58.5
2000791-01	FM2004011210-15	PFAS Isotope Dilution Method	13C2-10:2 FTS	H	35.3
2000791-01	FM2004011210-15	PFAS Isotope Dilution Method	d3-MeFOSA	H	6.70
2000791-01	FM2004011210-15	PFAS Isotope Dilution Method	13C2-PFTeDA	H	4.30
2000791-01	FM2004011210-15	PFAS Isotope Dilution Method	d5-EtFOSA	H	3.70
B0D0093-BLK1	B0D0093-BLK1	PFAS Isotope Dilution Method	d3-MeFOSA	H	8.30
B0D0093-BLK1	B0D0093-BLK1	PFAS Isotope Dilution Method	d5-EtFOSA	H	5.80
B0D0093-BLK1	B0D0093-BLK1	PFAS Isotope Dilution Method	13C2-PFHxDA	H	13.9

H = Recovery was outside laboratory acceptance criteria.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2000791-01	FM2004011210-15	01-Apr-20 12:10	07-Apr-20 09:10	HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data
Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data
Lab Sample: B0D0093-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
PFPrS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
3:3 FTCA	ND	1.60	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFPeA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFBS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-4:2 FTS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFHxA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFPeS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
HFPO-DA	ND	2.41	3.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
5:3 FTCA	ND	2.41	3.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFHpA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
ADONA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFHxS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
Br-PFHxS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
Total PFHxS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-6:2 FTS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFOA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
Br-PFOA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
Total PFOA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
PFecHS	ND	2.41	3.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFHpS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
7:3 FTCA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFNA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFOSA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFOS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
Br-PFOS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
Total PFOS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFDA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-8:2FTS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFNS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-MeFOSAA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
Total MeFOSAA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-EtFOSAA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
Total EtFOSAA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFUnA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0093-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
10:2 FTS	ND	2.41	3.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFDoA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFTrDA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
PFDoS	ND	2.41	3.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFTeDA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-MeFOSA	ND	4.41	10.0	20.0		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-EtFOSA	ND	4.41	10.0	20.0		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-EtFOSE	ND	4.41	10.0	20.0		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-MeFOSE	ND	4.41	10.0	20.0		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
L-PFHxDA	ND	1.37	2.00	4.00		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.1	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C3-PFPeA	IS	119	60 - 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C3-PFBS	IS	104	60 - 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C2-4:2 FTS	IS	109	40 - 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C2-PFHxA	IS	102	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C4-PFHpA	IS	114	60 - 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C3-PFHxS	IS	99.3	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C2-6:2 FTS	IS	109	40 - 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C2-PFOA	IS	103	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C5-PFNA	IS	103	50 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C8-PFOSA	IS	68.5	20 - 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C8-PFOS	IS	98.5	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C2-PFDA	IS	100	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C2-8:2 FTS	IS	101	40 - 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
d3-MeFOSAA	IS	105	50 - 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
d5-EtFOSAA	IS	93.7	50 - 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C2-PFUnA	IS	89.3	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C2-10:2 FTS	IS	78.0	40 - 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C2-PFDoA	IS	80.0	30 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
d3-MeFOSA	IS	8.30	10 - 130	H	B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C2-PFTeDA	IS	64.3	20 - 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
d5-EtFOSA	IS	5.80	10 - 150	H	B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
13C2-PFHxDA	IS	13.9	20 - 150	H	B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
d7-MeFOSE	IS	55.0	10 - 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1
d9-EtFOSE	IS	55.5	10 - 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0093-BLK1
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-HFPO-DA	IS	111	50 - 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:43	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0093-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	43.5	40.0	109	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
PFPrS	56.3	40.0	141	60 - 130	H	B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
3:3 FTCA	28.5	40.0	71.2	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFPeA	42.2	40.0	106	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFBS	45.7	40.0	114	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-4:2 FTS	37.5	40.0	93.7	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFHxA	45.7	40.0	114	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFPeS	39.7	40.0	99.4	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
HFPO-DA	41.2	40.0	103	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
5:3 FTCA	27.9	40.0	69.7	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFHpA	38.4	40.0	95.9	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
ADONA	38.8	40.0	96.9	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
Total PFHxS	43.2	40.0	108	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-6:2 FTS	39.5	40.0	98.9	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
Total PFOA	42.7	40.0	107	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
PFecHS	42.7	40.0	107	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFHpS	40.3	40.0	101	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
7:3 FTCA	22.4	40.0	56.1	60 - 130	H	B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFNA	39.5	40.0	98.7	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFOSA	42.4	40.0	106	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
Total PFOS	38.4	40.0	96.0	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
9Cl-PF3ONS	37.0	40.0	92.5	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFDA	41.4	40.0	103	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-8:2FTS	38.2	40.0	95.6	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFNS	35.3	40.0	88.2	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
Total MeFOSAA	40.4	40.0	101	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
Total EtFOSAA	44.9	40.0	112	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFUnA	41.9	40.0	105	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFDS	38.1	40.0	95.3	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
11Cl-PF3OUdS	51.6	40.0	129	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
10:2 FTS	45.2	40.0	113	60 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFDoA	41.7	40.0	104	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFTrDA	40.9	40.0	102	60 - 130	Q	B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
PFDoS	55.7	40.0	139	60 - 130	H	B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1

Sample ID: OPR — **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0093-BS1
Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFTeDA	47.1	40.0	118	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-MeFOSA	203	200	101	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-EtFOSA	232	200	116	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-EtFOSE	221	200	111	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-MeFOSE	218	200	109	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
L-PFHxDA	48.2	40.0	121	70 - 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	93.4	60- 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C3-PFPeA	IS	113	60- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C3-PFBS	IS	91.4	60- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C2-4:2 FTS	IS	98.7	40- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C2-PFHxA	IS	99.7	70- 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C4-PFHpA	IS	112	60- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C3-PFHxS	IS	98.2	60- 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C2-6:2 FTS	IS	100	40- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C2-PFOA	IS	101	60- 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C5-PFNA	IS	99.5	50- 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C8-PFOSA	IS	64.6	20- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C8-PFOS	IS	99.2	60- 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C2-PFDA	IS	101	60- 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C2-8:2 FTS	IS	85.2	40- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
d3-MeFOSAA	IS	102	50- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
d5-EtFOSAA	IS	93.5	50- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C2-PFUnA	IS	90.4	60- 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C2-10:2 FTS	IS	74.1	40- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C2-PFDoA	IS	86.5	30- 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
d3-MeFOSA	IS	15.8	10- 130		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C2-PFTeDA	IS	76.7	20- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
d5-EtFOSA	IS	11.9	10- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C2-PFHxDA	IS	30.9	20- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
d7-MeFOSE	IS	50.1	10- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
d9-EtFOSE	IS	51.9	10- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1
13C3-HFPO-DA	IS	110	50- 150		B0D0093	12-Apr-20	0.250 L	02-May-20 04:53	1

Sample ID: FM2004011210-15 **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: LAKE MARGRETHE-15
Matrix: Foam
Date Collected: 01-Apr-20 12:10

Laboratory Data

Lab Sample: 2000791-01
Date Received: 07-Apr-20 09:10
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
PFPrS	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
3:3 FTCA	ND	3.86	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFPeA	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFBS	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-4:2 FTS	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFHxA	8.54	3.32	4.85	9.69	J	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFPeS	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
HFPO-DA	ND	5.84	7.28	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
5:3 FTCA	ND	5.84	7.28	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFHpA	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
ADONA	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFHxS	7.55	3.32	4.85	9.69	J	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
Br-PFHxS	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
Total PFHxS	7.55	3.32	4.85	9.69	J	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-6:2 FTS	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFOA	207	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
Br-PFOA	13.6	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
Total PFOA	220	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
PFecHS	23.7	5.84	7.28	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFHpS	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
7:3 FTCA	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFNA	1010	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFOSA	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFOS	1210	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
Br-PFOS	2210	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
Total PFOS	3420	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
9Cl-PF3ONS	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFDA	198	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-8:2FTS	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFNS	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-MeFOSAA	3.37	3.32	4.85	9.69	J, Q	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1

Sample ID: FM2004011210-15

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: LAKE MARGRETHE-15
Matrix: Foam
Date Collected: 01-Apr-20 12:10

Laboratory Data

Lab Sample: 2000791-01
Date Received: 07-Apr-20 09:10
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
Br-MeFOSAA	17.1	3.32	4.85	9.69	Q	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
Total MeFOSAA	20.5	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-EtFOSAA	4.60	3.32	4.85	9.69	J	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
Br-EtFOSAA	4.37	3.32	4.85	9.69	J, Q	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
Total EtFOSAA	8.97	3.32	4.85	9.69	J	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFUnA	39.9	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFDS	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
11Cl-PF3OUdS	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
10:2 FTS	ND	5.84	7.28	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFDoA	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFTrDA	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
PFDoS	ND	5.84	7.28	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-PFTeDA	ND	3.32	4.85	9.69		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-MeFOSA	ND	10.7	24.3	48.4		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-EtFOSA	ND	10.7	24.3	48.4		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-EtFOSE	ND	10.7	24.3	48.4		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
L-MeFOSE	ND	10.7	24.3	48.4		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	53.7	60 - 130	H	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C3-PFPeA	IS	154	60 - 150	H	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C3-PFBS	IS	108	60 - 150		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C2-4:2 FTS	IS	58.3	40 - 150		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C2-PFHxA	IS	94.3	70 - 130		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C4-PFHpA	IS	82.0	60 - 150		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C3-PFHxS	IS	88.5	60 - 130		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C2-6:2 FTS	IS	84.0	40 - 150		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C2-PFOA	IS	95.6	60 - 130		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C5-PFNA	IS	94.0	50 - 130		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C8-PFOSA	IS	35.9	20 - 150		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C8-PFOS	IS	90.8	60 - 130		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C2-PFDA	IS	82.5	60 - 130		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C2-8:2 FTS	IS	56.9	40 - 150		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
d3-MeFOSAA	IS	42.9	50 - 150	H	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
d5-EtFOSAA	IS	41.0	50 - 150	H	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C2-PFUnA	IS	58.5	60 - 130	H	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1

Sample ID: FM2004011210-15

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: LAKE MARGRETHE-15
Matrix: Foam
Date Collected: 01-Apr-20 12:10

Laboratory Data

Lab Sample: 2000791-01
Date Received: 07-Apr-20 09:10
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-10:2 FTS	IS	35.3	40 - 150	H	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C2-PFDoA	IS	38.6	30 - 130		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
d3-MeFOSA	IS	6.70	10 - 130	H	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C2-PFTeDA	IS	4.30	20 - 150	H	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
d5-EtFOSA	IS	3.70	10 - 150	H	B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
d7-MeFOSE	IS	29.4	10 - 150		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
d9-EtFOSE	IS	21.5	10 - 150		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1
13C3-HFPO-DA	IS	85.5	50 - 150		B0D0093	12-Apr-20	0.103 L	02-May-20 05:04	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Vista Analytical Laboratory

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CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 2000791 Temp. 3.9 °C
Storage ID: R-13/WR-2 Storage Secured. Yes [X] No [ ]

Project ID: EGLE Foam Study PO#: 60612688 Sampler: Michal Kosciarz (name)

TAT (check one): Standard: [X] 21 days; Rush (surcharge may apply) [ ] 14 days [ ] 7 days Specify:

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
Mike Jury	EGLE	401 Ketchum, Suite B	Bay City	MI	989-894-6255	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Michal Kosciarz	04/06/20	1500	Ashweeni Prakash	04/07/20	0910
Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

ATTN.

Method of Shipment: FedEx
Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	Mod. EPA Method 537: PFOA/ PFOS	UCMR3 PFAS List 6	537 List: 14	PFAS List of 24	Other: Please List Below	PFAS Full list of 41 Branch and Linear	EPA Method 537(DW only): PFOA/ PFOS	UCMR3 PFAS List 6	PFAS List: 14	Comments
FM2004011210-15	4/1/20	1210	LAKE MARGRETHE-15	1	P	F						x				Creek off across from 2361 Danish Landing Road Collapsed foam - high concentrations expected; 40mL

Special Instructions/Comments:

Send Results and Acknowledgements to:

JuryM1@aecom.com Barry.Harding@aecom.com
Nic.Ropotos@aecom.com Dorin.Bogdan@aecom.com
Matt.Vandereide@aecom.com Robert.Kennedy@aecom.com
Geoffrey.Groff@aecom.com Jim.Carbone@aecom.com James.Buzzell@aecom.com

SEND DOCUMENTATION AND RESULTS TO:

Name: Mike Jury
Company: EGLE
Address: 401 Ketchum, Suite B
City: Bay City State MI Zip: 48708
Phone: 989-894-6255 Fax:
Email: juryM1@michigan.gov

Container Types: P= HDPE, PJ= HDPE Jar
O = Other:

Bottle Preservation Type: T = Thiosulfate,
TZ = Trizma:

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 2000791 TAT Std

Samples Arrival:	**Date/Time** 04/07/20 0910		**Initials:** tf		**Location:** WR-2 **Shelf/Rack:** NA		
Delivered By:	(FedEx)	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	(Ice)		Blue Ice		Dry Ice		None
Temp °C: 3.9 (uncorrected) **Temp °C:** 3.9 (corrected)			**Probe used:** Y / (N)		**Thermometer ID:** IR-3		

		YES	NO	NA
Shipping Container(s) Intact?		✓		
Shipping Custody Seals Intact?				✓
Airbill	Trk # 3916 7235 2438	✓		
Shipping Documentation Present?		✓		
Shipping Container	Vista / (Client) / Retain / (Return) / Dispose			
Chain of Custody / Sample Documentation Present?		✓		
Chain of Custody / Sample Documentation Complete?		✓		
Holding Time Acceptable?		✓		

Logged In:	**Date/Time** 04/07/20 1101	**Initials:** KS	**Location:** R-13 | WR-2 **Shelf/Rack:** A-2 | E-3	
COC Anomaly/Sample Acceptance Form completed?			✓	✓

Comments:

CoC/Label Reconciliation Report WO# 2000791

LabNumber	CoC Sample ID	SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
2000791-01	A FM2004011210-15 ☑	LAKE MARGRETHE-15	01-Apr-20 12:10 ☑	HDPE Bottle, 250 mL	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume? *	✓		
Container Type Appropriate for Analysis(es)	✓		
Preservation Documented: Na2S2O3 Trizma None Other			✓
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓

Comments: * ~ 100 ml

Verifed by/Date: MMS 4/7/20

May 05, 2020

Vista Work Order No. 2000792

Mr. Dorin Bogdan
AECOM
3950 Sparks Drive SE
Grand Rapids, MI 49546

Dear Mr. Bogdan,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on April 07, 2020 under your Project Name 'EGLE Foam Study'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Work Order No. 2000792
Case Narrative

Sample Condition on Receipt:

One surface water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

PFAS Isotope Dilution Method

The sample was extracted and analyzed for a selected list of PFAS using Vista's PFAS Isotope Dilution Method (Modified EPA Method 537). The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The sample was extracted and analyzed within the method hold times. The sample was re-extracted outside the method hold time. The results from the re-extraction have been reported.

Quality Control

The Initial Calibration met the method acceptance criteria. The recoveries of 5:3 FTCA and 7:3 FTCA were greater than 130% in one of the continuing calibration standards. This analyte was not detected in the associated sample. The recoveries of all other analytes were within the acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The recovery of PFODA was below 40% in the OPR. The reported sample result for this analyte may be biased low. The recoveries of all other analytes were within the acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
2000792-01	SW2004011215-15	PFAS Isotope Dilution Method	13C3-PFBA	H	41.4

H = Recovery was outside laboratory acceptance criteria.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2000792-01	SW2004011215-15	01-Apr-20 12:15	07-Apr-20 09:10	HDPE Bottle, 250 mL HDPE Bottle, 250 mL

Vista Project: 2000792

Client Project: EGLE Foam Study

ANALYTICAL RESULTS

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data
Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data
Lab Sample: B0D0336-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
PFPrS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
3:3 FTCA	ND	1.60	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFPeA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFBS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-4:2 FTS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFHxA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFPeS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
HFPO-DA	ND	2.41	3.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
5:3 FTCA	ND	2.41	3.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFHpA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
ADONA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFHxS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Br-PFHxS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Total PFHxS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-6:2 FTS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFOA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Br-PFOA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Total PFOA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
PFecHS	ND	2.41	3.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFHpS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
7:3 FTCA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFNA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFOSA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFOS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Br-PFOS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Total PFOS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFDA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-8:2FTS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFNS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-MeFOSAA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Total MeFOSAA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-EtFOSAA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Total EtFOSAA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFUnA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0336-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
10:2 FTS	ND	2.41	3.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFDoA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFTrDA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
PFDoS	ND	2.41	3.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFTeDA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-MeFOSA	ND	4.41	10.0	20.0		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-EtFOSA	ND	4.41	10.0	20.0		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-EtFOSE	ND	4.41	10.0	20.0		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-MeFOSE	ND	4.41	10.0	20.0		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFHxDA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFODA	ND	3.07	7.50	10.0		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.6	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C3-PFPeA	IS	104	60 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C3-PFBS	IS	100	60 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-4:2 FTS	IS	112	40 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-PFHxA	IS	95.9	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C4-PFHpA	IS	104	60 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C3-PFHxS	IS	103	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-6:2 FTS	IS	102	40 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-PFOA	IS	105	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C5-PFNA	IS	94.8	50 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C8-PFOSA	IS	69.3	20 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C8-PFOS	IS	90.8	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-PFDA	IS	87.8	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-8:2 FTS	IS	84.7	40 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
d3-MeFOSAA	IS	74.2	50 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
d5-EtFOSAA	IS	63.9	50 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-PFUnA	IS	77.5	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-10:2 FTS	IS	73.5	40 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-PFDoA	IS	76.0	30 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
d3-MeFOSA	IS	23.5	10 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-PFTeDA	IS	87.8	20 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
d5-EtFOSA	IS	19.9	10 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-PFHxDA	IS	65.1	20 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
d7-MeFOSE	IS	44.5	10 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0336-BLK1
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d9-EtFOSE	IS	44.7	10 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C3-HFPO-DA	IS	93.3	50 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study

Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0336-BS1 Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	40.6	40.0	102	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
PFPrS	50.0	40.0	125	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
3:3 FTCA	49.7	40.0	124	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFPeA	41.3	40.0	103	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFBS	46.6	40.0	117	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-4:2 FTS	34.5	40.0	86.2	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFHxA	43.1	40.0	108	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFPeS	49.6	40.0	124	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
HFPO-DA	43.9	40.0	110	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
5:3 FTCA	42.0	40.0	105	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFHpA	43.4	40.0	109	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
ADONA	40.1	40.0	100	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
Total PFHxS	43.7	40.0	109	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-6:2 FTS	37.1	40.0	92.7	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
Total PFOA	46.7	40.0	117	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
PFecHS	45.1	40.0	113	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFHpS	44.0	40.0	110	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
7:3 FTCA	37.3	40.0	93.2	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFNA	43.2	40.0	108	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFOSA	38.3	40.0	95.7	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
Total PFOS	44.1	40.0	110	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
9Cl-PF3ONS	40.3	40.0	101	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFDA	39.5	40.0	98.7	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-8:2FTS	42.5	40.0	106	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFNS	39.8	40.0	99.5	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
Total MeFOSAA	40.8	40.0	102	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
Total EtFOSAA	40.1	40.0	100	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFUnA	41.8	40.0	105	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFDS	37.0	40.0	92.4	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
11Cl-PF3OUdS	50.4	40.0	126	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
10:2 FTS	44.5	40.0	111	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFDoA	43.8	40.0	109	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFTrDA	46.5	40.0	116	60 - 130	Q	B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
PFDoS	41.4	40.0	103	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study

Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0336-BS1 Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFTeDA	43.0	40.0	107	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-MeFOSA	212	200	106	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-EtFOSA	205	200	102	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-EtFOSE	204	200	102	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-MeFOSE	211	200	106	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFHxDA	44.3	40.0	111	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFODA	9.18	40.0	22.9	40 - 130	J, H	B0D0336	01-May-20	0.250 L	04-May-20 03:27	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	98.9	60- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C3-PFPeA	IS	107	60- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C3-PFBS	IS	90.4	60- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-4:2 FTS	IS	103	40- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-PFHxA	IS	103	70- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C4-PFHpA	IS	103	60- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C3-PFHxS	IS	102	60- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-6:2 FTS	IS	99.1	40- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-PFOA	IS	89.7	60- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C5-PFNA	IS	95.4	50- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C8-PFOSA	IS	96.3	20- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C8-PFOS	IS	94.6	60- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-PFDA	IS	98.9	60- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-8:2 FTS	IS	98.9	40- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
d3-MeFOSAA	IS	88.2	50- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
d5-EtFOSAA	IS	88.6	50- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-PFUnA	IS	90.8	60- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-10:2 FTS	IS	83.6	40- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-PFDoA	IS	80.3	30- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
d3-MeFOSA	IS	35.6	10- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-PFTeDA	IS	87.9	20- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
d5-EtFOSA	IS	32.1	10- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-PFHxDA	IS	36.5	20- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
d7-MeFOSE	IS	67.6	10- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
d9-EtFOSE	IS	71.2	10- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C3-HFPO-DA	IS	91.9	50- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1

Sample ID: SW2004011215-15 **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: LAKE MARGRETHE-15
Matrix: Surface Water
Date Collected: 01-Apr-20 12:15

Laboratory Data

Lab Sample: 2000792-01
Date Received: 07-Apr-20 09:10
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
PFPrS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
3:3 FTCA	ND	1.66	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFPeA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFBS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-4:2 FTS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFHxA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFPeS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
HFPO-DA	ND	2.50	3.11	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
5:3 FTCA	ND	2.50	3.11	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFHpA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
ADONA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFHxS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
Br-PFHxS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
Total PFHxS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-6:2 FTS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFOA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
Br-PFOA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
Total PFOA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
PFecHS	ND	2.50	3.11	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFHpS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
7:3 FTCA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFNA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFOSA	7.82	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFOS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
Br-PFOS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
Total PFOS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
9Cl-PF3ONS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFDA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-8:2FTS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFNS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-MeFOSAA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
Br-MeFOSAA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
Total MeFOSAA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-EtFOSAA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
Br-EtFOSAA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
Total EtFOSAA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFUnA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1

Sample ID: SW2004011215-15

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: LAKE MARGRETHE-15

Matrix: Surface Water
Date Collected: 01-Apr-20 12:15

Laboratory Data

Lab Sample: 2000792-01
Date Received: 07-Apr-20 09:10

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
11Cl-PF3OUdS	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
10:2 FTS	ND	2.50	3.11	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFDoA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFTrDA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
PFDoS	ND	2.50	3.11	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFTeDA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-MeFOSA	ND	4.58	10.4	20.8		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-EtFOSA	ND	4.58	10.4	20.8		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-EtFOSE	ND	4.58	10.4	20.8		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-MeFOSE	ND	4.58	10.4	20.8		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFHxDA	ND	1.42	2.07	4.16		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
L-PFODA	ND	3.19	7.78	10.4		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	41.4	60 - 130	H	B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C3-PFPeA	IS	111	60 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C3-PFBS	IS	94.4	60 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C2-4:2 FTS	IS	97.0	40 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C2-PFHxA	IS	105	70 - 130		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C4-PFHpA	IS	109	60 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C3-PFHxS	IS	101	60 - 130		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C2-6:2 FTS	IS	117	40 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C2-PFOA	IS	96.1	60 - 130		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C5-PFNA	IS	98.9	50 - 130		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C8-PFOSA	IS	104	20 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C8-PFOS	IS	103	60 - 130		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C2-PFDA	IS	97.9	60 - 130		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C2-8:2 FTS	IS	98.6	40 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
d3-MeFOSAA	IS	103	50 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
d5-EtFOSAA	IS	103	50 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C2-PFUnA	IS	95.8	60 - 130		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C2-10:2 FTS	IS	92.1	40 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C2-PFDoA	IS	90.5	30 - 130		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
d3-MeFOSA	IS	35.5	10 - 130		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C2-PFTeDA	IS	76.9	20 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
d5-EtFOSA	IS	31.8	10 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C2-PFHxDA	IS	24.1	20 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
d7-MeFOSE	IS	85.0	10 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1

Sample ID: SW2004011215-15 **PFAS Isotope Dilution Method**

Client Data

Name:	AECOM	Matrix:	Surface Water
Project:	EGLE Foam Study	Date Collected:	01-Apr-20 12:15
Location:	LAKE MARGRETHE-15		

Laboratory Data

Lab Sample:	2000792-01	Column:	BEH C18
Date Received:	07-Apr-20 09:10		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d9-EtFOSE	IS	87.8	10 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1
13C3-HFPO-DA	IS	102	50 - 150		B0D0336	01-May-20	0.241 L	04-May-20 05:22	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 2000792 Temp: 3.9 °C
Storage ID: R-13/WR-2 Storage Secured: Yes [X] No [ ]

Project ID: EGLE Foam Study PO#: 60612688 Sampler: Michal Kosciarz (name)

TAT (check one): Standard: [X] 21 days; Rush (surcharge may apply): [ ] 14 days [ ] 7 days Specify:

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
Mike Jury	EGLE	401 Ketchum, Suite B	Bay City	MI	989-894-6255	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Michal Kosciarz	04/06/20	1500	Ashweeni Prakash	04/07/20	0910
Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

ATTN:

Method of Shipment: FedEx
Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	Mod. EPA Method 537 PFOA/ PFOS	UCMR3 PFAS List:6	537 List: 14	PFAS List of 24	Other: Please List Below	PFAS Full list of 41 Branch and Linear	EPA Method 537(DW only) PFOA/ PFOS	UCMR3 PFAS List:6	PFAS List: 14	Comments
SW2004011215-15	4/1/20	1215	LAKE MARGRETHE-15	2	P	WS						X				Creek off across from 2361 Danish Landing Road Surface

Special Instructions/Comments:

Send Results and Acknowledgements to:
JuryM1@aecom.com, Barry.Harding@aecom.com, Nic.Ropotos@aecom.com, Dorin.Bogdan@aecom.com, Matt.Vandereide@aecom.com, Robert.Kennedy@aecom.com, Geoffrey.Groff@aecom.com, Jim.Carbone@aecom.com, James.Buzzell@aecom.com

SEND DOCUMENTATION AND RESULTS TO:
Name: Mike Jury
Company: EGLE
Address: 401 Ketchum, Suite B
City: Bay City State: MI Zip: 48708
Phone: 989-894-6255 Fax:
Email: juryM1@michigan.gov

Container Types: P= HDPE, PJ= HDPE Jar, O = Other:

Bottle Preservation Type: T = Thiosulfate, TZ = Trizma.

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 2000792 TAT Std

Samples Arrival:	**Date/Time** 04/07/20 0910		**Initials:** tf		**Location:** WR-2 **Shelf/Rack:** MA		
Delivered By:	FedEx	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	Ice		Blue Ice		Dry Ice		None
Temp °C: 3.9 (uncorrected) **Temp °C:** 3.9 (corrected)			**Probe used:** Y / (N)		**Thermometer ID:** IR-3		

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?			✓
Airbill Trk # 3916 7235 2489	✓		
Shipping Documentation Present?	✓		
Shipping Container: Vista / (Client) / Retain / (Return) / Dispose			
Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	**Date/Time** 04/07/20 1104	**Initials:** KS	**Location:** R-13 / WR-2 **Shelf/Rack:** A-2 / E-3	
COC Anomaly/Sample Acceptance Form completed?			✓	✓

Comments:

CoC/Label Reconciliation Report WO# 2000792

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
2000792-01	A SW2004011215-15	☑	LAKE MARGRETHE-15	01-Apr-20 12:15	☑	HDPE Bottle, 250 mL	Aqueous	
2000792-01	B SW2004011215-15	☑	LAKE MARGRETHE-15	01-Apr-20 12:15	☑	HDPE Bottle, 250 mL	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		
Preservation Documented: Na2S2O3 Trizma None Other			✓
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓

Comments:

Verifed by/Date: MB 4/7/20

May 08, 2020

Vista Work Order No. 2000864

Mr. Dorin Bogdan
AECOM
3950 Sparks Drive SE
Grand Rapids, MI 49546

Dear Mr. Bogdan,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on April 14, 2020 under your Project Name 'EGLE Foam Study'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Work Order No. 2000864
Case Narrative

Sample Condition on Receipt:

One collapsed foam sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

PFAS Isotope Dilution Method

The sample contained particulate and was centrifuged prior to extraction.

The sample was extracted and analyzed for a selected list of PFAS using Vista's PFAS Isotope Dilution Method (Modified EPA Method 537). The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The sample was extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The recoveries of PFHpS and PFDoS were greater than 130% in the OPR. These analytes were not detected in the sample. The recoveries of all other analytes were within the method acceptance criteria.

Results for PFHxDA and PFODA could not be reported.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
2000864-01	FM2004081320-16	PFAS Isotope Dilution Method	d3-MeFOSAA	H	30.1
2000864-01	FM2004081320-16	PFAS Isotope Dilution Method	d5-EtFOSAA	H	39.0
2000864-01	FM2004081320-16	PFAS Isotope Dilution Method	13C2-PFUnA	H	51.7
2000864-01	FM2004081320-16	PFAS Isotope Dilution Method	13C2-PFDoA	H	20.3
2000864-01	FM2004081320-16	PFAS Isotope Dilution Method	13C2-PFTeDA	H	5.10
2000864-01	FM2004081320-16	PFAS Isotope Dilution Method	d5-EtFOSA	H	7.80

H = Recovery was outside laboratory acceptance criteria.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2000864-01	FM2004081320-16	08-Apr-20 13:20	14-Apr-20 08:57	HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data
Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data
Lab Sample: B0D0170-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
PFPrS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
3:3 FTCA	ND	1.60	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFPeA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFBS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-4:2 FTS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFHxA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFPeS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
HFPO-DA	ND	2.41	3.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
5:3 FTCA	ND	2.41	3.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFHpA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
ADONA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFHxS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
Br-PFHxS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
Total PFHxS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-6:2 FTS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFOA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
Br-PFOA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
Total PFOA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
PFecHS	ND	2.41	3.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFHpS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
7:3 FTCA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFNA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFOSA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFOS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
Br-PFOS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
Total PFOS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFDA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-8:2FTS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFNS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-MeFOSAA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
Total MeFOSAA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-EtFOSAA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
Total EtFOSAA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFUnA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0170-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
10:2 FTS	ND	2.41	3.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFDoA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFTrDA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
PFDoS	ND	2.41	3.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-PFTeDA	ND	1.37	2.00	4.00		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-MeFOSA	ND	4.41	10.0	20.0		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-EtFOSA	ND	4.41	10.0	20.0		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-EtFOSE	ND	4.41	10.0	20.0		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
L-MeFOSE	ND	4.41	10.0	20.0		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	87.3	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C3-PFPeA	IS	94.3	60 - 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C3-PFBS	IS	95.7	60 - 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C2-4:2 FTS	IS	90.7	40 - 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C2-PFHxA	IS	98.3	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C4-PFHpA	IS	91.7	60 - 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C3-PFHxS	IS	117	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C2-6:2 FTS	IS	94.0	40 - 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C2-PFOA	IS	96.4	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C5-PFNA	IS	95.7	50 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C8-PFOSA	IS	55.5	20 - 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C8-PFOS	IS	90.9	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C2-PFDA	IS	87.7	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C2-8:2 FTS	IS	90.2	40 - 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
d3-MeFOSAA	IS	88.6	50 - 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
d5-EtFOSAA	IS	78.9	50 - 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C2-PFUnA	IS	95.2	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C2-PFDoA	IS	79.7	30 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
d3-MeFOSA	IS	28.8	10 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C2-PFTeDA	IS	64.5	20 - 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
d5-EtFOSA	IS	29.3	10 - 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
d7-MeFOSE	IS	52.8	10 - 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
d9-EtFOSE	IS	56.9	10 - 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1
13C3-HFPO-DA	IS	90.3	50 - 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:15	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study

Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0170-BS1 Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	40.1	40.0	100	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
PFPrS	49.1	40.0	123	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
3:3 FTCA	25.4	40.0	63.5	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-PFPeA	38.5	40.0	96.1	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-PFBS	41.0	40.0	102	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-4:2 FTS	38.1	40.0	95.1	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-PFHxA	38.3	40.0	95.7	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-PFPeS	35.7	40.0	89.2	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
HFPO-DA	38.3	40.0	95.8	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
5:3 FTCA	31.2	40.0	77.9	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-PFHpA	38.7	40.0	96.8	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
ADONA	46.3	40.0	116	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
Total PFHxS	41.1	40.0	103	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-6:2 FTS	42.4	40.0	106	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
Total PFOA	40.1	40.0	100	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
PFecHS	45.0	40.0	113	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-PFHpS	52.8	40.0	132	60 - 130	H	B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
7:3 FTCA	26.4	40.0	66.0	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-PFNA	41.2	40.0	103	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-PFOSA	35.3	40.0	88.2	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
Total PFOS	44.9	40.0	112	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
9Cl-PF3ONS	43.5	40.0	109	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-PFDA	37.3	40.0	93.3	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-8:2FTS	42.3	40.0	106	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-PFNS	47.0	40.0	118	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
Total MeFOSAA	46.7	40.0	117	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
Total EtFOSAA	43.8	40.0	110	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-PFUnA	38.2	40.0	95.5	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-PFDS	47.2	40.0	118	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
11Cl-PF3OUdS	49.8	40.0	125	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
10:2 FTS	33.2	40.0	83.1	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-PFDoA	45.5	40.0	114	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-PFTrDA	40.2	40.0	100	60 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
PFDoS	62.1	40.0	155	60 - 130	H	B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study

Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0170-BS1 Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFTeDA	45.9	40.0	115	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-MeFOSA	220	200	110	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-EtFOSA	196	200	98.1	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-EtFOSE	204	200	102	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
L-MeFOSE	170	200	85.1	70 - 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
Labeled Standards	**Type**		**% Rec**	**Limits**	**Qualifiers**	**Batch**	**Extracted**	**Samp Size**	**Analyzed**	**Dilution**
13C3-PFBA	IS		86.1	60- 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C3-PFPeA	IS		98.2	60- 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C3-PFBS	IS		115	60- 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C2-4:2 FTS	IS		123	40- 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C2-PFHxA	IS		98.5	70- 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C4-PFHpA	IS		93.1	60- 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C3-PFHxS	IS		116	60- 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C2-6:2 FTS	IS		122	40- 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C2-PFOA	IS		93.7	60- 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C5-PFNA	IS		81.9	50- 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C8-PFOSA	IS		70.0	20- 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C8-PFOS	IS		93.0	60- 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C2-PFDA	IS		85.7	60- 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C2-8:2 FTS	IS		115	40- 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
d3-MeFOSAA	IS		74.6	50- 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
d5-EtFOSAA	IS		91.2	50- 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C2-PFUnA	IS		91.5	60- 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C2-PFDoA	IS		62.2	30- 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
d3-MeFOSA	IS		26.5	10- 130		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C2-PFTeDA	IS		46.6	20- 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
d5-EtFOSA	IS		28.5	10- 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
d7-MeFOSE	IS		53.1	10- 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
d9-EtFOSE	IS		58.0	10- 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1
13C3-HFPO-DA	IS		101	50- 150		B0D0170	19-Apr-20	0.250 L	27-Apr-20 23:26	1

Sample ID: FM2004081320-16

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: CEDAR LAKE-16

Matrix: Foam
Date Collected: 08-Apr-20 13:20

Laboratory Data

Lab Sample: 2000864-01
Date Received: 14-Apr-20 08:57

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
PFPrS	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
3:3 FTCA	ND	10.5	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFPeA	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFBS	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-4:2 FTS	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFHxA	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFPeS	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
HFPO-DA	ND	15.9	19.7	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
5:3 FTCA	ND	15.9	19.7	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFHpA	17.0	9.02	13.2	26.3	J	B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
ADONA	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFHxS	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
Br-PFHxS	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
Total PFHxS	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-6:2 FTS	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFOA	71.9	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
Br-PFOA	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
Total PFOA	76.2	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
PFecHS	ND	15.9	19.7	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFHpS	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
7:3 FTCA	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFNA	956	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFOSA	40.8	9.02	13.2	26.3	Q	B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFOS	3580	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
Br-PFOS	3680	9.02	13.2	26.3	Q	B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
Total PFOS	7260	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
9Cl-PF3ONS	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFDA	3100	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-8:2FTS	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFNS	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-MeFOSAA	295	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
Br-MeFOSAA	408	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
Total MeFOSAA	703	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-EtFOSAA	1020	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
Br-EtFOSAA	526	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
Total EtFOSAA	1550	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFUnA	4700	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1

Sample ID: FM2004081320-16

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: CEDAR LAKE-16

Matrix: Foam
Date Collected: 08-Apr-20 13:20

Laboratory Data

Lab Sample: 2000864-01
Date Received: 14-Apr-20 08:57

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
11Cl-PF3OUdS	ND	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
10:2 FTS	ND	15.9	19.7	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFDoA	1040	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFTrDA	144	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
PFDoS	ND	15.9	19.7	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-PFTeDA	40.5	9.02	13.2	26.3		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-MeFOSA	ND	29.0	65.8	132		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-EtFOSA	ND	29.0	65.8	132		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-EtFOSE	ND	29.0	65.8	132		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
L-MeFOSE	ND	29.0	65.8	132		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	61.9	60 - 130		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C3-PFPeA	IS	80.4	60 - 150		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C3-PFBS	IS	97.2	60 - 150		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C2-4:2 FTS	IS	107	40 - 150		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C2-PFHxA	IS	87.4	70 - 130		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C4-PFHpA	IS	78.0	60 - 150		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C3-PFHxS	IS	106	60 - 130		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C2-6:2 FTS	IS	101	40 - 150		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C2-PFOA	IS	94.0	60 - 130		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C5-PFNA	IS	82.4	50 - 130		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C8-PFOSA	IS	50.9	20 - 150		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C8-PFOS	IS	86.0	60 - 130		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C2-PFDA	IS	74.1	60 - 130		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C2-8:2 FTS	IS	59.5	40 - 150		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
d3-MeFOSAA	IS	30.1	50 - 150	H	B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
d5-EtFOSAA	IS	39.0	50 - 150	H	B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C2-PFUnA	IS	51.7	60 - 130	H	B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C2-PFDoA	IS	20.3	30 - 130	H	B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
d3-MeFOSA	IS	13.9	10 - 130		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C2-PFTeDA	IS	5.10	20 - 150	H	B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
d5-EtFOSA	IS	7.80	10 - 150	H	B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
d7-MeFOSE	IS	14.7	10 - 150		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
d9-EtFOSE	IS	11.7	10 - 150		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1
13C3-HFPO-DA	IS	85.7	50 - 150		B0D0170	19-Apr-20	0.0380 L	27-Apr-20 23:36	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Vista Analytical Laboratory

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CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 2000864 Temp: 1.3 °C
Storage ID: R-13 Storage Secured: Yes [X] No [ ]

Project ID: **EGLE Foam Study** PO#: **60612688** Sampler: **Stanley Krenz** (name)

TAT (check one): Standard: [X] 21 days; Rush (surcharge may apply): [ ] 14 days [ ] 7 days Specify:

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
Mike Jury	**EGLE**	**401 Ketchum, Suite B**	**Bay City**	**MI**	**989-894-6255**	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Stanley Krenz	**4/10/2020**	**1500**	**Michal Kosciarz**	**4/10/2020**	**1500**
Michal Kosciarz	**4/13/2020**	**1800**	William R Wright	4/14/20	08:57

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

Method of Shipment: FedEx

Tracking No.:

ATTN:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	Mod. EPA Method 537: PFOA/ PFOS	UCMR3 PFAS List 6	537 List: 14	PFAS List of 24	Other: Please List Below	PFAS Full list of 41 Branch and Linear	EPA Method 537(DW only): PFOA/ PFOS	UCMR3 PFAS List 6	PFAS List: 14	Comments
FM2004081320-16	**4/8/20**	**1320**	**CEDAR LAKE-16**	**1**	**P**	**F**						**x**				**Collapsed foam - high concentrations expected; 40mL**

Special Instructions/Comments:

Send Results and Acknowledgements to:

JuryM1@aecom.com Barry.Harding@aecom.com
Nic.Ropotos@aecom.com Dorin.Bogdan@aecom.com
Matt.Vandereide@aecom.com Robert.Kennedy@aecom.com
Geoffrey.Groff@aecom.com Jim.Carbone@aecom.com James.Buzzell@aecom.com

SEND DOCUMENTATION AND RESULTS TO:

Name: **Mike Jury**
Company: **EGLE**
Address: **401 Ketchum, Suite B**
City: **Bay City** State: **MI** Zip: **48708**
Phone: **989-894-6255** Fax:
Email: juryM1@michigan.gov

Container Types: P= HDPE, PJ= HDPE Jar
O = Other:

Bottle Preservation Type: T = Thiosulfate,
TZ = Trizma:

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 2000864 TAT std

Samples Arrival:	**Date/Time** 4/14/20 08:57		**Initials:** WRW		**Location:** WR-2 **Shelf/Rack:** NA		
Delivered By:	FedEx	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	Ice		Blue Ice		Dry Ice		None
Temp °C: 1.3 (uncorrected) **Temp °C:** 1.3 (corrected)			**Probe used: Y / N**		**Thermometer ID:** IR-3		

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?		✓	X
Airbill - Trk # 3918 5934 9094	✓	✓	
Shipping Documentation Present?	✓		

Shipping Container	Vista	Client	Retain	Return	Dispose

Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	**Date/Time** 04/14/20 1029	**Initials:** RS	**Location:** R-13 **Shelf/Rack:** A-2		
COC Anomaly/Sample Acceptance Form completed?				✓	✓

Comments:

CoC/Label Reconciliation Report WO# 2000864

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
2000864-01	A FM2004081320-16	☑	CEDAR LAKE-16	08-Apr-20 13:20	☑	HDPE Bottle, 250 mL	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		
Preservation Documented: Na2S2O3 Trizma (None) Other		✓	✓
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓

Comments:

Verifed by/Date: KS 04/14/20

May 05, 2020

Vista Work Order No. 2000865

Mr. Dorin Bogdan
AECOM
3950 Sparks Drive SE
Grand Rapids, MI 49546

Dear Mr. Bogdan,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on April 14, 2020 under your Project Name 'EGLE Foam Study'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Work Order No. 2000865
Case Narrative

Sample Condition on Receipt:

One surface water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A collection time discrepancy was noted for the sample. The collection time has been reported as listed on the CoC.

Analytical Notes:

PFAS Isotope Dilution Method

The sample was extracted and analyzed for a selected list of PFAS using Vista's PFAS Isotope Dilution Method (Modified EPA Method 537). The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The sample was extracted and analyzed within the method hold times. The sample was re-extracted outside the method hold time. The results from the re-extraction have been reported.

Quality Control

The Initial Calibration met the method acceptance criteria. The recoveries of 5:3 FTCA and 7:3 FTCA were greater than 130% in one of the continuing calibration standards. This analyte was not detected in the associated sample. The recoveries of all other analytes were within the acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The recovery of PFODA was below 40% in the OPR. The reported sample result for this analyte may be biased low. The recoveries of all other analytes were within the acceptance criteria.

The labeled standard recoveries for all QC and field samples were within the acceptance criteria.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2000865-01	SW2004081325-16	08-Apr-20 13:20	14-Apr-20 08:57	HDPE Bottle, 250 mL HDPE Bottle, 250 mL

Vista Project: 2000865

Client Project: EGLE Foam Study

ANALYTICAL RESULTS

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data
Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data
Lab Sample: B0D0336-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
PFPrS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
3:3 FTCA	ND	1.60	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFPeA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFBS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-4:2 FTS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFHxA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFPeS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
HFPO-DA	ND	2.41	3.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
5:3 FTCA	ND	2.41	3.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFHpA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
ADONA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFHxS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Br-PFHxS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Total PFHxS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-6:2 FTS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFOA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Br-PFOA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Total PFOA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
PFecHS	ND	2.41	3.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFHpS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
7:3 FTCA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFNA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFOSA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFOS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Br-PFOS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Total PFOS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
9Cl-PF3ONS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFDA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-8:2FTS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFNS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-MeFOSAA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Total MeFOSAA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-EtFOSAA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
Total EtFOSAA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFUnA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0336-BLK1
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
11Cl-PF3OUdS	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
10:2 FTS	ND	2.41	3.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFDoA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFTrDA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
PFDoS	ND	2.41	3.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFTeDA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-MeFOSA	ND	4.41	10.0	20.0		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-EtFOSA	ND	4.41	10.0	20.0		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-EtFOSE	ND	4.41	10.0	20.0		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-MeFOSE	ND	4.41	10.0	20.0		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFHxDA	ND	1.37	2.00	4.00		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
L-PFODA	ND	3.07	7.50	10.0		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.6	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C3-PFPeA	IS	104	60 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C3-PFBS	IS	100	60 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-4:2 FTS	IS	112	40 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-PFHxA	IS	95.9	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C4-PFHpA	IS	104	60 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C3-PFHxS	IS	103	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-6:2 FTS	IS	102	40 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-PFOA	IS	105	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C5-PFNA	IS	94.8	50 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C8-PFOSA	IS	69.3	20 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C8-PFOS	IS	90.8	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-PFDA	IS	87.8	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-8:2 FTS	IS	84.7	40 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
d3-MeFOSAA	IS	74.2	50 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
d5-EtFOSAA	IS	63.9	50 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-PFUnA	IS	77.5	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-10:2 FTS	IS	73.5	40 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-PFDoA	IS	76.0	30 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
d3-MeFOSA	IS	23.5	10 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-PFTeDA	IS	87.8	20 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
d5-EtFOSA	IS	19.9	10 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C2-PFHxDA	IS	65.1	20 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
d7-MeFOSE	IS	44.5	10 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1

Sample ID: Method Blank **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0336-BLK1
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d9-EtFOSE	IS	44.7	10 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1
13C3-HFPO-DA	IS	93.3	50 - 150		B0D0336	01-May-20	0.250 L	04-May-20 03:16	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study

Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0336-BS1 Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	40.6	40.0	102	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
PFPrS	50.0	40.0	125	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
3:3 FTCA	49.7	40.0	124	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFPeA	41.3	40.0	103	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFBS	46.6	40.0	117	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-4:2 FTS	34.5	40.0	86.2	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFHxA	43.1	40.0	108	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFPeS	49.6	40.0	124	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
HFPO-DA	43.9	40.0	110	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
5:3 FTCA	42.0	40.0	105	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFHpA	43.4	40.0	109	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
ADONA	40.1	40.0	100	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
Total PFHxS	43.7	40.0	109	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-6:2 FTS	37.1	40.0	92.7	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
Total PFOA	46.7	40.0	117	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
PFecHS	45.1	40.0	113	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFHpS	44.0	40.0	110	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
7:3 FTCA	37.3	40.0	93.2	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFNA	43.2	40.0	108	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFOSA	38.3	40.0	95.7	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
Total PFOS	44.1	40.0	110	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
9Cl-PF3ONS	40.3	40.0	101	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFDA	39.5	40.0	98.7	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-8:2FTS	42.5	40.0	106	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFNS	39.8	40.0	99.5	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
Total MeFOSAA	40.8	40.0	102	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
Total EtFOSAA	40.1	40.0	100	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFUnA	41.8	40.0	105	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFDS	37.0	40.0	92.4	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
11Cl-PF3OUdS	50.4	40.0	126	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
10:2 FTS	44.5	40.0	111	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFDoA	43.8	40.0	109	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFTrDA	46.5	40.0	116	60 - 130	Q	B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
PFDoS	41.4	40.0	103	60 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study

Matrix: Aqueous

Laboratory Data

Lab Sample: B0D0336-BS1 Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFTeDA	43.0	40.0	107	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-MeFOSA	212	200	106	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-EtFOSA	205	200	102	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-EtFOSE	204	200	102	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-MeFOSE	211	200	106	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFHxDA	44.3	40.0	111	70 - 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
L-PFODA	9.18	40.0	22.9	40 - 130	J, H	B0D0336	01-May-20	0.250 L	04-May-20 03:27	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	98.9	60- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C3-PFPeA	IS	107	60- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C3-PFBS	IS	90.4	60- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-4:2 FTS	IS	103	40- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-PFHxA	IS	103	70- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C4-PFHpA	IS	103	60- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C3-PFHxS	IS	102	60- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-6:2 FTS	IS	99.1	40- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-PFOA	IS	89.7	60- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C5-PFNA	IS	95.4	50- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C8-PFOSA	IS	96.3	20- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C8-PFOS	IS	94.6	60- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-PFDA	IS	98.9	60- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-8:2 FTS	IS	98.9	40- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
d3-MeFOSAA	IS	88.2	50- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
d5-EtFOSAA	IS	88.6	50- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-PFUnA	IS	90.8	60- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-10:2 FTS	IS	83.6	40- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-PFDoA	IS	80.3	30- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
d3-MeFOSA	IS	35.6	10- 130		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-PFTeDA	IS	87.9	20- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
d5-EtFOSA	IS	32.1	10- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C2-PFHxDA	IS	36.5	20- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
d7-MeFOSE	IS	67.6	10- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
d9-EtFOSE	IS	71.2	10- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1
13C3-HFPO-DA	IS	91.9	50- 150		B0D0336	01-May-20	0.250 L	04-May-20 03:27	1

Sample ID: SW2004081325-16 **PFAS Isotope Dilution Method**

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: CEDAR LAKE-16
Matrix: Surface Water
Date Collected: 08-Apr-20 13:20

Laboratory Data

Lab Sample: 2000865-01
Date Received: 14-Apr-20 08:57
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	4.11	1.43	2.09	4.19	J	B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
PFPrS	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
3:3 FTCA	ND	1.67	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFPeA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFBS	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-4:2 FTS	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFHxA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFPeS	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
HFPO-DA	ND	2.52	3.14	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
5:3 FTCA	ND	2.52	3.14	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFHpA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
ADONA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFHxS	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
Br-PFHxS	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
Total PFHxS	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-6:2 FTS	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFOA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
Br-PFOA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
Total PFOA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
PFecHS	ND	2.52	3.14	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFHpS	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
7:3 FTCA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFNA	1.46	1.43	2.09	4.19	J	B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFOSA	6.02	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFOS	2.63	1.43	2.09	4.19	J	B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
Br-PFOS	2.80	1.43	2.09	4.19	J	B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
Total PFOS	5.43	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
9Cl-PF3ONS	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFDA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-8:2FTS	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFNS	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-MeFOSAA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
Br-MeFOSAA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
Total MeFOSAA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-EtFOSAA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
Br-EtFOSAA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
Total EtFOSAA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFUnA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1

Sample ID: SW2004081325-16

PFAS Isotope Dilution Method

Client Data

Name: AECOM
Project: EGLE Foam Study
Location: CEDAR LAKE-16

Matrix: Surface Water
Date Collected: 08-Apr-20 13:20

Laboratory Data

Lab Sample: 2000865-01
Date Received: 14-Apr-20 08:57

Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFDS	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
11Cl-PF3OUdS	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
10:2 FTS	ND	2.52	3.14	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFDoA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFTrDA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
PFDoS	ND	2.52	3.14	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFTeDA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-MeFOSA	ND	4.61	10.5	20.9		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-EtFOSA	ND	4.61	10.5	20.9		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-EtFOSE	ND	4.61	10.5	20.9		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-MeFOSE	ND	4.61	10.5	20.9		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFHxDA	ND	1.43	2.09	4.19		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
L-PFODA	ND	3.22	7.85	10.5		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	72.5	60 - 130		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C3-PFPeA	IS	107	60 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C3-PFBS	IS	91.6	60 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C2-4:2 FTS	IS	97.2	40 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C2-PFHxA	IS	99.6	70 - 130		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C4-PFHpA	IS	108	60 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C3-PFHxS	IS	101	60 - 130		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C2-6:2 FTS	IS	112	40 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C2-PFOA	IS	91.5	60 - 130		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C5-PFNA	IS	101	50 - 130		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C8-PFOSA	IS	104	20 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C8-PFOS	IS	95.7	60 - 130		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C2-PFDA	IS	97.9	60 - 130		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C2-8:2 FTS	IS	91.0	40 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
d3-MeFOSAA	IS	96.5	50 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
d5-EtFOSAA	IS	96.3	50 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C2-PFUnA	IS	85.8	60 - 130		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C2-10:2 FTS	IS	86.3	40 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C2-PFDoA	IS	95.6	30 - 130		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
d3-MeFOSA	IS	28.6	10 - 130		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C2-PFTeDA	IS	85.5	20 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
d5-EtFOSA	IS	24.5	10 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C2-PFHxDA	IS	45.9	20 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
d7-MeFOSE	IS	73.0	10 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1

Sample ID: SW2004081325-16 **PFAS Isotope Dilution Method**

Client Data

Name:	AECOM	Matrix:	Surface Water
Project:	EGLE Foam Study	Date Collected:	08-Apr-20 13:20
Location:	CEDAR LAKE-16		

Laboratory Data

Lab Sample:	2000865-01	Column:	BEH C18
Date Received:	14-Apr-20 08:57		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
d9-EtFOSE	IS	72.3	10 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1
13C3-HFPO-DA	IS	91.0	50 - 150		B0D0336	01-May-20	0.239 L	04-May-20 05:33	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
Results reported to the DL.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Page 1 of 1

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 2000865 Temp: 1.3 °C
Storage ID: R-13/WE-2 Storage Secured: Yes ☒ No ☐

Project ID: EGLE Foam Study PO#: 60612688 Sampler: Stanley Krenz (name)

TAT (check one): Standard: X 21 days; Rush (surcharge may apply): ☐ 14 days ☐ 7 days Specify:

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
Mike Jury	EGLE	401 Ketchum, Suite B	Bay City	MI	989-894-6255	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Stanley Krenz	4/10/2020	1500	Michal Kosciarz	4/10/2020	1500
Michal Kosciarz	4/13/2020	1800	William R. Wright	4/14/20	08:57

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

ATTN:

Method of Shipment: FedEx
Tracking No.:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	Mod. EPA Method 537: PFOA/ PFOS	UCMR3 PFAS List:6	537 List: 14	PFAS List of 24	Other: Please List Below	PFAS Full list of 41 Branch and Linear	EPA Method 537(DW only): PFOA/ PFOS	UCMR3 PFAS List:6	PFAS List: 14	Comments
SW2004081325-16	4/8/20	1320	CEDAR LAKE-16	2	P	WS						X				

Special Instructions/Comments:

Send Results and Acknowledgements to:
JuryM1@aecom.com, Barry.Harding@aecom.com, Nic.Ropotos@aecom.com, Dorin.Bogdan@aecom.com, Matt.Vandereide@aecom.com, Robert.Kennedy@aecom.com, Geoffrey.Groff@aecom.com, Jim.Carbone@aecom.com, James.Buzzell@aecom.com

SEND DOCUMENTATION AND RESULTS TO:
Name: Mike Jury
Company: EGLE
Address: 401 Ketchum, Suite B
City: Bay City State: MI Zip: 48708
Phone: 989-894-6255 Fax:
Email: juryM1@michigan.gov

Container Types: P= HDPE, PJ= HDPE Jar, O = Other:

Bottle Preservation Type: T = Thiosulfate, TZ = Trizma:

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:

Vista Analytical Laboratory

Sample Log-In Checklist

Vista Work Order #: 2000865 **TAT** std

Samples Arrival:	**Date/Time** 4/14/20 08:57		**Initials:** WRW		**Location:** WR-2 **Shelf/Rack:** NA		
Delivered By:	(FedEx)	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	(Ice)		Blue Ice		Dry Ice		None
Temp °C: 1.3 (uncorrected) **Temp °C:** 1.3 (corrected)			**Probe used: Y / (N)**		**Thermometer ID:** IR-3		

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?		✓	X
Airbill - Trk # 3918 5934 9094	✓		
Shipping Documentation Present?	✓		
Shipping Container: Vista / (Client) / Retain / Return / Dispose		✓	
Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	**Date/Time** 04/14/20 1032	**Initials:** KS	**Location:** R-13 / WR-2 **Shelf/Rack:** A-2 / E-2
COC Anomaly/Sample Acceptance Form completed?	✓		

Comments:

CoC/Label Reconciliation Report WO# 2000865

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
2000865-01	A SW2004081325-16	☑	CEDAR LAKE-16	08-Apr-20 13:20	☐ *	HDPE Bottle, 250 mL	Aqueous	
2000865-01	B SW2004081325-16	☑	CEDAR LAKE-16	08-Apr-20 13:20	☐	HDPE Bottle, 250 mL	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		
Preservation Documented: Na2S2O3 Trizma None Other	✓		
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	✓		

Comments:

* CoC | Sample label
1320 | 1325

Verifed by/Date: KS 04/14/20

Vista Analytical Laboratory

ANOMALY FORM

Vista Work Order 2000865

Initial/Date — The following checked issues were noted during sample receipt and login:

_____ ☐ **1. The samples were received out of temperature at (WI-PHT):** _____
Was Ice present: Yes No Melted Blue Ice

_____ ☐ 2. The Chain-of-Custody (CoC) was not relinquished properly.

_____ ☐ 3. The CoC did not include collection time(s). 00:00 will be used unless notified otherwise.

_____ ☐ 4. The sample(s) did not include a sample collection time. All or Sample Name: _____

_____ ☐ 5. A sample ID discrepancy was found. See the Reconciliation report.
The CoC Sample ID will be used unless notified otherwise.

KS 04/14/20 ☒ 6. A sample date and/or time discrepancy was found. See the Reconciliation report.
The CoC Sample date/time will be used unless notified otherwise.

_____ ☐ **7. The CoC did not include a sample matrix. The following sample matrix will be used:** _____

_____ ☐ **8. Insufficent volume received for analysis. All or Sample Name:** _____

_____ ☐ 9. The backup bottle was received broken. Sample Name: _____

_____ ☐ **10. CoC not received, illegible or destroyed.**

_____ ☐ **11. The sample(s) were received out of holding time. All or Sample Name:** _____

_____ ☐ **12. The CoC did not include an analysis. All or Sample Name:** _____

_____ ☐ **13. Sample(s) received without collection date. All or Sample Name:** _____

_____ ☐ **14. Sample(s) not received. All or Sample Name:** _____

_____ ☐ **15. Sample(s) received broken. All or Sample Name:** _____

_____ ☐ **16. An incorrect container-type was used. All or Sample Name:** _____

_____ ☐ 17. Other:

Bolded items require sign-off

Client Contacted: _____

Date of Contact: _____

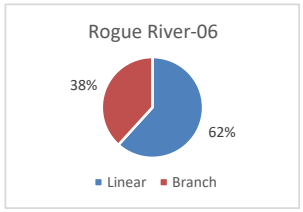
Vista Client Manager: _____

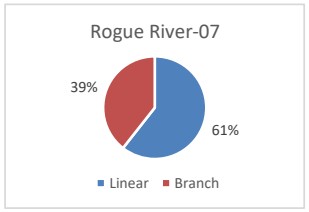
Resolution:

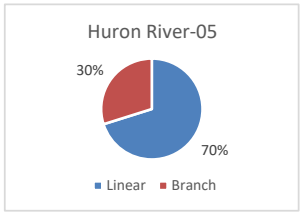
Appendix B

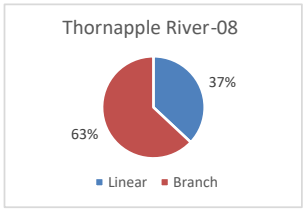
Appendix B
B/L Ratio in SWF and Surface Water PFOS Surface Water Foam Study

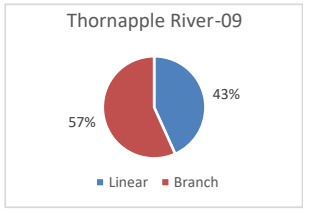
SWF PFOS



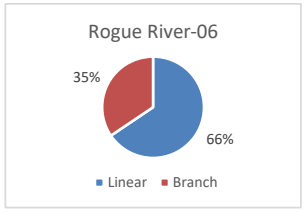


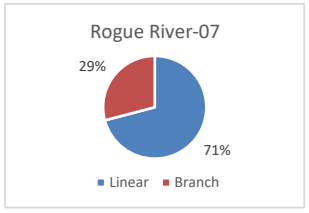


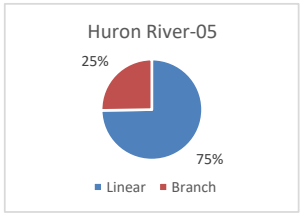


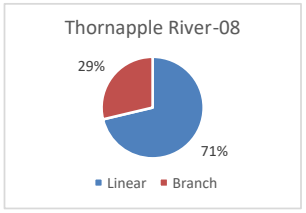


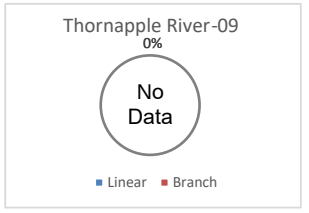
SURFACE WATER PFOS



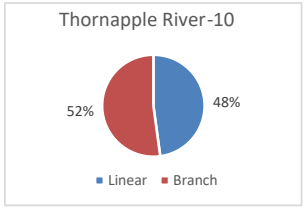


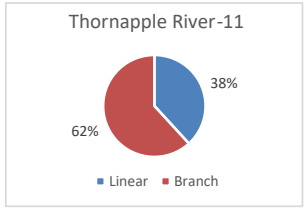


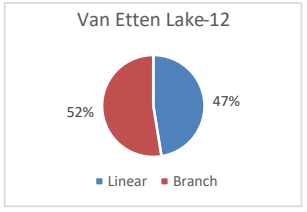


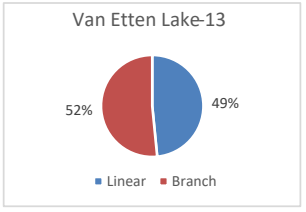


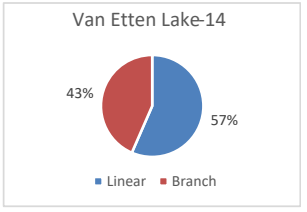
SWF PFOS



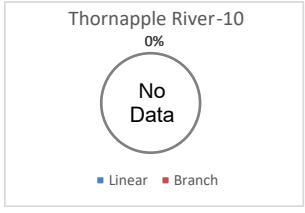


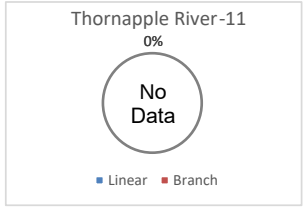


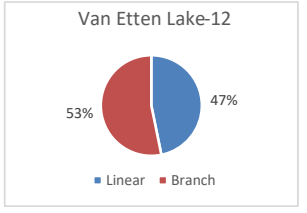


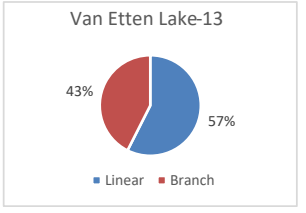


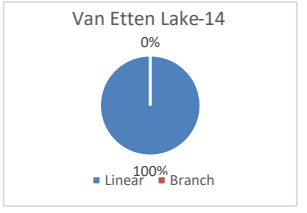
SURFACE WATER PFOS



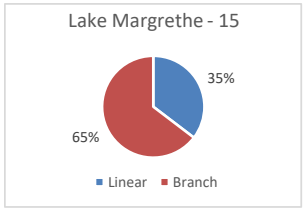


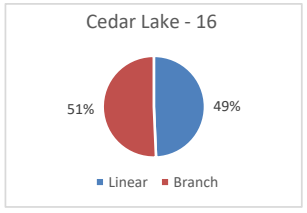




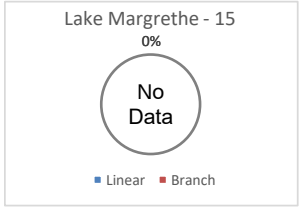


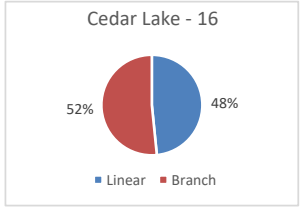
SWF PFOS





SURFACE WATER PFOS





Appendix C

ZYMO RESEARCH

ZymoBIOMICS® Service Report: Shotgun Metagenomic Sequencing

Table of Contents

1. Workflow Checklist

Sample Received	✓
Sample Quality Evaluated	✓
Sample Prepared for Sequencing	✓
Next-Gen Sequencing	✓
Sequence Quality Check	✓
Bioinformatics Processing	✓
Data/Results	✓

ZYMO RESEARCH CORP.
Phone: (949) 679-1190 ▪ Toll Free: (888) 882-9682 ▪ Fax: (949) 266-9452
services@zymoresearch.com ▪ info@zymoresearch.com ▪ www.zymoresearch.com

ZYMO RESEARCH

2. Methods

The samples were processed and analyzed with the ZymoBIOMICS® Shotgun Metagenomic Sequencing Service (Zymo Research, Irvine, CA).

DNA Extraction: If DNA extraction was performed, one of three different DNA extraction kits was used depending on the sample type and sample volume and were used according to the manufacturer's instructions, unless otherwise stated. The kit used in this project is marked below.

☐ ZymoBIOMICS® DNA Miniprep Kit (Zymo Research, Irvine, CA)

☐ ZymoBIOMICS® DNA Microprep Kit (Zymo Research, Irvine, CA)

☒ ZymoBIOMICS®-96 MagBead DNA Kit (Zymo Research, Irvine, CA)

☐ N/A (DNA Extraction Not Performed)

Additional Notes: N/A

Library Preparation: Genomic DNA samples were profiled with shotgun metagenomic sequencing. Sequencing libraries were prepared with the option marked below.

☐ KAPA™ HyperPlus Library Preparation Kit (Kapa Biosystems, Wilmington, MA) with up to 100 ng DNA input following the manufacturer's protocol using internal single-index 8 bp barcodes with TruSeq® adapters (Illumina, San Diego, CA)

☒ Nextera® DNA Flex Library Prep Kit (Illumina, San Diego, CA) with up to 100 ng DNA input following the manufacturer's protocol using internal dual-index 8 bp barcodes with Nextera® adapters (Illumina, San Diego, CA)

All libraries were quantified with TapeStation® (Agilent Technologies, Santa Clara, CA) and then pooled in equal abundance. The final pool was quantified using qPCR.

Sequencing: The final library was sequenced on the platform marked below.

☐ HiSeq® (Illumina, San Diego, CA)

☒ NovaSeq® (Illumina, San Diego, CA)

Control Samples: The ZymoBIOMICS® Microbial Community Standard (Zymo Research, Irvine, CA) was used as a positive control for each DNA extraction, if performed. The ZymoBIOMICS® Microbial Community DNA Standard (Zymo Research, Irvine, CA) was used as a positive control for each targeted library preparation. Negative controls (i.e. blank extraction control, blank library preparation control) were included to assess the level of bioburden carried by the wet-lab process.

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Phone: (949) 679-1190 ▪ Toll Free: (888) 882-9682 ▪ Fax: (949) 266-9452
services@zymoresearch.com ▪ info@zymoresearch.com ▪ www.zymoresearch.com

ZYMO RESEARCH

2. Methods

Bioinformatics Analysis: Raw sequence reads were trimmed to remove low quality fractions and adapters with Trimmomatic-0.33 (Bolger et al., 2014): quality trimming by sliding window with 6 bp window size and a quality cutoff of 20, and reads with size lower than 70 bp were removed. Antimicrobial resistance and virulence factor gene identification was performed with the DIAMOND sequence aligner (Buchfink et al., 2015). Microbial composition was profiled with Centrifuge (Kim et al., 2016) using bacterial, viral, fungal, mouse, and human genome datasets. Strain-level abundance information was extracted from the Centrifuge outputs and further analyzed: (1) to perform alpha- and beta-diversity analyses; (2) to create microbial composition barplots with QIIME (Caporaso et al., 2012); (3) to create taxa abundance heatmaps with hierarchical clustering (based on Bray-Curtis dissimilarity); and (4) for biomarker discovery with LEfSe (Segata et al., 2011) with default settings ($p > 0.05$ and LDA effect size > 2).

3. References

Bolger, A.M., Lohse, M., and Usadel, B. (2014) Trimmomatic: a flexible trimmer for Illumina sequence data. *Bioinformatics* **30**: 2114-2120.

Buchfink, B., Xie, C., Huson, D.H. (2015) Fast and sensitive protein alignment using DIAMOND. *Nature Methods* **12**:59-60.

Caporaso, J.G., Kuczynski, J., Stombaugh, J., Bittinger, K., Bushman, F.D., Costello, E.K. et al. (2010) QIIME allows analysis of high-throughput community sequencing data. *Nat Methods* **7**: 335-336.

Kim, D., Song, L., Breitwieser, F.P., Salzberg, S.L. (2016) Centrifuge: rapid and sensitive classification of metagenomic sequences. *Genome Res* **12**:1721-1729.

Segata, N., Izard, J., Waldron, L., Gevers, D., Miropolsky, L., Garrett, W.S., and Huttenhower, C. (2011) Metagenomic biomarker discovery and explanation. *Genome Biol* **12**: R60.

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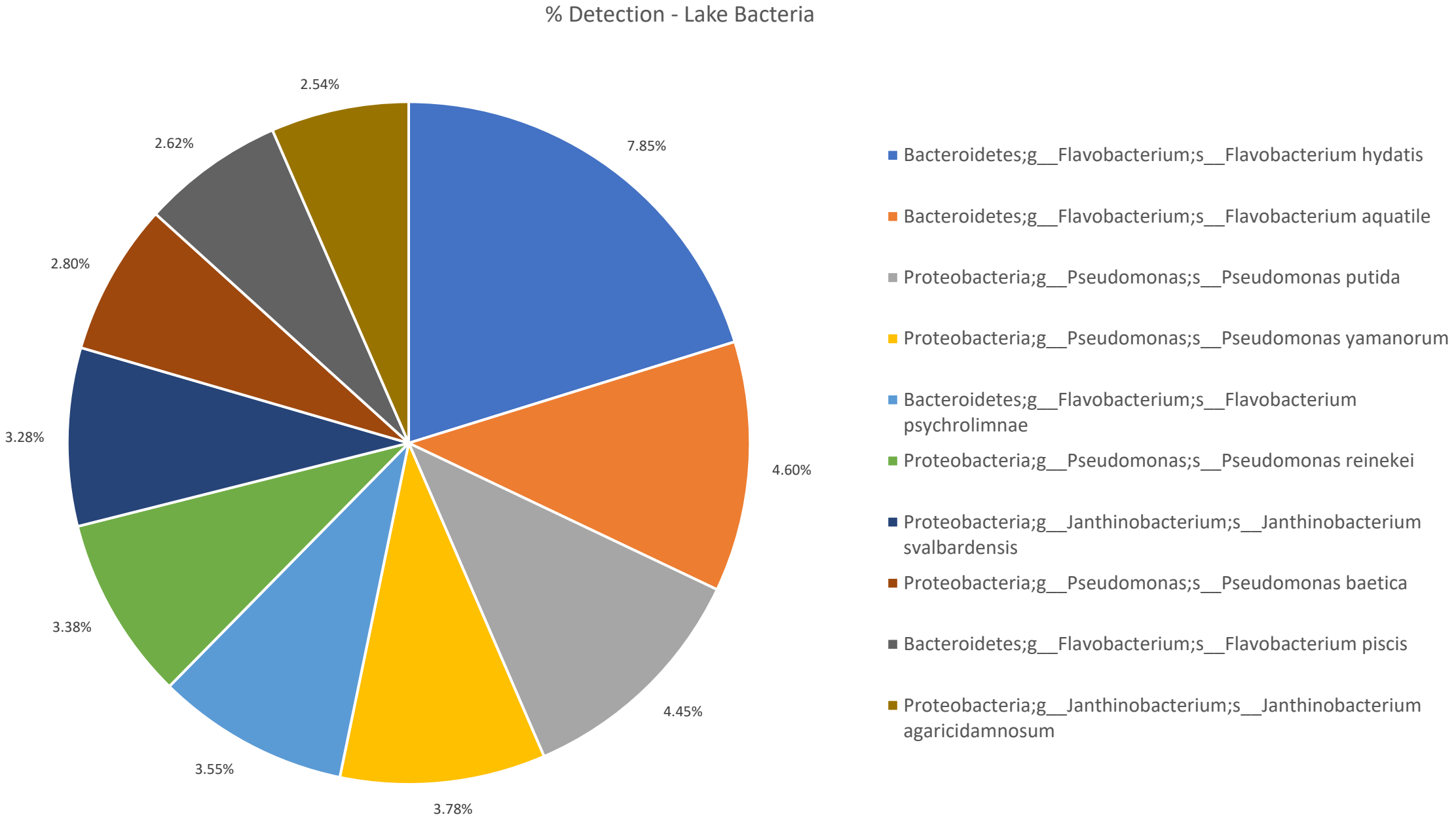
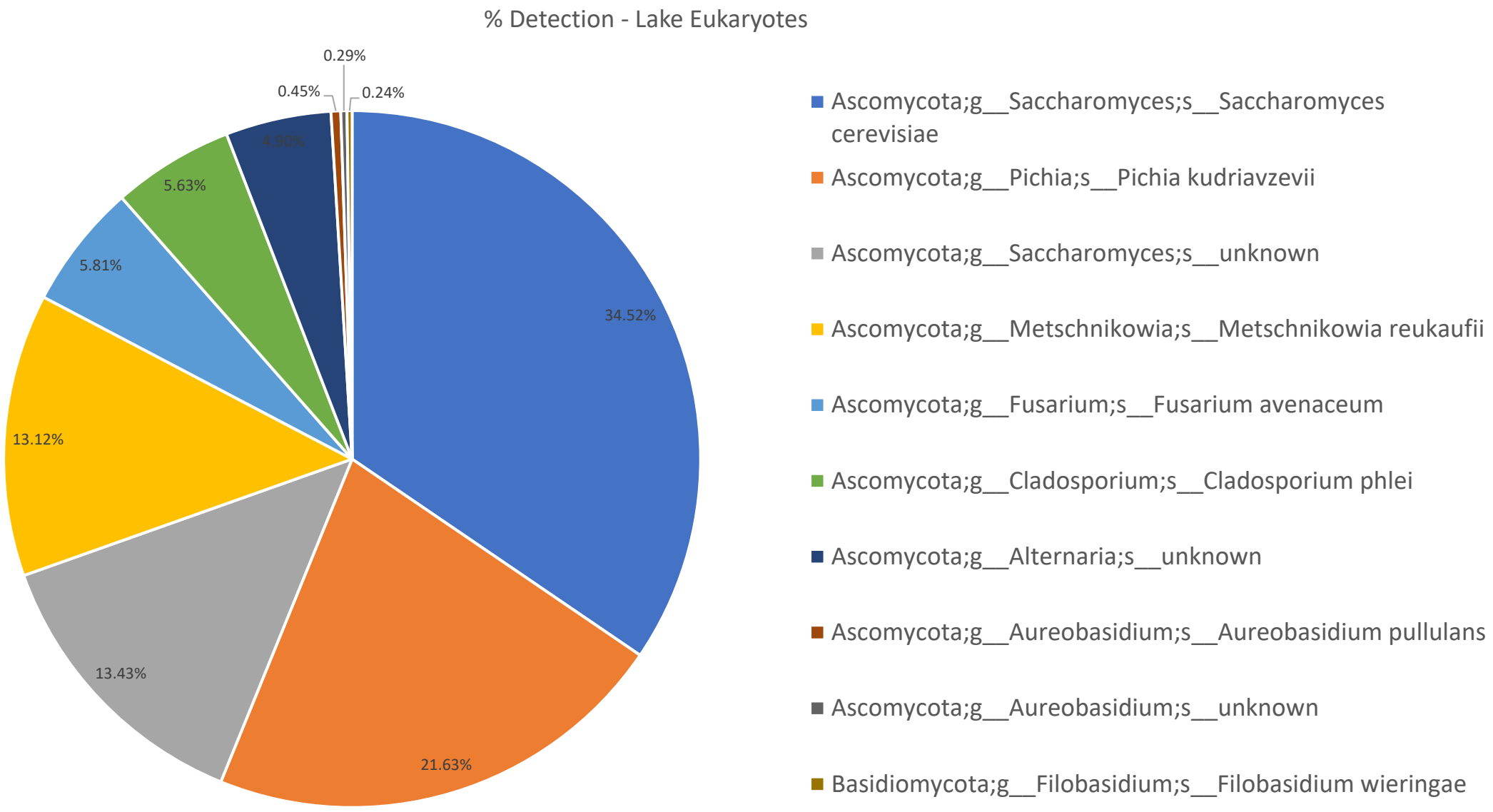
Appendix D

Summary of Primary Taxa Identified Bacteria and Fungi

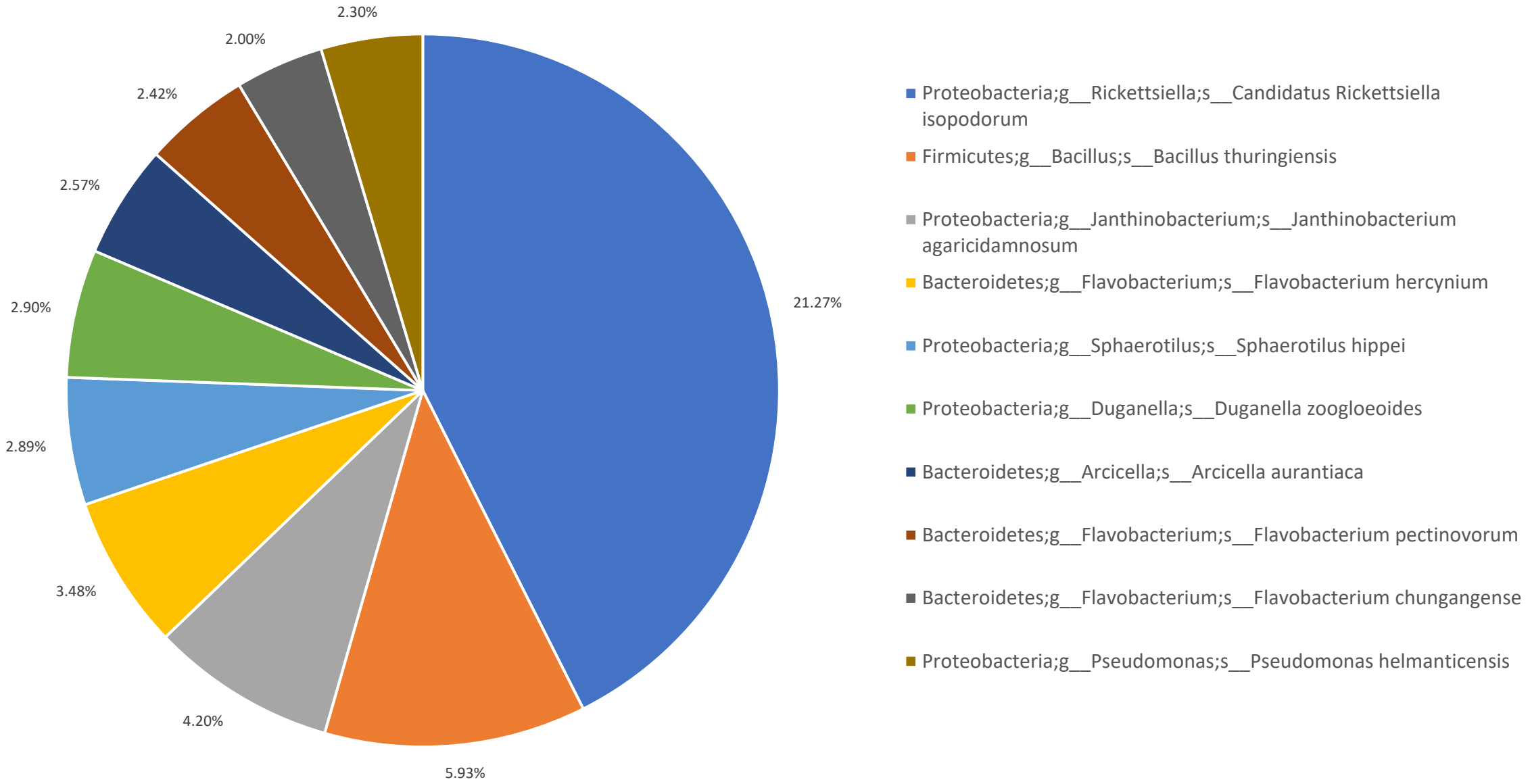
16S rRNA Shotgun Metagenomic Sequencing

Michigan Surface Water Foam Study

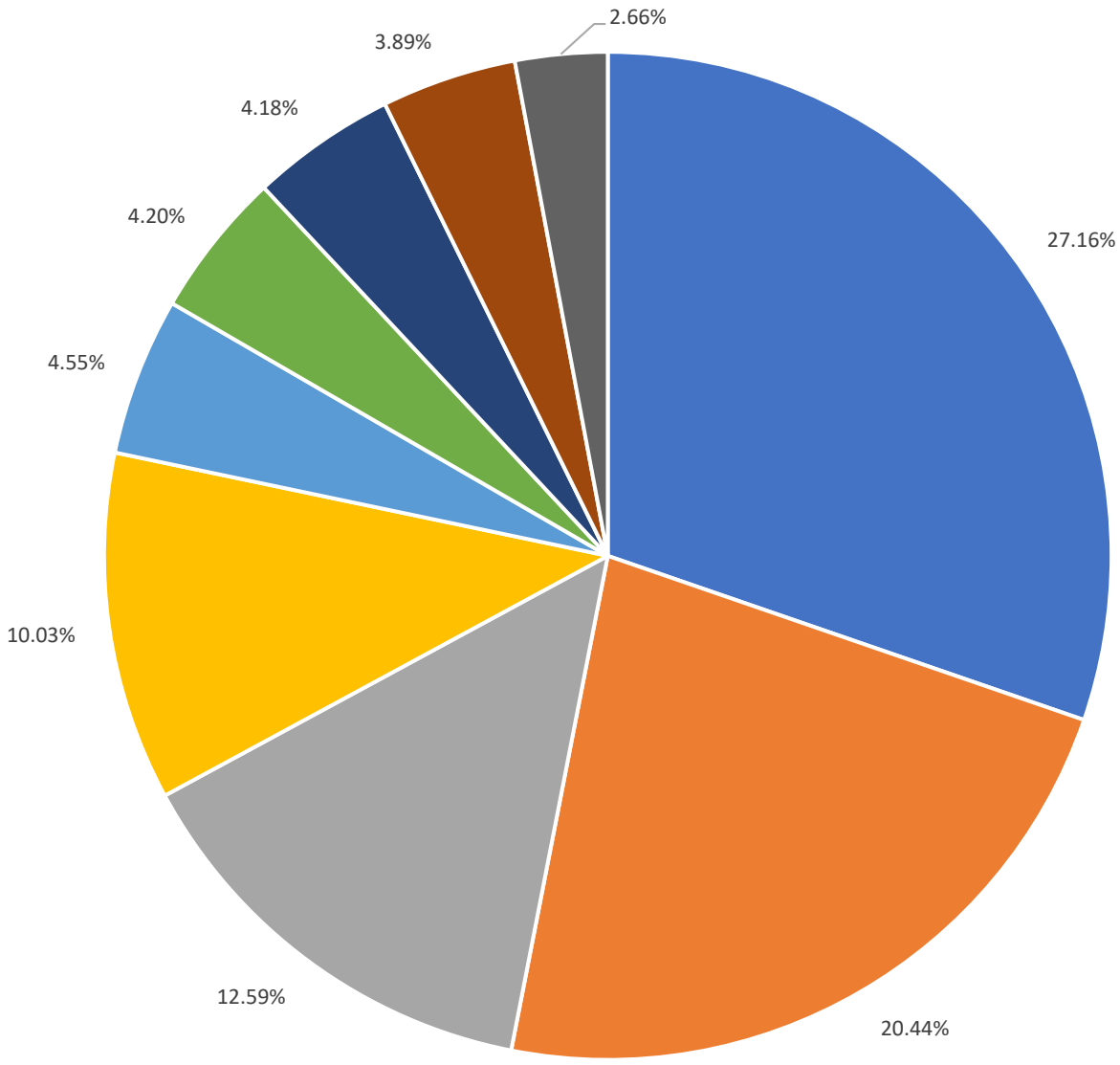

% Detection - Lake Bacteria
2.54%
2.62%
7.85%
2.80%
3.28%
4.60%
3.38%
4.45%
3.55%
3.78%
Bacteroidetes;g__Flavobacterium;s__Flavobacterium hydatis
Bacteroidetes;g__Flavobacterium;s__Flavobacterium aquatile
Proteobacteria;g__Pseudomonas;s__Pseudomonas putida
Proteobacteria;g__Pseudomonas;s__Pseudomonas yamanorum
Bacteroidetes;g__Flavobacterium;s__Flavobacterium psychrolimnae
Proteobacteria;g__Pseudomonas;s__Pseudomonas reinekei
Proteobacteria;g__Janthinobacterium;s__Janthinobacterium svalbardensis
Proteobacteria;g__Pseudomonas;s__Pseudomonas baetica
Bacteroidetes;g__Flavobacterium;s__Flavobacterium piscis
Proteobacteria;g__Janthinobacterium;s__Janthinobacterium agaricidamnosum


% Detection - Lake Eukaryotes
0.29%
0.45%
0.24%
4.90%
5.63%
5.81%
34.52%
13.12%
13.43%
21.63%
Ascomycota;g__Saccharomyces;s__Saccharomyces cerevisiae
Ascomycota;g__Pichia;s__Pichia kudriavzevii
Ascomycota;g__Saccharomyces;s__unknown
Ascomycota;g__Metschnikowia;s__Metschnikowia reukaufii
Ascomycota;g__Fusarium;s__Fusarium avenaceum
Ascomycota;g__Cladosporium;s__Cladosporium phlei
Ascomycota;g__Alternaria;s__unknown
Ascomycota;g__Aureobasidium;s__Aureobasidium pullulans
Ascomycota;g__Aureobasidium;s__unknown
Basidiomycota;g__Filobasidium;s__Filobasidium wieringae

% Detection - Rogue River Bacteria

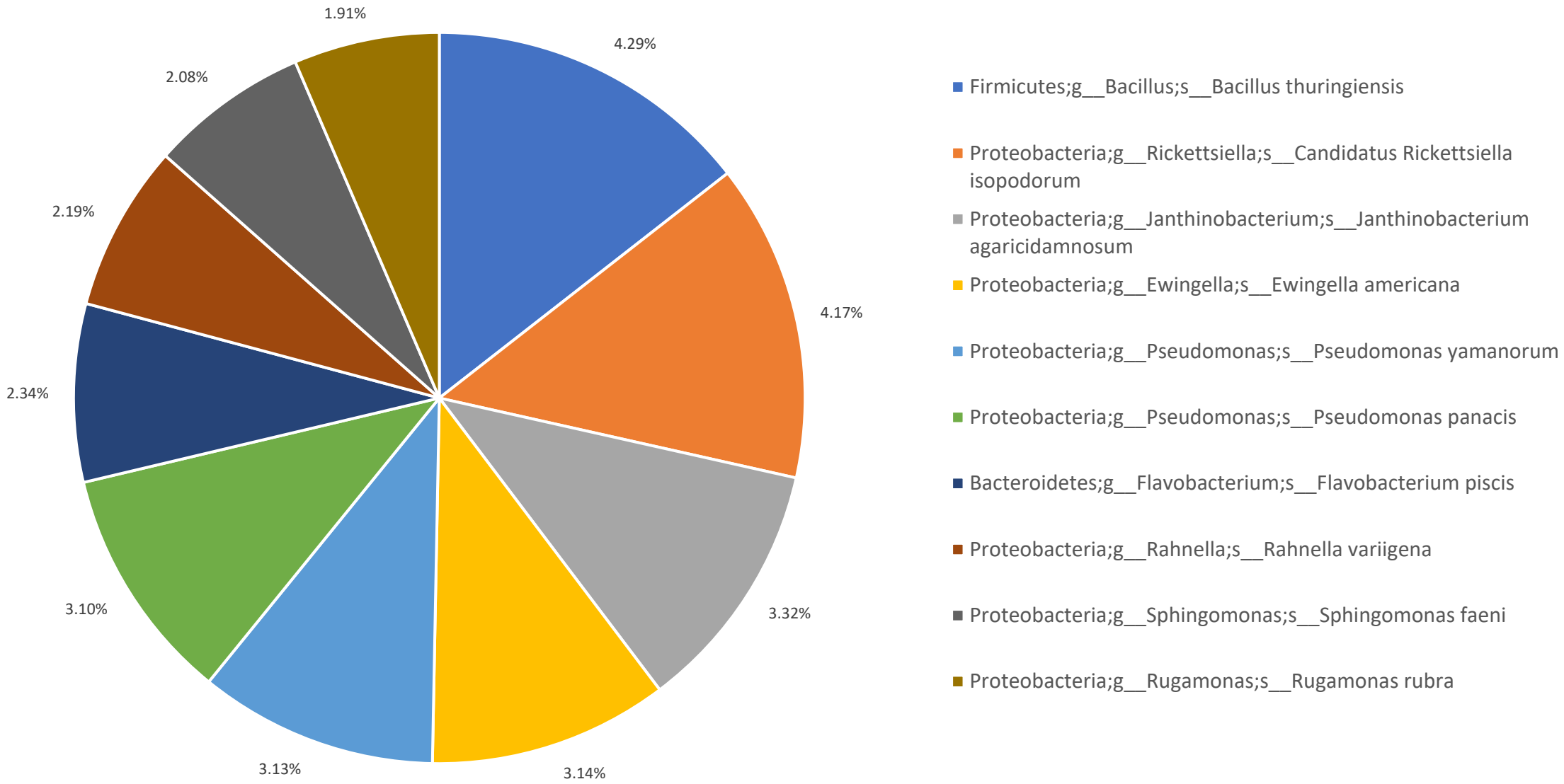


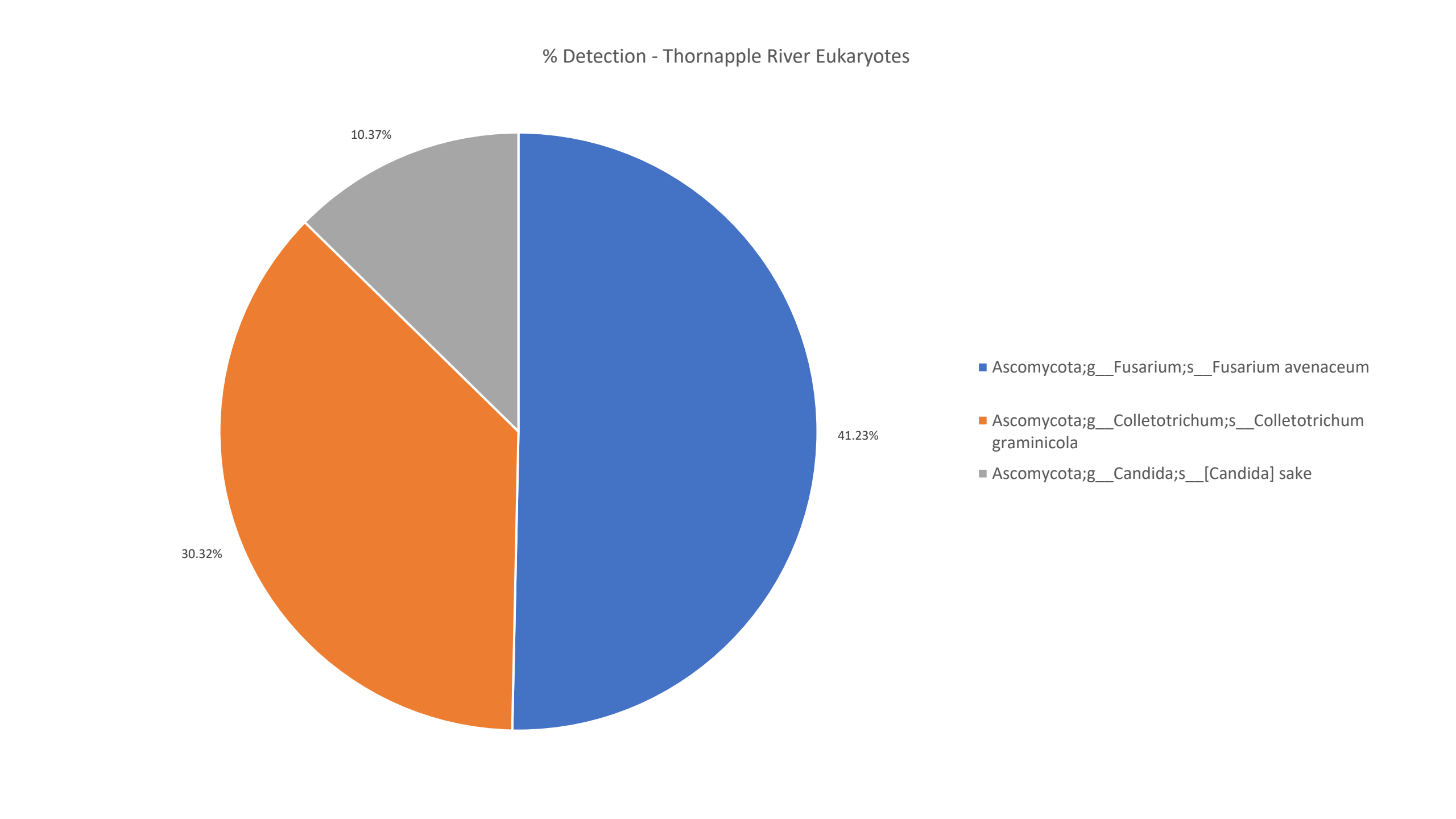
% Detection - Rogue River Eukaryotes



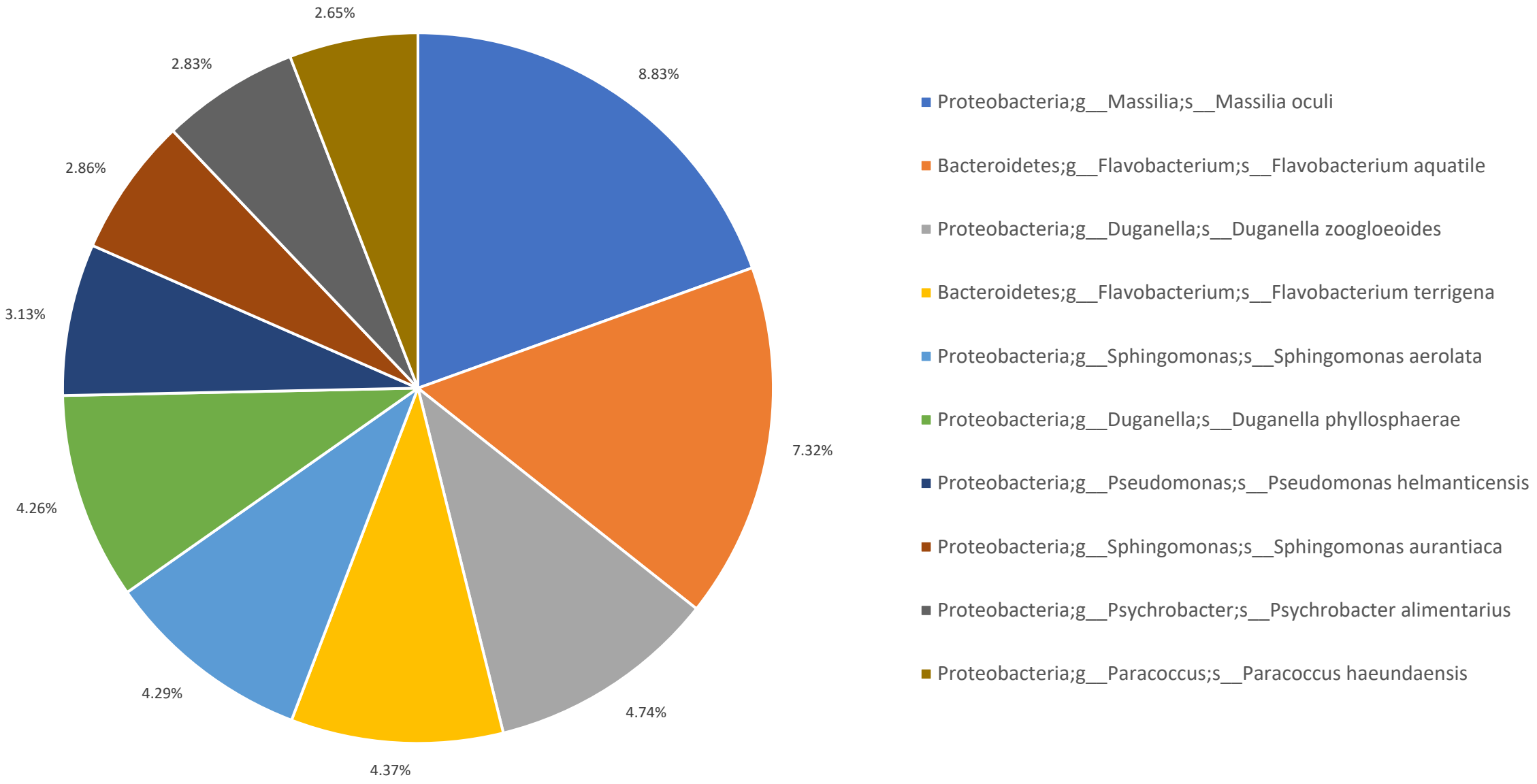
- k__Eukaryota;p__Ascomycota;g__Scytalidium;s__Scytalidium lignicola
- k__Eukaryota;p__Ascomycota;g__Scytalidium;s__unknown
- k__Eukaryota;p__Ascomycota;g__Epicoccum;s__Epicoccum nigrum
- k__Eukaryota;p__Ascomycota;g__Fusarium;s__Fusarium avenaceum
- k__Eukaryota;p__Ascomycota;g__Talaromyces;s__Talaromyces amestolkiae
- k__Eukaryota;p__Ascomycota;g__Penicillium;s__Penicillium oxalicum
- k__Eukaryota;p__Ascomycota;g__Trichoderma;s__unknown
- k__Eukaryota;p__Ascomycota;g__Alternaria;s__Alternaria alternata
- k__Eukaryota;p__Ascomycota;g__Colletotrichum;s__Colletotrichum fioriniae

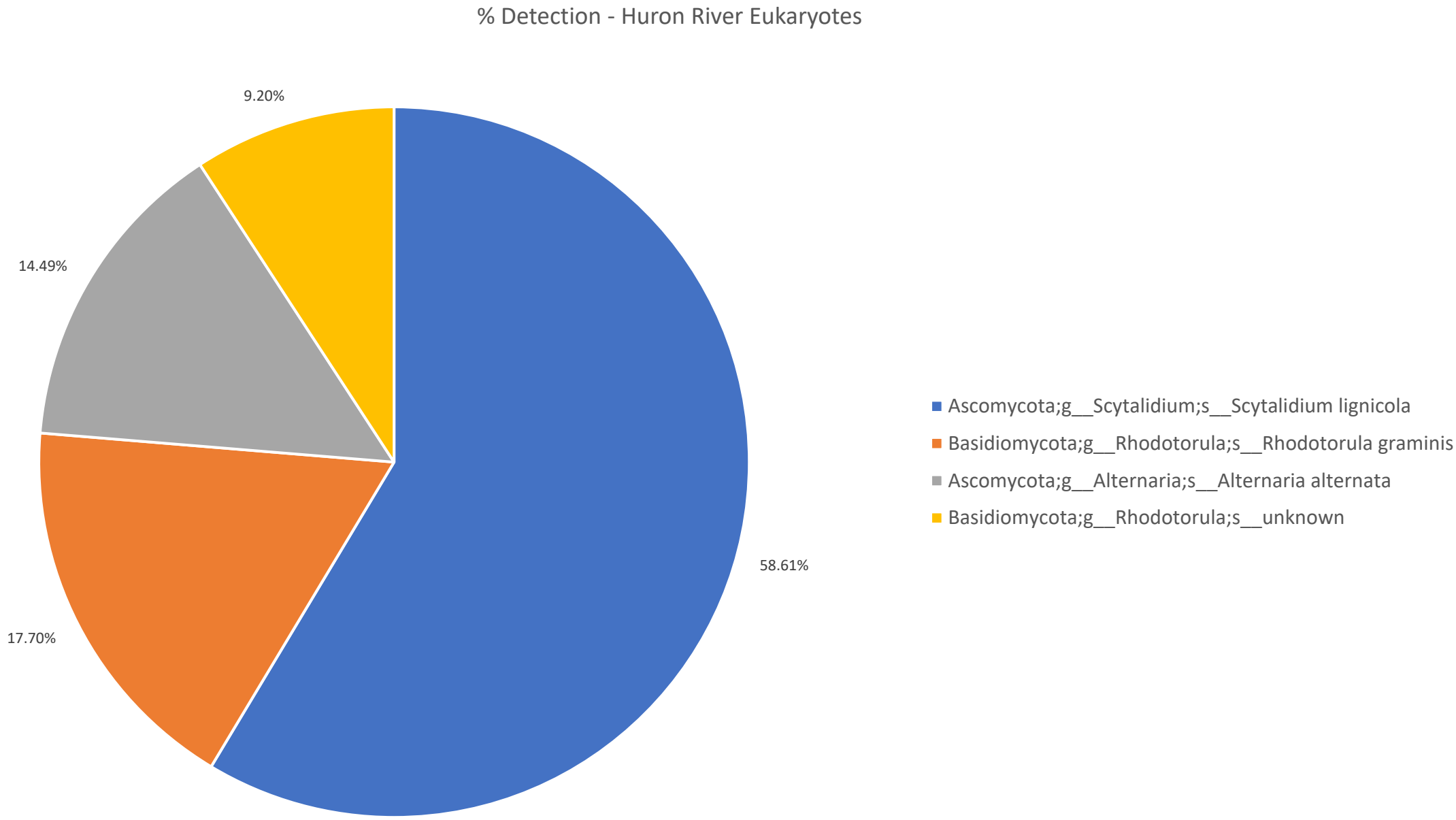
% Detection - Thornapple River Bacteria




% Detection - Thornapple River Eukaryotes
10.37%
41.23%
30.32%
Ascomycota;g__Fusarium;s__Fusarium avenaceum
Ascomycota;g__Colletotrichum;s__Colletotrichum graminicola
Ascomycota;g__Candida;s__[Candida] sake

% Detection - Huron River Bacteria




% Detection - Huron River Eukaryotes
9.20%
14.49%
58.61%
17.70%
Ascomycota;g__Scytalidium;s__Scytalidium lignicola
Basidiomycota;g__Rhodotorula;s__Rhodotorula graminis
Ascomycota;g__Alternaria;s__Alternaria alternata
Basidiomycota;g__Rhodotorula;s__unknown

Appendix E

Appendix E - Table 1
Summary
PFAS Surface Water Foam Study

Site	Surface Water Body	Site Location	Sample Date	Sample ID
A	Rogue River	Rockford, MI	4-Nov-19	FM.RNA.01
A	Rogue River	Rockford, MI	4-Nov-19	FM.RNA.02
A	Rogue River	Rockford, MI	4-Nov-19	FM.RNA.03
A	Rogue River	Rockford, MI	4-Nov-19	FM.RNA.04
A	Rogue River	Rockford, MI	3-Dec-19	FM.RNA.06
A	Rogue River	Rockford, MI	3-Dec-19	FM.RNA.07
B	Thornapple River	Cascade, MI	4-Dec-19	FM.RNA.08
B	Thornapple River	Cascade, MI	3-Jan-20	FM.RNA.09
B	Thornapple River	Cascade, MI	3-Jan-20	FM.RNA.09D
B	Thornapple River	Cascade, MI	16-Jan-20	FM.RNA.10
B	Thornapple River	Cascade, MI	16-Jan-20	FM.RNA.11
C	Huron River	Wixom, MI	22-Nov-19	FM.RNA.05
D	Van Etten Lake	Oscoda, MI	SWF SAMPLE VOLUME NOT OBTAINABLE	
E	Lake Margarethe	Grayling, MI	31-Mar-20	FM.RNA.13
F	Cedar Lake	Oscoda, MI	31-Mar-20	FM.RNA.14

Appendix E - Table 2
All Bacteria
PFAS Surface Water Foam Study

TAXA	Rogue River-01	Rogue River-02	Rogue River-03	Rogue River-04	Rogue River-06	Rogue River-07	Rogue River	Huron River-05	Thornapple River-08	Thornapple River-09	Thornapple River-09 DUPE	Thornapple River-10	Thornapple River-11	Thornapple River	Lake Margrethe-15	Cedar Lake-16
k__Bacteria;p__Actinobacteria;g__Actinomadura;s__Actinomadura hallensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.18%	0.11%	0.00%	0.00%	0.23%	0.11%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Aeromicrobium;s__Aeromicrobium fastidiosum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.69%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Arthrobacter;s__Arthrobacter psychrolactophilus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.05%	0.00%	0.05%	0.04%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Brachybacterium;s__Brachybacterium alimentarium	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.06%	0.18%	0.14%	0.06%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Brachybacterium;s__Brachybacterium massiliense	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Brevibacterium;s__Brevibacterium casei	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.12%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Brevibacterium;s__Brevibacterium epidermidis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.07%	0.06%	0.08%	0.07%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Brevibacterium;s__Brevibacterium linens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Candidatus Nanopelagicus;s__Candidatus Nanopelagicus abundans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Candidatus Planktophila;s__Candidatus Planktophila sulfonica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Candidatus Planktophila;s__Candidatus Planktophila vernalis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Clavibacter;s__Clavibacter michiganensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.25%	0.18%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Corynebacterium;s__Corynebacterium flavescens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Corynebacterium;s__Corynebacterium glutamicum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.10%	0.09%	0.06%	0.07%	0.07%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Corynebacterium;s__Corynebacterium kroppenstedtii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Corynebacterium;s__Corynebacterium maris	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Corynebacterium;s__Corynebacterium pollutisoli	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Corynebacterium;s__Corynebacterium stationis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.14%	0.14%	0.04%	0.04%	0.04%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Corynebacterium;s__Corynebacterium variabile	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Corynebacterium;s__Corynebacterium xerosis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Cutibacterium;s__Cutibacterium acnes	0.00%	0.00%	0.00%	0.00%	0.30%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	4.84%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Cutibacterium;s__Cutibacterium granulosum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Cutibacterium;s__[Propionibacterium] namnetense	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Enteractinococcus;s__Enteractinococcus helveticum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Frankia;s__Frankia inefficax	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.57%	0.00%
k__Bacteria;p__Actinobacteria;g__Frankia;s__Frankia saprophytica	0.00%	0.00%	0.00%	0.00%	0.51%	0.48%	0.00%	0.00%	0.00%	0.16%	0.15%	0.57%	0.34%	0.16%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Frankia;s__Frankia symbiont of Coriaria nepalensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.26%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Glutamicibacter;s__Glutamicibacter arilaitensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.00%	0.05%	0.03%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Janibacter;s__Janibacter anophelis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.15%	0.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Janibacter;s__Janibacter hoylei	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.35%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Kocuria;s__Kocuria polaris	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.41%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Kocuria;s__Kocuria rosea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.45%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Microbacterium;s__Microbacterium foliorum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Microbacterium;s__Microbacterium gubbeenense	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Microbacterium;s__Microbacterium hatanonis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.18%	0.15%	0.07%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Microbacterium;s__Microbacterium laevaniformans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.50%	0.00%	0.29%	0.36%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Mycobacterium;s__Mycobacterium gallinarum	0.61%	1.23%	1.32%	1.15%	1.09%	1.67%	1.19%	0.00%	0.76%	0.83%	0.43%	1.13%	0.83%	0.83%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Mycobacteroides;s__Mycobacteroides salmoniphilum	0.00%	0.00%	0.16%	0.18%	0.00%	0.00%	0.00%	0.00%	0.08%	0.05%	0.00%	0.14%	0.00%	0.05%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Mycolicibacterium;s__Mycolicibacterium aurum	1.02%	1.27%	1.24%	1.62%	1.65%	1.73%	1.45%	0.00%	1.22%	0.57%	0.52%	1.22%	1.02%	1.02%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Mycolicibacterium;s__Mycolicibacterium fallax	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Mycolicibacterium;s__Mycolicibacterium fluoranthenivorans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.59%	0.00%	0.31%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Mycolicibacterium;s__Mycolicibacterium llatzerense	0.52%	0.64%	0.70%	0.79%	0.86%	0.00%	0.67%	0.00%	0.60%	0.35%	0.31%	0.83%	0.57%	0.57%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Mycolicibacterium;s__Mycolicibacterium neoaurum	0.67%	0.82%	0.84%	1.08%	0.00%	0.98%	0.83%	0.18%	0.79%	0.46%	0.40%	0.91%	0.66%	0.66%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Mycolicibacterium;s__Mycolicibacterium peregrinum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.48%	0.32%	0.27%	0.00%	0.55%	0.32%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Mycolicibacterium;s__Mycolicibacterium rhodesiae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Mycolicibacterium;s__Mycolicibacterium sediminis	1.09%	1.32%	1.34%	1.59%	1.60%	1.60%	1.47%	0.00%	1.58%	0.93%	0.89%	2.21%	1.67%	1.58%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Mycolicibacterium;s__Mycolicibacterium tusciae	0.55%	0.00%	0.00%	1.07%	1.00%	0.00%	0.28%	0.00%	0.72%	0.00%	0.40%	1.03%	0.77%	0.72%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Nocardia;s__Nocardia gamkensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.33%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Nocardia;s__Nocardia globerula	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Nocardia;s__Nocardia shimofusensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.28%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Nocardioides;s__Nocardioides terrigena	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.39%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Paeniglutamicibacter;s__Paeniglutamicibacter gangotriensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.09%	0.09%	0.15%	0.18%	0.09%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Plantibacter;s__Plantibacter cousiniae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.16%	0.00%	0.00%	0.02%
k__Bacteria;p__Actinobacteria;g__Pseudoclavibacter;s__Pseudoclavibacter caeni	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.02%	0.03%	0.07%	0.04%	0.04%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Rathayibacter;s__Rathayibacter festucae	0.00%	0.00%	0.00%	0.00%	0.53%	0.00%	0.00%	0.00%	0.20%	0.13%	0.16%	0.48%	0.35%	0.20%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Rhodococcus;s__Rhodococcus enclensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.10%	0.00%	0.00%	0.15%	0.10%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Rhodococcus;s__Rhodococcus erythropolis	0.20%	0.23%	0.19%	0.22%	0.20%	0.14%	0.20%	0.00%	0.18%	0.13%	0.13%	0.00%	0.20%	0.13%	0.14%	0.00%
k__Bacteria;p__Actinobacteria;g__Rhodococcus;s__Rhodococcus fascians	0.73%	0.74%	0.90%	1.39%	1.85%	1.72%	1.14%	0.18%	1.86%	1.11%	1.06%	8.90%	5.90%	1.86%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Rhodococcus;s__Rhodococcus globerulus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.00%	0.14%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Rhodococcus;s__Rhodococcus qingshengii	0.00%	0.00%	0.17%	0.24%	0.22%	0.18%	0.18%	0.00%	0.12%	0.07%	0.15%	0.57%	0.14%	0.14%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Rhodococcus;s__Rhodococcus rhodochrous	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.15%	0.09%	0.09%	0.00%	0.17%	0.09%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Saccharopolyspora;s__Saccharopolyspora rectivirgula	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Appendix E - Table 2
All Bacteria
PFAS Surface Water Foam Study

TAXA	Rogue River-01	Rogue River-02	Rogue River-03	Rogue River-04	Rogue River-06	Rogue River-07	Rogue River	Huron River-05	Thornapple River-08	Thornapple River-09	Thornapple River-09 DUPE	Thornapple River-10	Thornapple River-11	Thornapple River	Lake Margrethe-15	Cedar Lake-16
k__Bacteria;p__Actinobacteria;g__Sanguibacter;s__Sanguibacter keddieii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	0.11%	0.11%	0.30%	0.20%	0.11%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Skermania;s__Skermania piniformis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Streptomyces;s__Streptomyces alboverticillatus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Streptomyces;s__Streptomyces antimycoticus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.27%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Streptomyces;s__Streptomyces europaeiscabiei	0.00%	0.00%	0.00%	0.00%	0.92%	0.71%	0.00%	0.00%	0.60%	0.42%	0.41%	0.77%	0.79%	0.60%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Streptomyces;s__Streptomyces hygroscopicus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.30%	0.33%	0.34%	0.64%	0.63%	0.34%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Streptomyces;s__Streptomyces lysosuperificus	0.62%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Streptomyces;s__Streptomyces virginiae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.33%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Thermopolyspora;s__Thermopolyspora flexuosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.11%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Williamsia;s__Williamsia herbipolensis	0.00%	0.00%	0.48%	0.62%	0.00%	0.49%	0.24%	0.00%	0.47%	0.34%	0.32%	0.75%	0.47%	0.47%	0.00%	0.00%
k__Bacteria;p__Actinobacteria;g__Yaniella;s__Yaniella halotolerans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Algoriella;s__Algoriella xinjiangensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Alistipes;s__Alistipes onderdonkii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
k__Bacteria;p__Bacteroidetes;g__Alistipes;s__Alistipes putredinis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
k__Bacteria;p__Bacteroidetes;g__Arcicella;s__Arcicella aurantiaca	1.73%	2.89%	2.95%	0.00%	2.25%	3.64%	2.57%	0.00%	0.94%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Bacteroides;s__Bacteroides cellulosilyticus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%
k__Bacteria;p__Bacteroidetes;g__Bacteroides;s__Bacteroides koreensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.00%
k__Bacteria;p__Bacteroidetes;g__Bacteroides;s__Bacteroides thetaiotaomicron	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
k__Bacteria;p__Bacteroidetes;g__Bacteroides;s__Bacteroides xylanolyticus	0.32%	0.44%	0.42%	0.00%	0.66%	0.50%	0.43%	0.00%	0.20%	0.00%	0.07%	0.00%	0.09%	0.07%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Barnesiella;s__Barnesiella intestinihominis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium balustinum	0.33%	0.00%	0.35%	0.00%	0.00%	0.00%	0.00%	0.00%	0.54%	1.14%	0.88%	0.69%	0.82%	0.82%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium carnipullorum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium chaponense	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.45%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.48%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium glaciei	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.60%	0.00%	0.00%	0.00%	0.18%	0.46%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium halperniae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.35%	0.48%	1.73%	1.70%	0.42%	0.65%	0.65%	0.00%	1.34%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium indoltheticum	0.32%	0.43%	0.35%	0.35%	0.68%	0.56%	0.39%	0.00%	0.77%	1.93%	1.57%	0.84%	0.98%	0.98%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium lathyri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.26%	0.25%	0.26%	0.00%	0.25%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium limigenitum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.95%	0.49%	0.00%	0.00%	0.00%	0.16%	0.36%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium luteum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.22%	0.40%	0.36%	0.00%	0.29%	0.29%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium mulctrae	0.00%	0.00%	0.00%	0.36%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.63%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium piscicola	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.14%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium piscium	0.30%	0.36%	0.23%	0.31%	0.00%	0.00%	0.27%	0.00%	0.00%	0.98%	0.63%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium scophthalmum	0.42%	0.50%	0.38%	0.00%	0.00%	0.00%	0.19%	0.00%	0.56%	0.00%	0.65%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium shigense	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.26%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium tenax	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.35%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium viscerum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium vrystaatense	0.25%	0.28%	0.29%	0.23%	0.00%	0.18%	0.24%	0.00%	0.19%	0.45%	0.42%	0.35%	0.28%	0.35%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Chryseobacterium;s__Chryseobacterium zeae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.23%	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Dyadobacter;s__Dyadobacter koreensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.00%	0.07%	0.00%	0.21%	0.17%	0.07%	0.00%	0.25%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium alvei	1.44%	1.48%	1.71%	1.04%	1.44%	0.62%	1.44%	0.79%	1.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.30%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium aquariorum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.07%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium aquatile	0.73%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.32%	0.00%	1.03%	1.07%	0.00%	0.00%	0.00%	0.00%	9.21%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium aquicola	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.11%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium aquidurense	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.72%	0.73%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium cheniae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.64%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium chungangense	3.04%	2.72%	2.98%	2.00%	1.37%	1.11%	2.36%	1.04%	0.00%	0.38%	0.00%	0.00%	0.00%	0.00%	0.69%	0.55%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium cupreum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.68%	0.51%	0.53%	0.00%	0.53%	0.53%	1.04%	0.00%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium dankookense	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.44%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium endophyticum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium frigidimaris	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.07%	0.00%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium glaciei	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.15%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium hercynium	4.16%	3.83%	3.81%	3.48%	2.38%	2.83%	3.65%	0.00%	2.40%	1.84%	1.85%	0.52%	0.81%	1.84%	0.99%	1.54%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium hibernum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.31%	0.00%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium hydatis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.17%	4.19%	1.77%	1.83%	1.83%	14.99%	0.70%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium johnsoniae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.75%	0.47%	0.45%	0.00%	0.00%	0.45%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium limicola	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.44%	1.20%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium macacae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.32%	0.37%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium omnivorum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.50%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium pectinovorum	2.48%	2.36%	2.33%	1.90%	2.57%	3.33%	2.42%	0.00%	1.57%	1.36%	1.46%	0.82%	1.16%	1.36%	2.66%	0.00%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium piscis	2.22%	2.03%	1.94%	1.64%	2.55%	2.53%	2.12%	1.20%	1.72%	4.46%	4.52%	1.31%	2.34%	2.34%	3.56%	1.69%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium psychrolimnae	2.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.89%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.20%	4.89%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium reichenbachii	1.85%	1.76%	1.62%	1.37%	1.55%	1.81%	1.69%	0.00%	0.84%	0.60%	0.64%	0.34%	0.66%	0.64%	0.58%	0.00%

Appendix E - Table 2
All Bacteria
PFAS Surface Water Foam Study

TAXA	Rogue River-01	Rogue River-02	Rogue River-03	Rogue River-04	Rogue River-06	Rogue River-07	Rogue River	Huron River-05	Thornapple River-08	Thornapple River-09	Thornapple River-09 DUPE	Thornapple River-10	Thornapple River-11	Thornapple River	Lake Margrethe-15	Cedar Lake-16
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium rivuli	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.17%	0.29%	0.31%	0.12%	0.20%	0.20%	0.00%	0.29%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium saccharophilum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.91%	0.97%	0.00%	0.00%	0.00%	0.89%	0.57%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium sinopsychrotolerans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.51%	1.13%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium spartansii	0.00%	0.00%	1.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium subsaxonicum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.12%	0.00%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium succinicans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.82%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.89%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium terrigena	2.02%	1.75%	2.02%	0.00%	2.22%	1.03%	1.88%	4.37%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.08%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium tiangeerense	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.52%	1.52%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium tructae	1.28%	1.34%	0.00%	1.15%	0.00%	0.66%	0.90%	0.64%	0.50%	0.44%	0.42%	0.00%	0.00%	0.42%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium viscosus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium xinjiangense	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.47%
k__Bacteria;p__Bacteroidetes;g__Hymenobacter;s__Hymenobacter rigui	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.52%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Hymenobacter;s__Hymenobacter swuensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.64%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Myroides;s__Myroides guanonis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.15%	0.15%	0.17%	0.21%	0.15%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Parabacteroides;s__Parabacteroides distasonis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%
k__Bacteria;p__Bacteroidetes;g__Parabacteroides;s__Parabacteroides merdae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
k__Bacteria;p__Bacteroidetes;g__Pedobacter;s__Pedobacter agri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.24%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Pedobacter;s__Pedobacter alluvionis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.33%	0.00%	0.65%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Pedobacter;s__Pedobacter antarcticus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.13%	0.13%	0.17%	0.14%	0.13%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Pedobacter;s__Pedobacter caeni	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.29%	0.29%	0.33%	0.32%	0.29%	0.33%	0.00%
k__Bacteria;p__Bacteroidetes;g__Pedobacter;s__Pedobacter cryoconitis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.25%	1.34%	1.30%	0.87%	1.28%	1.28%	0.23%	0.27%
k__Bacteria;p__Bacteroidetes;g__Pedobacter;s__Pedobacter ginsenosidimutans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.52%	0.81%	1.02%	0.65%	0.87%	0.81%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Pedobacter;s__Pedobacter jeongneungensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	0.00%
k__Bacteria;p__Bacteroidetes;g__Pedobacter;s__Pedobacter miscanthi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.50%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Pedobacter;s__Pedobacter notötheniae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.00%
k__Bacteria;p__Bacteroidetes;g__Pedobacter;s__Pedobacter suwonensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.37%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Pedobacter;s__Pedobacter westerhofensis	0.26%	0.00%	0.00%	0.00%	0.26%	0.20%	0.10%	0.00%	0.11%	0.29%	0.30%	0.15%	0.29%	0.29%	0.11%	0.11%
k__Bacteria;p__Bacteroidetes;g__Prevotella;s__Prevotella copri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.02%
k__Bacteria;p__Bacteroidetes;g__Sediminibacterium;s__Sediminibacterium goheungense	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Sphingobacterium;s__Sphingobacterium faecium	0.21%	0.00%	0.21%	0.00%	0.19%	0.24%	0.20%	0.00%	0.35%	0.96%	0.96%	1.02%	0.72%	0.96%	0.00%	0.05%
k__Bacteria;p__Bacteroidetes;g__Sphingobacterium;s__Sphingobacterium multivorum	0.00%	0.00%	0.00%	0.00%	0.00%	0.09%	0.00%	0.00%	0.14%	0.14%	0.14%	0.17%	0.12%	0.14%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Sphingobacterium;s__Sphingobacterium siyangense	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.12%	0.13%	0.11%	0.14%	0.10%	0.12%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Sphingobacterium;s__Sphingobacterium thalpophilum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Spirosoma;s__Spirosoma agri	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Bacteroidetes;g__Spirosoma;s__Spirosoma endophyticum	0.00%	0.00%	0.00%	0.00%	0.00%	0.17%	0.00%	0.00%	0.00%	0.03%	0.03%	0.14%	0.12%	0.03%	0.06%	0.00%
k__Bacteria;p__Cyanobacteria;g__Planktothrix;s__Planktothrix prolifica	0.00%	0.00%	0.00%	0.08%	0.00%	0.08%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Cyanobacteria;g__Planktothrix;s__Planktothrix rubescens	0.05%	0.00%	0.09%	0.00%	0.10%	0.00%	0.02%	0.00%	0.24%	0.00%	0.00%	0.03%	0.03%	0.03%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Anaerobutyricum;s__Anaerobutyricum hallii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
k__Bacteria;p__Firmicutes;g__Anaerobutyricum;s__Anaerobutyricum soehngenii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%
k__Bacteria;p__Firmicutes;g__Anaerostipes;s__Anaerostipes hadrus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%
k__Bacteria;p__Firmicutes;g__Aneurinibacillus;s__Aneurinibacillus thermoaerophilus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus aerophilus	0.28%	0.34%	0.41%	0.00%	0.26%	0.21%	0.27%	0.00%	0.26%	0.11%	0.11%	0.00%	0.00%	0.11%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus altitudinis	0.27%	0.16%	0.28%	0.97%	0.28%	0.19%	0.27%	0.10%	0.32%	0.12%	0.09%	0.61%	0.42%	0.32%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus amyloliquefaciens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.03%	0.00%	0.06%	0.00%	0.03%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus aryabhattai	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.32%	0.30%	0.45%	0.48%	0.32%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus butanolivorans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.05%	0.05%	0.05%	0.07%	0.05%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus cecembensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	0.00%	0.00%	0.09%	0.06%	0.00%	0.11%	0.08%	0.08%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus gibsonii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.03%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus glycinifermentans	0.00%	0.00%	0.06%	0.00%	0.11%	0.08%	0.03%	0.00%	0.04%	0.02%	0.02%	0.03%	0.03%	0.03%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus kochii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus licheniformis	0.15%	0.17%	0.17%	0.19%	0.28%	0.20%	0.18%	0.00%	0.13%	0.05%	0.05%	0.10%	0.08%	0.08%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus luciferensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus megaterium	0.27%	0.25%	0.33%	0.31%	0.37%	0.35%	0.32%	0.00%	0.56%	0.15%	0.15%	0.24%	0.22%	0.22%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus miscanthi	0.08%	0.09%	0.08%	0.09%	0.10%	0.08%	0.09%	0.00%	0.07%	0.03%	0.03%	0.08%	0.05%	0.05%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus murimartini	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus mycoides	1.59%	1.45%	1.71%	2.59%	1.81%	1.94%	1.76%	0.00%	1.07%	0.65%	0.67%	1.66%	1.17%	1.07%	0.20%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus pumilus	0.82%	1.02%	1.09%	1.11%	1.30%	1.02%	1.06%	0.05%	1.11%	0.42%	0.39%	1.00%	0.62%	0.62%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus safensis	0.00%	0.00%	0.00%	0.00%	0.29%	0.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus stratosphericus	0.00%	0.00%	0.00%	0.00%	0.35%	0.29%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus subtilis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus thermoamylovorans	0.00%	0.00%	0.00%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus thuringiensis	4.13%	5.56%	5.93%	5.22%	6.27%	7.16%	5.75%	0.00%	4.41%	2.39%	2.37%	8.85%	4.29%	4.29%	0.00%	0.00%

Appendix E - Table 2
All Bacteria
PFAS Surface Water Foam Study

TAXA	Rogue River-01	Rogue River-02	Rogue River-03	Rogue River-04	Rogue River-06	Rogue River-07	Rogue River	Huron River-05	Thornapple River-08	Thornapple River-09	Thornapple River-09 DUPE	Thornapple River-10	Thornapple River-11	Thornapple River	Lake Margrethe-15	Cedar Lake-16
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus toyonensis	0.45%	0.70%	0.67%	1.81%	0.85%	0.81%	0.75%	0.26%	0.45%	0.46%	0.38%	0.96%	0.44%	0.45%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus velezensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.05%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus wiedmannii	0.79%	0.59%	0.67%	0.75%	0.61%	1.36%	0.71%	0.00%	0.54%	0.33%	0.37%	0.82%	0.61%	0.54%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__Bacillus zhangzhouensis	0.00%	0.00%	0.00%	0.00%	0.33%	0.20%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Bacillus;s__[Brevibacterium] frigoritolerans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.05%	0.04%	0.09%	0.07%	0.07%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Blautia;s__Blautia massiliensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.03%	0.00%
k__Bacteria;p__Firmicutes;g__Blautia;s__Blautia obeum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.01%
k__Bacteria;p__Firmicutes;g__Blautia;s__Blautia wexlerae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%
k__Bacteria;p__Firmicutes;g__Blautia;s__[Ruminococcus] torques	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
k__Bacteria;p__Firmicutes;g__Brevibacillus;s__Brevibacillus agri	0.00%	0.00%	0.00%	0.00%	0.11%	0.10%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Brevibacillus;s__Brevibacillus gelatini	0.13%	0.13%	0.14%	0.23%	0.14%	0.11%	0.13%	0.00%	0.04%	0.03%	0.02%	0.05%	0.04%	0.04%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Brochothrix;s__Brochothrix thermosphacta	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.02%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Carnobacterium;s__Carnobacterium divergens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.05%	0.03%	0.01%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Carnobacterium;s__Carnobacterium maltaromaticum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.12%	0.12%	0.31%	0.22%	0.12%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Clostridium;s__Clostridium diolis	0.00%	0.37%	0.38%	0.00%	0.57%	0.52%	0.38%	0.00%	0.23%	0.11%	0.11%	0.16%	0.14%	0.14%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Clostridium;s__Clostridium estertheticum	0.00%	0.21%	0.00%	0.00%	0.34%	0.32%	0.11%	0.00%	0.23%	0.12%	0.11%	0.21%	0.21%	0.21%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Clostridium;s__Clostridium frigidicarnis	0.10%	0.00%	0.13%	0.00%	0.14%	0.12%	0.11%	0.00%	0.06%	0.03%	0.02%	0.05%	0.04%	0.04%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Clostridium;s__Clostridium intestinale	0.34%	0.34%	0.44%	0.34%	0.48%	0.49%	0.39%	0.05%	0.22%	0.09%	0.07%	0.12%	0.11%	0.11%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Clostridium;s__Clostridium perfringens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%
k__Bacteria;p__Firmicutes;g__Clostridium;s__Clostridium saccharoperbutylacetonicum	0.42%	0.36%	0.36%	0.39%	0.52%	0.50%	0.40%	0.00%	0.22%	0.14%	0.13%	0.19%	0.16%	0.16%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Dorea;s__Dorea formicigenerans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
k__Bacteria;p__Firmicutes;g__Evtepia;s__Evtepia gabavorous	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
k__Bacteria;p__Firmicutes;g__Exiguobacterium;s__Exiguobacterium undae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%
k__Bacteria;p__Firmicutes;g__Faecalibacterium;s__Faecalibacterium prausnitzii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.09%	0.02%
k__Bacteria;p__Firmicutes;g__Fusicatenibacter;s__Fusicatenibacter saccharivorans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%
k__Bacteria;p__Firmicutes;g__Gemmiger;s__Gemmiger formicilis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%
k__Bacteria;p__Firmicutes;g__Geobacillus;s__Geobacillus thermodenitrificans	0.00%	0.07%	0.07%	0.08%	0.07%	0.06%	0.07%	0.00%	0.04%	0.02%	0.01%	0.02%	0.00%	0.02%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Jeotgalicoccus;s__Jeotgalicoccus halophilus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.07%	0.00%	0.05%	0.05%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Jeotgalicoccus;s__Jeotgalicoccus nanhaiensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Lacrimispora;s__Lacrimispora aerotolerans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.04%	0.04%	0.00%	0.05%	0.04%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Lacrimispora;s__Lacrimispora algidixylanolytica	1.60%	1.67%	1.93%	1.85%	2.61%	2.15%	1.89%	0.00%	0.79%	0.29%	0.28%	0.44%	0.47%	0.44%	0.04%	0.00%
k__Bacteria;p__Firmicutes;g__Lactobacillus;s__Lactobacillus fermentum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
k__Bacteria;p__Firmicutes;g__Lawsonibacter;s__Lawsonibacter asaccharolyticus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%
k__Bacteria;p__Firmicutes;g__Leuconostoc;s__Leuconostoc carnosum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Lysinibacillus;s__Lysinibacillus capsici	0.00%	0.00%	0.00%	0.00%	0.12%	0.16%	0.00%	0.00%	0.06%	0.00%	0.04%	0.06%	0.03%	0.04%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Lysinibacillus;s__Lysinibacillus fusiformis	0.00%	0.00%	0.00%	0.00%	0.14%	0.00%	0.00%	0.00%	0.07%	0.05%	0.00%	0.13%	0.08%	0.07%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Lysinibacillus;s__Lysinibacillus telephonicus	0.00%	0.00%	0.00%	0.00%	0.00%	0.14%	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Lysinibacillus;s__Lysinibacillus xylanilyticus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.12%	0.09%	0.10%	0.18%	0.13%	0.12%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Paenibacillus;s__Paenibacillus alvei	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Paenibacillus;s__Paenibacillus amylolyticus	0.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Paenibacillus;s__Paenibacillus borealis	0.74%	0.91%	0.90%	1.10%	1.57%	1.21%	1.00%	0.00%	0.49%	0.19%	0.20%	0.23%	0.31%	0.23%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Paenibacillus;s__Paenibacillus lactis	0.12%	0.13%	0.14%	0.18%	0.20%	0.16%	0.15%	0.00%	0.08%	0.03%	0.03%	0.00%	0.05%	0.03%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Paenibacillus;s__Paenibacillus nuruki	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%	0.00%	0.03%	0.02%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Paenibacillus;s__Paenibacillus odorifer	0.18%	0.00%	0.26%	0.00%	0.37%	0.25%	0.22%	0.00%	0.12%	0.04%	0.04%	0.00%	0.00%	0.04%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Paenibacillus;s__Paenibacillus oryzisoli	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.13%	0.07%	0.07%	0.14%	0.14%	0.13%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Paenibacillus;s__Paenibacillus polysaccharolyticus	0.24%	0.24%	0.32%	0.41%	0.32%	0.22%	0.28%	0.00%	0.20%	0.06%	0.06%	0.07%	0.10%	0.07%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Paenibacillus;s__Paenibacillus terrigena	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.07%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Paenibacillus;s__Paenibacillus xylanexedens	0.31%	0.64%	0.68%	1.08%	0.93%	0.74%	0.71%	0.00%	0.23%	0.16%	0.16%	0.27%	0.29%	0.23%	0.05%	0.00%
k__Bacteria;p__Firmicutes;g__Pelosinus;s__Pelosinus fermentans	0.00%	0.00%	0.00%	0.00%	0.50%	0.51%	0.00%	0.00%	0.14%	0.10%	0.10%	0.00%	0.19%	0.10%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Phascolarctobacterium;s__Phascolarctobacterium faecium	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%
k__Bacteria;p__Firmicutes;g__Planifilum;s__Planifilum fulgidum	0.06%	0.00%	0.08%	0.00%	0.10%	0.06%	0.06%	0.00%	0.05%	0.02%	0.02%	0.00%	0.04%	0.02%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Roseburia;s__Roseburia intestinalis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
k__Bacteria;p__Firmicutes;g__Ruminococcus;s__Ruminococcus bicirculans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
k__Bacteria;p__Firmicutes;g__Salinicoccus;s__Salinicoccus halodurans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Sporosarcina;s__Sporosarcina psychrophila	0.00%	0.00%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%	0.19%	0.18%	0.18%	0.57%	0.40%	0.19%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Staphylococcus;s__Staphylococcus capitis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Staphylococcus;s__Staphylococcus epidermidis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Staphylococcus;s__Staphylococcus vitulinus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.02%	0.00%	0.02%	0.01%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Streptococcus;s__Streptococcus thermophilus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Streptococcus;s__Streptococcus vestibularis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Thermoactinomyces;s__Thermoactinomyces vulgaris	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.02%	0.02%	0.02%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Turicibacter;s__Turicibacter sanguinis	0.00%	0.00%	0.00%	0.00%	0.78%	0.62%	0.00%	0.00%	0.30%	0.00%	0.10%	0.00%	0.14%	0.10%	0.00%	0.00%

Appendix E - Table 2
All Bacteria
PFAS Surface Water Foam Study

TAXA	Rogue River-01	Rogue River-02	Rogue River-03	Rogue River-04	Rogue River-06	Rogue River-07	Rogue River	Huron River-05	Thornapple River-08	Thornapple River-09	Thornapple River-09 DUPE	Thornapple River-10	Thornapple River-11	Thornapple River	Lake Margrethe-15	Cedar Lake-16
k__Bacteria;p__Firmicutes;g__Ureibacillus;s__Ureibacillus terrenus	0.15%	0.18%	0.18%	0.21%	0.31%	0.23%	0.20%	0.00%	0.14%	0.05%	0.05%	0.09%	0.06%	0.06%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Ureibacillus;s__Ureibacillus thermophilus	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%	0.00%	0.00%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__Ureibacillus;s__Ureibacillus thermosphaericus	0.60%	0.76%	0.76%	0.82%	0.69%	0.64%	0.72%	0.00%	0.31%	0.12%	0.12%	0.20%	0.17%	0.17%	0.00%	0.00%
k__Bacteria;p__Firmicutes;g__unknown;s__[Eubacterium] rectale	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.01%
k__Bacteria;p__Firmicutes;g__unknown;s__[Eubacterium] siraeum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%
k__Bacteria;p__Fusobacteria;g__Cetobacterium;s__Cetobacterium ceti	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%
k__Bacteria;p__Proteobacteria;g__Acinetobacter;s__Acinetobacter albensis	0.00%	0.24%	0.61%	0.71%	0.18%	0.00%	0.21%	0.18%	0.13%	0.07%	0.06%	0.00%	0.04%	0.06%	0.00%	0.03%
k__Bacteria;p__Proteobacteria;g__Acinetobacter;s__Acinetobacter bohemicus	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.29%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%
k__Bacteria;p__Proteobacteria;g__Acinetobacter;s__Acinetobacter guillouiae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Acinetobacter;s__Acinetobacter harbinensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%
k__Bacteria;p__Proteobacteria;g__Acinetobacter;s__Acinetobacter johnsonii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Acinetobacter;s__Acinetobacter junii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Acinetobacter;s__Acinetobacter kyonggiensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%
k__Bacteria;p__Proteobacteria;g__Acinetobacter;s__Acinetobacter lwoffii	1.11%	1.13%	1.17%	1.28%	0.15%	0.13%	1.12%	0.00%	0.46%	0.29%	0.28%	0.08%	0.12%	0.28%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Acinetobacter;s__Acinetobacter oleivorans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Advenella;s__Advenella incenata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.24%	0.25%	0.11%	0.10%	0.11%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Aeromonas;s__Aeromonas bestiarum	0.00%	0.21%	0.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Aeromonas;s__Aeromonas encheleia	0.00%	0.00%	0.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Aeromonas;s__Aeromonas piscicola	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.24%	0.23%
k__Bacteria;p__Proteobacteria;g__Aeromonas;s__Aeromonas popoffii	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.28%
k__Bacteria;p__Proteobacteria;g__Aeromonas;s__Aeromonas rivipollensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.26%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Aeromonas;s__Aeromonas salmonicida	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.47%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%
k__Bacteria;p__Proteobacteria;g__Aeromonas;s__Aeromonas sobria	0.46%	0.28%	0.57%	1.38%	0.00%	0.00%	0.37%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.04%
k__Bacteria;p__Proteobacteria;g__Agrobacterium;s__Agrobacterium bohemicum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.59%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Agrobacterium;s__Agrobacterium rosae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.54%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Agrobacterium;s__Agrobacterium rubi	0.88%	0.95%	1.14%	1.36%	0.42%	0.49%	0.92%	0.60%	0.00%	0.15%	0.14%	0.00%	0.00%	0.00%	0.00%	0.08%
k__Bacteria;p__Proteobacteria;g__Alishewanella;s__Alishewanella agri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.17%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Arcobacter;s__Arcobacter suis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.97%
k__Bacteria;p__Proteobacteria;g__Bradyrhizobium;s__Bradyrhizobium diazoefficiens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.48%	0.00%	0.50%	0.60%	0.73%	0.50%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Bradyrhizobium;s__Bradyrhizobium japonicum	0.00%	0.00%	0.00%	0.00%	1.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Brevundimonas;s__Brevundimonas intermedia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.27%	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Brevundimonas;s__Brevundimonas subvibrioides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.71%
k__Bacteria;p__Proteobacteria;g__Brevundimonas;s__Brevundimonas vesicularis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.38%	0.00%	0.19%	0.19%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Budvicia;s__Budvicia aquatica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
k__Bacteria;p__Proteobacteria;g__Burkholderia;s__Burkholderia gladioli	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.24%	0.32%	0.26%	0.00%	0.30%	0.26%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Buttiauxella;s__Buttiauxella brennerae	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.05%	0.04%	0.04%	0.00%	0.00%	0.04%	0.02%	0.00%
k__Bacteria;p__Proteobacteria;g__Buttiauxella;s__Buttiauxella gaviniae	0.00%	0.00%	0.00%	0.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Caedimonas;s__Caedimonas varicaedens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Candidatus Methylopumilus;s__Candidatus Methylopumilus universalis	0.13%	0.00%	0.00%	0.00%	0.20%	0.00%	0.00%	0.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Caulobacter;s__Caulobacter henricii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.62%
k__Bacteria;p__Proteobacteria;g__Cereibacter;s__Cereibacter changlensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Collimonas;s__Collimonas fungivorans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.28%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Collimonas;s__Collimonas pratensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.21%	0.00%
k__Bacteria;p__Proteobacteria;g__Corallococcus;s__Corallococcus terminator	0.00%	0.77%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Deefgea;s__Deefgea rivuli	0.00%	0.00%	0.63%	0.85%	0.00%	0.00%	0.00%	0.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.68%	0.85%
k__Bacteria;p__Proteobacteria;g__Delftia;s__Delftia acidovorans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.31%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Duganella;s__Duganella phyllosphaerae	2.64%	2.15%	0.00%	0.00%	0.81%	0.50%	0.66%	4.26%	0.88%	1.26%	1.23%	0.88%	1.37%	1.23%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Duganella;s__Duganella zoogloeoides	3.28%	2.53%	4.18%	3.82%	0.81%	0.46%	2.90%	4.74%	0.92%	1.26%	1.23%	0.84%	1.36%	1.23%	0.84%	1.85%
k__Bacteria;p__Proteobacteria;g__Dyella;s__Dyella marensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.18%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Erwinia;s__Erwinia aphidicola	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.09%	0.10%	0.10%	0.11%	0.12%	0.10%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Erwinia;s__Erwinia billingiae	0.28%	0.27%	0.30%	0.41%	0.18%	0.22%	0.27%	0.00%	0.10%	0.12%	0.12%	0.12%	0.12%	0.12%	0.17%	0.02%
k__Bacteria;p__Proteobacteria;g__Erwinia;s__Erwinia persicina	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.12%	0.12%	0.13%	0.15%	0.12%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Erwinia;s__Erwinia rhapontici	0.85%	0.86%	0.91%	1.49%	0.61%	0.62%	0.86%	0.00%	0.75%	0.90%	0.91%	0.81%	0.79%	0.81%	0.03%	0.05%
k__Bacteria;p__Proteobacteria;g__Ewingella;s__Ewingella americana	0.37%	0.32%	0.35%	0.53%	0.44%	0.43%	0.40%	0.00%	3.14%	4.69%	4.68%	2.80%	2.46%	3.14%	0.04%	0.00%
k__Bacteria;p__Proteobacteria;g__Iodobacter;s__Iodobacter fluviatilis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.96%
k__Bacteria;p__Proteobacteria;g__Janthinobacterium;s__Janthinobacterium agaricidamnosum	5.06%	4.03%	4.36%	4.86%	3.48%	3.61%	4.20%	0.00%	0.00%	3.32%	3.29%	3.61%	3.92%	3.32%	3.35%	1.72%
k__Bacteria;p__Proteobacteria;g__Janthinobacterium;s__Janthinobacterium lividum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.45%
k__Bacteria;p__Proteobacteria;g__Janthinobacterium;s__Janthinobacterium svalbardensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.62%	0.00%	0.00%	0.00%	0.00%	0.00%	4.12%	2.43%
k__Bacteria;p__Proteobacteria;g__Ketogulonicigenium;s__Ketogulonicigenium vulgare	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Klebsiella;s__Klebsiella aerogenes	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Klebsiella;s__Klebsiella pneumoniae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.07%	0.07%	0.09%	0.04%	0.07%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Kosakonia;s__Kosakonia cowanii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Appendix E - Table 2
All Bacteria
PFAS Surface Water Foam Study

TAXA	Rogue River-01	Rogue River-02	Rogue River-03	Rogue River-04	Rogue River-06	Rogue River-07	Rogue River	Huron River-05	Thornapple River-08	Thornapple River-09	Thornapple River-09 DUPE	Thornapple River-10	Thornapple River-11	Thornapple River	Lake Margrethe-15	Cedar Lake-16
k__Bacteria;p__Proteobacteria;g__Massilia;s__Massilia oculi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	8.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Massilia;s__Massilia yuzhufengensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Methylocystis;s__Methylocystis rosea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Methylotenera;s__Methylotenera versatilis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.38%	0.00%
k__Bacteria;p__Proteobacteria;g__Microvirga;s__Microvirga ossetica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.32%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Novosphingobium;s__Novosphingobium barchaimii	0.93%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.17%	0.17%	0.00%	0.00%	0.00%	0.20%	0.00%
k__Bacteria;p__Proteobacteria;g__Ochrobactrum;s__Ochrobactrum pseudogrignonense	0.00%	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	0.09%	0.09%	0.09%	0.09%	0.09%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pantoea;s__Pantoea agglomerans	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pantoea;s__Pantoea endophytica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.09%	0.10%	0.10%	0.10%	0.10%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pantoea;s__Pantoea vagans	0.28%	0.14%	0.16%	0.19%	0.11%	0.07%	0.15%	0.10%	0.00%	0.04%	0.00%	0.59%	0.28%	0.04%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pantoea;s__[Curtobacterium] plantarum	0.00%	0.17%	0.17%	0.00%	0.18%	0.14%	0.15%	0.05%	0.58%	0.44%	0.49%	0.00%	0.36%	0.44%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Paracoccus;s__Paracoccus alcaliphilus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.09%	0.12%	0.12%	0.10%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Paracoccus;s__Paracoccus haeundaensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.65%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.40%
k__Bacteria;p__Proteobacteria;g__Paracoccus;s__Paracoccus marcusii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.17%	0.00%	0.00%	0.00%	0.14%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pararheinheimera;s__Pararheinheimera tangshanensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.13%
k__Bacteria;p__Proteobacteria;g__Paucibacter;s__Paucibacter toxinivorans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.98%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%
k__Bacteria;p__Proteobacteria;g__Paucimonas;s__Paucimonas lemoignei	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.49%	0.22%	0.24%	0.00%	0.17%	0.22%	4.43%	0.53%
k__Bacteria;p__Proteobacteria;g__Perlucidibaca;s__Perlucidibaca aquatica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%
k__Bacteria;p__Proteobacteria;g__Photobacterium;s__Photobacterium iliopiscarium	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Polynucleobacter;s__Polynucleobacter cosmopolitanus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Polynucleobacter;s__Polynucleobacter difficilis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Polynucleobacter;s__Polynucleobacter duraquae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas abietaniphila	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.15%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas arsenicoxydans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.12%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas asturiensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.35%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas azotoformans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.76%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas baetica	1.36%	1.08%	1.17%	1.53%	0.79%	0.75%	1.12%	2.17%	0.54%	0.18%	0.20%	0.00%	0.31%	0.20%	4.81%	0.79%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas brenneri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.50%	0.59%	0.59%	0.44%	0.50%	0.50%	0.76%	0.36%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas caeni	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.46%	0.40%	0.39%	0.17%	0.20%	0.39%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas canadensis	0.85%	0.00%	0.87%	1.02%	0.51%	0.00%	0.68%	0.47%	2.49%	0.92%	0.92%	0.54%	1.12%	0.92%	0.56%	0.61%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas cichorii	0.49%	0.00%	0.44%	0.51%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas coleopterorum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.29%	0.22%	0.19%	0.18%	0.14%	0.23%	0.19%	0.10%	0.16%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas congelans	0.00%	0.48%	0.00%	0.00%	0.00%	0.00%	0.00%	0.45%	0.31%	0.16%	0.18%	0.00%	0.00%	0.16%	0.00%	0.22%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas coronafaciens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas costantinii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.68%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas deceptionensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.46%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas extremorientalis	0.83%	0.00%	0.00%	0.95%	0.57%	0.67%	0.62%	0.00%	3.04%	1.25%	1.29%	0.70%	1.73%	1.29%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas fluorescens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.58%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas fragi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.34%	0.21%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas fulva	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas gessardii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.58%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas gingeri	0.00%	0.00%	0.00%	0.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas graminis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.43%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas grimontii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.05%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas helleri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.14%	0.14%	0.00%	0.13%	0.13%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas helmanticensis	3.07%	2.24%	2.36%	4.00%	1.63%	1.52%	2.30%	3.13%	0.00%	0.26%	0.28%	0.00%	0.00%	0.00%	4.17%	0.84%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas jessenii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.88%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas kairouanensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.28%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas koreensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.13%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas laurylsulfatiphila	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.18%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas laurylsulfativorans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.91%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas lini	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.24%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas lundensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.22%	0.07%	0.07%	0.00%	0.11%	0.07%	0.00%	0.08%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas lurida	1.41%	1.45%	1.24%	1.92%	0.89%	0.92%	1.32%	1.03%	0.73%	0.67%	0.65%	0.37%	0.79%	0.67%	1.26%	2.66%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas lutea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.21%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas mandelii	0.00%	0.00%	0.00%	0.00%	0.82%	0.92%	0.00%	2.05%	0.00%	0.00%	0.00%	0.31%	0.00%	0.00%	1.87%	1.83%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas marginalis	1.01%	0.00%	0.86%	1.11%	0.71%	0.00%	0.78%	0.70%	1.28%	0.64%	0.65%	0.45%	0.81%	0.65%	0.70%	0.39%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas migulae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.44%	1.43%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas mohnii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.35%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas moorei	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.37%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas moraviensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.42%	0.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.18%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas orientalis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.46%	0.00%	0.00%	0.00%

Appendix E - Table 2
All Bacteria
PFAS Surface Water Foam Study

TAXA	Rogue River-01	Rogue River-02	Rogue River-03	Rogue River-04	Rogue River-06	Rogue River-07	Rogue River	Huron River-05	Thornapple River-08	Thornapple River-09	Thornapple River-09 DUPE	Thornapple River-10	Thornapple River-11	Thornapple River	Lake Margrethe-15	Cedar Lake-16
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas panacis	1.71%	1.73%	1.72%	2.19%	1.41%	1.10%	1.71%	0.00%	7.70%	3.01%	3.10%	1.55%	3.58%	3.10%	1.06%	1.69%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas peli	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.84%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas poae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.47%	0.00%	0.00%	0.00%	0.21%	0.61%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas prosekii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.38%	0.71%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas protegens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.74%	0.30%	0.33%	0.26%	0.29%	0.30%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas proteolytica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.46%	0.46%	0.33%	0.28%	0.00%	0.31%	0.31%	0.58%	0.58%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas putida	1.15%	0.99%	1.21%	1.34%	0.00%	0.00%	1.07%	2.20%	0.45%	0.60%	0.56%	0.71%	0.56%	0.56%	2.90%	5.99%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas reinekei	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.76%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas salomonii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.54%	1.63%	1.61%	1.50%	2.57%	1.61%	1.57%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas saxonica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.25%	0.07%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas silesiensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.40%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas simiae	0.87%	1.12%	0.94%	1.27%	0.66%	0.58%	0.91%	0.83%	1.17%	1.06%	1.04%	0.55%	0.88%	1.04%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas synxantha	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.27%	0.68%	0.69%	0.67%	0.77%	0.69%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas syringae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.43%	0.43%	0.41%	0.35%	0.00%	0.45%	0.41%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas taetrolens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.67%	0.74%	0.73%	0.51%	0.50%	0.67%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas tolaasii	1.24%	1.27%	1.21%	1.52%	0.00%	0.00%	1.22%	0.46%	0.61%	0.58%	0.59%	0.41%	0.56%	0.58%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas trivialis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.63%	0.84%	0.78%	0.75%	0.26%	0.55%	0.75%	0.00%	0.30%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas umsongensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.94%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas veronii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.53%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas versuta	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.81%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas viridiflava	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	0.24%	0.26%	0.00%	0.25%	0.24%	0.37%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas weihenstephanensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas yamanorum	1.51%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.13%	3.44%	3.45%	2.16%	2.64%	3.13%	6.52%	1.03%
k__Bacteria;p__Proteobacteria;g__Psychrobacter;s__Psychrobacter alimentarius	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.83%	0.17%	0.17%	0.18%	0.42%	0.42%	0.18%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Psychrobacter;s__Psychrobacter cibarius	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Psychrobacter;s__Psychrobacter immobilis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	0.38%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Psychrobacter;s__Psychrobacter pacificensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Psychrobacter;s__Psychrobacter pasteurii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.21%	0.32%	0.29%	0.09%	0.16%	0.21%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Rahnella;s__Rahnella aquatilis	0.09%	0.14%	0.14%	0.19%	0.13%	0.13%	0.14%	0.00%	0.40%	0.60%	0.61%	0.56%	0.49%	0.56%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Rahnella;s__Rahnella inusitata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	0.18%	0.30%	0.29%	0.19%	0.12%	0.03%
k__Bacteria;p__Proteobacteria;g__Rahnella;s__Rahnella variigena	0.17%	0.13%	0.18%	0.22%	0.25%	0.22%	0.20%	0.07%	1.99%	2.18%	2.19%	3.54%	3.48%	2.19%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Rahnella;s__Rahnella victoriana	0.16%	0.17%	0.15%	0.19%	0.14%	0.13%	0.16%	0.00%	0.23%	0.24%	0.23%	0.32%	0.32%	0.24%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Rhizobium;s__Rhizobium oryziradicis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Rhodoferax;s__Rhodoferax fermentans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.58%
k__Bacteria;p__Proteobacteria;g__Rhodoferax;s__Rhodoferax saidenbachensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.57%	0.00%
k__Bacteria;p__Proteobacteria;g__Rickettsia;s__Rickettsia endosymbiont of Bemisia tabaci	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Rickettsiella;s__Candidatus Rickettsiella isopodorum	15.22%	24.10%	18.44%	13.19%	27.79%	31.82%	21.27%	0.85%	6.64%	2.91%	2.83%	4.17%	5.42%	4.17%	3.49%	0.00%
k__Bacteria;p__Proteobacteria;g__Rouxiella;s__Rouxiella badensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.71%	0.43%	0.42%	0.30%	0.34%	0.42%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Rouxiella;s__Rouxiella chamberiensis	0.15%	0.00%	0.00%	0.17%	0.00%	0.09%	0.04%	0.00%	1.15%	1.24%	1.25%	1.46%	0.94%	1.24%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Rouxiella;s__Rouxiella silvae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.05%	0.05%	0.04%	0.00%	0.05%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Rugamonas;s__Rugamonas rubra	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.69%	1.91%	1.95%	0.00%	2.25%	1.91%	1.30%	1.80%
k__Bacteria;p__Proteobacteria;g__Serratia;s__Serratia fonticola	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.00%
k__Bacteria;p__Proteobacteria;g__Serratia;s__Serratia liquefaciens	0.30%	0.38%	0.36%	0.53%	0.16%	0.24%	0.33%	0.00%	0.67%	0.57%	0.58%	0.39%	0.33%	0.57%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Serratia;s__Serratia quinivorans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Shewanella;s__Shewanella baltica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.09%
k__Bacteria;p__Proteobacteria;g__Sphaerotilus;s__Sphaerotilus hippei	3.33%	2.94%	3.98%	2.89%	0.00%	0.00%	2.91%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Sphingomonas;s__Sphingomonas aerolata	0.00%	1.33%	0.00%	0.00%	0.00%	0.00%	0.00%	4.29%	0.00%	0.72%	0.70%	0.40%	0.50%	0.50%	0.28%	0.18%
k__Bacteria;p__Proteobacteria;g__Sphingomonas;s__Sphingomonas aurantiaca	1.61%	0.00%	0.00%	1.51%	0.00%	0.00%	0.00%	2.86%	0.49%	1.89%	1.86%	0.92%	1.15%	1.15%	0.46%	0.23%
k__Bacteria;p__Proteobacteria;g__Sphingomonas;s__Sphingomonas faeni	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.57%	3.40%	3.42%	1.71%	2.08%	2.08%	0.67%	0.40%
k__Bacteria;p__Proteobacteria;g__Sphingomonas;s__Sphingomonas ginsenosidivorax	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.54%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.12%
k__Bacteria;p__Proteobacteria;g__Sphingomonas;s__Sphingomonas taxi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.61%	0.00%	0.39%	0.39%	0.42%	0.42%	0.39%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Stenotrophomonas;s__Stenotrophomonas chelatiphaga	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.29%	0.11%	0.11%	0.11%	0.00%	0.18%	0.11%	0.00%	0.04%
k__Bacteria;p__Proteobacteria;g__Stenotrophomonas;s__Stenotrophomonas indicatrix	0.00%	0.00%	0.00%	0.40%	0.00%	0.15%	0.00%	0.00%	0.00%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Stenotrophomonas;s__Stenotrophomonas maltophilia	0.00%	0.00%	0.00%	0.00%	0.35%	0.00%	0.00%	0.00%	0.36%	0.12%	0.25%	0.19%	0.33%	0.25%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Stenotrophomonas;s__Stenotrophomonas rhizophila	0.00%	0.52%	0.00%	0.35%	0.25%	0.25%	0.25%	0.35%	0.12%	0.15%	0.16%	0.00%	0.00%	0.12%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Thiothrix;s__Thiothrix lacustris	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Variovorax;s__Variovorax ginsengisoli	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.45%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.53%
k__Bacteria;p__Proteobacteria;g__Xanthomonas;s__Xanthomonas arboricola	0.87%	0.59%	0.79%	0.67%	0.49%	0.31%	0.63%	0.00%	0.21%	0.34%	0.39%	0.34%	0.43%	0.34%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Xanthomonas;s__Xanthomonas oryzae	0.00%	0.29%	0.45%	0.35%	0.27%	0.24%	0.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Xanthomonas;s__Xanthomonas retroflexus	0.00%	0.00%	0.00%	0.00%	0.00%	0.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	0.00%	0.00%	0.00%	0.00%
k__Bacteria;p__Proteobacteria;g__Yersinia;s__Yersinia intermedia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%

Appendix E - Table 3
All Eukaryotes
PFAS Surface Water Foam Study

#OTU ID	Rogue River-01	Rogue River-02	Rogue River-03	Rogue River-04	Huron River-05	Rogue River-06	Rogue River-07	Thornapple River-08	Thornapple River-09	Thornapple River-09 DUPE	Thornapple River-10	Thornapple River-11	Lake Margrethe-15	Cedar Lake-16
k__Eukaryota;p__Ascomycota;g__Alternaria;s__Alternaria alternata	5.44%	3.45%	5.17%	4.33%	14.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Eukaryota;p__Ascomycota;g__Alternaria;s__Alternaria tenuissima	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	11.56%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Eukaryota;p__Ascomycota;g__Alternaria;s__unknown	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.80%	0.00%
k__Eukaryota;p__Ascomycota;g__Aureobasidium;s__Aureobasidium pullulans	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.90%
k__Eukaryota;p__Ascomycota;g__Aureobasidium;s__unknown	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.57%
k__Eukaryota;p__Ascomycota;g__Candida;s__[Candida] sake	0.00%	0.00%	0.00%	0.00%	0.00%	2.79%	2.17%	8.25%	15.96%	23.54%	7.87%	10.37%	0.00%	0.00%
k__Eukaryota;p__Ascomycota;g__Cladosporium;s__Cladosporium phlei	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	11.26%
k__Eukaryota;p__Ascomycota;g__Colletotrichum;s__Colletotrichum fioriniae	5.47%	5.31%	0.00%	5.82%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Eukaryota;p__Ascomycota;g__Colletotrichum;s__Colletotrichum graminicola	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	44.34%	30.32%	0.00%	0.00%	38.25%	0.00%	0.00%
k__Eukaryota;p__Ascomycota;g__Didymella;s__Didymella segeticola	0.00%	6.04%	0.00%	0.00%	0.00%	0.00%	17.79%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Eukaryota;p__Ascomycota;g__Epicoccum;s__Epicoccum nigrum	16.79%	9.23%	15.94%	16.29%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	32.82%	0.00%	0.00%	0.00%
k__Eukaryota;p__Ascomycota;g__Exophiala;s__Exophiala alcalophila	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.14%	0.00%	0.00%
k__Eukaryota;p__Ascomycota;g__Fusarium;s__Fusarium avenaceum	6.40%	6.54%	10.03%	7.56%	0.00%	22.59%	22.81%	29.30%	42.16%	76.46%	39.92%	41.23%	11.61%	0.00%
k__Eukaryota;p__Ascomycota;g__Fusarium;s__Fusarium solani	0.00%	4.77%	0.00%	5.21%	0.00%	0.00%	0.00%	18.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Eukaryota;p__Ascomycota;g__Metschnikowia;s__Metschnikowia reukaufii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	11.84%	14.40%
k__Eukaryota;p__Ascomycota;g__Penicillium;s__Penicillium oxalicum	5.29%	4.13%	7.22%	4.27%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Eukaryota;p__Ascomycota;g__Pichia;s__Pichia kudriavzevii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	19.21%	24.05%
k__Eukaryota;p__Ascomycota;g__Saccharomyces;s__Saccharomyces cerevisiae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	30.62%	38.41%
k__Eukaryota;p__Ascomycota;g__Saccharomyces;s__unknown	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	16.91%	9.94%
k__Eukaryota;p__Ascomycota;g__Scytalidium;s__Scytalidium lignicola	27.54%	28.60%	46.53%	27.16%	58.61%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Eukaryota;p__Ascomycota;g__Scytalidium;s__unknown	20.38%	20.51%	0.00%	19.44%	0.00%	73.22%	57.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Eukaryota;p__Ascomycota;g__Talaromyces;s__Talaromyces amestolkiae	5.26%	4.47%	7.08%	4.62%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Eukaryota;p__Ascomycota;g__Trichoderma;s__Trichoderma atrobrunneum	0.00%	3.89%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Eukaryota;p__Ascomycota;g__Trichoderma;s__unknown	5.41%	3.06%	8.03%	5.31%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Eukaryota;p__Basidiomycota;g__Filobasidium;s__Filobasidium wieringae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.47%
k__Eukaryota;p__Basidiomycota;g__Malassezia;s__Malassezia globosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.79%	0.00%	0.00%	0.00%
k__Eukaryota;p__Basidiomycota;g__Malassezia;s__Malassezia restricta	0.00%	0.00%	0.00%	0.00%	0.00%	1.40%	0.00%	0.00%	0.00%	0.00%	10.98%	0.00%	0.00%	0.00%
k__Eukaryota;p__Basidiomycota;g__Rhodotorula;s__Rhodotorula graminis	0.00%	0.00%	0.00%	0.00%	17.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Eukaryota;p__Basidiomycota;g__Rhodotorula;s__unknown	0.00%	0.00%	0.00%	0.00%	9.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Eukaryota;p__Basidiomycota;g__Ustilago;s__Ustilago maydis	2.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
k__Eukaryota;p__Basidiomycota;g__Wallemia;s__Wallemia mellicola	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.62%	0.00%	0.00%	0.00%

Appendix E - Table 4
Lake Bacteria
PFAS Surface Water Foam Study

TAXA	Lake Margrethe-15	Cedar Lake-16	MEDIAN	Bacteria Taxa: Phyla, Genus, Species	% Detection - Lake Bacteria	Notes
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium hydatis	14.99%	0.70%	7.85%	Bacteroidetes;g__Flavobacterium;s__Flavobacterium hydatis	7.85%	Associated with fish disease; pathogen; economically significant
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium aquatile	0.00%	9.21%	4.60%	Bacteroidetes;g__Flavobacterium;s__Flavobacterium aquatile	4.60%	Forms endospores. Motile. Fermenter.
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas putida	2.90%	5.99%	4.45%	Proteobacteria;g__Pseudomonas;s__Pseudomonas putida	4.45%	Flagellated bacteria; usually in aerobic soil and water habitats
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas yamanorum	6.52%	1.03%	3.78%	Proteobacteria;g__Pseudomonas;s__Pseudomonas yamanorum	3.78%	Flagelated bacteria; tough; extremeist; found in sub-antarctice environments.
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium psychrolimnae	2.20%	4.89%	3.55%	Bacteroidetes;g__Flavobacterium;s__Flavobacterium psychrolimnae	3.55%	Novel psychrophilic bacteria isolated from microbial mats
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas reinekei	0.00%	6.76%	3.38%	Proteobacteria;g__Pseudomonas;s__Pseudomonas reinekei	3.38%	Novel species capable of degrading chlorosalicylates or isopimaric acid
k__Bacteria;p__Proteobacteria;g__Janthinobacterium;s__Janthinobacterium svalbardensis	4.12%	2.43%	3.28%	Proteobacteria;g__Janthinobacterium;s__Janthinobacterium svalbardensis	3.28%	A novel violacein-like pigment producing psychrotrophic bacteria
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas baetica	4.81%	0.79%	2.80%	Proteobacteria;g__Pseudomonas;s__Pseudomonas baetica	2.80%	*P. baetica* is a denitrifier, meaning it rearranges bioavailable nitrogenous compounds into atmospheric nitrogen gas, N2.*P. baetica* can grow in temperatures ranging from 4-30 degrees Celsius, making it a mesophile, and salinity ranging from 0-6% NaCl.
k__Bacteria;p__Bacteroidetes;g__Flavobacterium;s__Flavobacterium piscis	3.56%	1.69%	2.62%	Bacteroidetes;g__Flavobacterium;s__Flavobacterium piscis	2.62%	Possible fish pathogen; isolated from trout
k__Bacteria;p__Proteobacteria;g__Janthinobacterium;s__Janthinobacterium agaricidamnosum	3.35%	1.72%	2.54%	Proteobacteria;g__Janthinobacterium;s__Janthinobacterium agaricidamnosum	2.54%	An oxalobacteria; causes soft rot disease in fungi; beneficial

Appendix E - Table 5
Lake Eukaryotes
PFAS Surface Water Foam Study

TAXA	Lake Margrethe-15	Cedar Lake-16	MEDIAN	Eukaryote Taxa: Phyla, Genus, Species	% Detection - Lake Eukaryotes	Notes
k__Eukaryota;p__Ascomycota;g__Saccharomyces;s__Saccharomyces cerevisiae	30.62%	38.41%	0.345173	Ascomycota;g__Saccharomyces;s__Saccharomyces cerevisiae	34.52%	Brewers Yeast
k__Eukaryota;p__Ascomycota;g__Pichia;s__Pichia kudriavzevii	19.21%	24.05%	0.216313	Ascomycota;g__Pichia;s__Pichia kudriavzevii	21.63%	Yeast; fermenter; telemorph of Candida krusei
k__Eukaryota;p__Ascomycota;g__Saccharomyces;s__unknown	16.91%	9.94%	0.1342575	Ascomycota;g__Saccharomyces;s__unknown	13.43%	Yeasts
k__Eukaryota;p__Ascomycota;g__Metschnikowia;s__Metschnikowia reukaufii	11.84%	14.40%	0.131204	Ascomycota;g__Metschnikowia;s__Metschnikowia reukaufii	13.12%	A brewing yeast; isolated from flower nectar
k__Eukaryota;p__Ascomycota;g__Fusarium;s__Fusarium avenaceum	11.61%	0.00%	0.058069	Ascomycota;g__Fusarium;s__Fusarium avenaceum	5.81%	A temperate grain and legume pathogen
k__Eukaryota;p__Ascomycota;g__Cladosporium;s__Cladosporium phlei	0.00%	11.26%	0.0562945	Ascomycota;g__Cladosporium;s__Cladosporium phlei	5.63%	Causes purple eyespot disease in plants; source of phleichrom from perylenequinine pigments
k__Eukaryota;p__Ascomycota;g__Alternaria;s__unknown	9.80%	0.00%	0.0489965	Ascomycota;g__Alternaria;s__unknown	4.90%	Plant pathogens; alergens; can be human pathogens
k__Eukaryota;p__Ascomycota;g__Aureobasidium;s__Aureobasidium pullulans	0.00%	0.90%	0.0044855	Ascomycota;g__Aureobasidium;s__Aureobasidium pullulans	0.45%	Black, yeast-like fungus; enzyme active
k__Eukaryota;p__Ascomycota;g__Aureobasidium;s__unknown	0.00%	0.57%	0.002856	Ascomycota;g__Aureobasidium;s__unknown	0.29%	Black, yeast-like fungus; enzyme active
k__Eukaryota;p__Basidiomycota;g__Filobasidium;s__Filobasidium wieringae	0.00%	0.47%	0.002352	Basidiomycota;g__Filobasidium;s__Filobasidium wieringae	0.24%	Yeast

Appendix E - Table 6
Huron River Bacteria
PFAS Surface Water Foam Study

TAXA	% Detection - Huron River Bacteria	Notes
Proteobacteria;g__Massilia;s__Massilia oculi	8.83%	Oxalobacteria; Possible human pathogen; isolated from infammed human eyeball
Bacteroidetes;g__Flavobacterium;s__Flavobacterium aquat	7.32%	Forms endospores. Motile. Fermente
Proteobacteria;g__Duganella;s__Duganella zoogloeoid	4.74%	An oxalobacteria; causes soft rot disease in fungi; benefici
Bacteroidetes;g__Flavobacterium;s__Flavobacterium terriger	4.37%	Soil bacteria; originally isolated in Korean soil from Isle of Dok
Proteobacteria;g__Sphingomonas;s__Sphingomonas aerola	4.29%	An aerborne bacteria; forms orange colonie
Proteobacteria;g__Duganella;s__Duganella phyllosphaer	4.26%	Oxalobacteria; associated with plants, esp Trifoliu
Proteobacteria;g__Pseudomonas;s__Pseudomonas helmanticens	3.13%	Phosphate-solubilizing bacteria found in forest so
Proteobacteria;g__Sphingomonas;s__Sphingomonas aurantia	2.86%	Psychrotolerant bacteria; can be aerborn
Proteobacteria;g__Psychrobacter;s__Psychrobacter alimentarius	2.83%	Spore-forming moderately halophilic bacterium, was first isolated from fermented seafood
Proteobacteria;g__Paracoccus;s__Paracoccus haeundaensis	2.65%	An aerobic, non-motile, Gram-negative, orange-pigmented, rod-shaped, astaxanthin-produci marine bacterium was isolated from the Haeundae Coast, Korea.

Appendix E - Table 7
Huron R Eukaryotes
PFAS Surface Water Foam Study

TAXA	% Detection - Huron River Eukaryotes	Notes
Ascomycota;g__Scytalidium;s__Scytalidium lignicola	58.61%	Common ascomycete; Incertae sedis; Wood and soil dwellers
Basidiomycota;g__Rhodotorula;s__Rhodotorula graminis	17.70%	Pigmented yeast; forms red-orange colonies
Ascomycota;g__Alternaria;s__Alternaria alternata	14.49%	Fungus causes leaf-spot disease; plant pathogen
Basidiomycota;g__Rhodotorula;s__unknown	9.20%	Common airborne yeast; can be a human pathogen

Appendix E - Table 8
Rogue River Bacteria
PFAS Surface Water Foam Study

TAXA	% Detection - Rogue River Bacteria	NOTES
Proteobacteria;g__Rickettsiella;s__Candidatus Rickettsiella isopodorum	21.27%	Intracellular bacteria found in isopod crustanceans
Firmicutes;g__Bacillus;s__Bacillus thuringiensis	5.93%	Soil-dwelling bacteria; Used as biological pesticide. Spores kill insect
Proteobacteria;g__Janthinobacterium;s__Janthinobacterium agaricidamnosu	4.20%	An oxalobacteria; causes soft rot disease in fungi; benefici
Bacteroidetes;g__Flavobacterium;s__Flavobacterium hercyniu	3.48%	A freshwater bacteria; found in hard waters; limited inf
Proteobacteria;g__Sphaerotilus;s__Sphaerotilus hipp	2.89%	Common filamentous bacteria found in waste waters and industrial effluen
Proteobacteria;g__Duganella;s__Duganella zoogloeoid	2.90%	An oxalobacteria; causes soft rot disease in fungi; benefici
Bacteroidetes;g__Arcicella;s__Arcicella aurantiac	2.57%	Single know species; waste water bacteria; forms ge
Bacteroidetes;g__Flavobacterium;s__Flavobacterium pectinovoru	2.42%	Produce polygalacturonate lyase; Taxonomy being debat
Bacteroidetes;g__Flavobacterium;s__Flavobacterium chungangen	2.00%	Freshwater aerobic bacteria; named after Chung-Ang Universi
Proteobacteria;g__Pseudomonas;s__Pseudomonas helmanticens	2.30%	Forest-dwelling bacteria; phosphate solubilizing; plant symbion

Appendix E - Table 9
Thornapple River Bacteria
PFAS Surface Water Foam Study

TAXA	Rogue River-01	Rogue River-02	Rogue River-03	Rogue River-04	Rogue River-06	Rogue River-07	MEDIAN	Notes
k__Eukaryota;p__Ascomycota;g__Scytalidium;s__Scytalidium lignicola	27.54%	28.60%	46.53%	27.16%	0.00%	0.00%	27.35%	Ubiquitous and common mold; found on oaks; can be human pathogen
k__Eukaryota;p__Ascomycota;g__Scytalidium;s__unknown	20.38%	20.51%	0.00%	19.44%	73.22%	57.23%	20.44%	Ubiquitous and common mold; can be human pathogen
k__Eukaryota;p__Ascomycota;g__Epicoccum;s__Epicoccum nigrum	16.79%	9.23%	15.94%	16.29%	0.00%	0.00%	12.59%	Plant pathogen and endophyte
k__Eukaryota;p__Ascomycota;g__Fusarium;s__Fusarium avenaceum	6.40%	6.54%	10.03%	7.56%	22.59%	22.81%	8.80%	A temperate grain and legume pathogen
k__Eukaryota;p__Ascomycota;g__Talaromyces;s__Talaromyces amestolkiae	5.26%	4.47%	7.08%	4.62%	0.00%	0.00%	4.55%	Telemorph of penicillium; can be a human pathogen
k__Eukaryota;p__Ascomycota;g__Penicillium;s__Penicillium oxalicum	5.29%	4.13%	7.22%	4.27%	0.00%	0.00%	4.20%	Pharmacologically significant fungi; enzyme-rich
k__Eukaryota;p__Ascomycota;g__Trichoderma;s__unknown	5.41%	3.06%	8.03%	5.31%	0.00%	0.00%	4.18%	Soil fungi; plant symbionts; endophytes
k__Eukaryota;p__Ascomycota;g__Alternaria;s__Alternaria alternata	5.44%	3.45%	5.17%	4.33%	0.00%	0.00%	3.89%	Leaf spot fungi; can be human pathogen
k__Eukaryota;p__Ascomycota;g__Colletotrichum;s__Colletotrichum fioriniae	5.47%	5.31%	0.00%	5.82%	0.00%	0.00%	2.66%	Apple blight fungus; pathogen; anthracnose

Appendix E - Table 10
Thornapple River Bacteria
PFAS Surface Water Foam Study

Bacteria Taxa: Phyla, Genus, Species	% Detection - Thornapple River Bacteria	Notes
Firmicutes;g__Bacillus;s__Bacillus thuringiensis	4.29%	Soil-dwelling bacteria; Used as biological pesticide. Spores kill insects.
Proteobacteria;g__Rickettsiella;s__Candidatus Rickettsiella isopodoru	4.17%	Intracellular bacteria found in isopod crustacean
Proteobacteria;g__Janthinobacterium;s__Janthinobacterium agaricidamnosu	3.32%	An oxalobacteria; causes soft rot disease in fungi; benefici
Proteobacteria;g__Ewingella;s__Ewingella americar	3.14%	Enterobacteria; Possible human pathogen; lactose-fermenter; enzymatically act
Proteobacteria;g__Pseudomonas;s__Pseudomonas yamanoru	3.13%	Flagelated bacteria; tough; extremeist; found in sub-antarctice environmen
Proteobacteria;g__Pseudomonas;s__Pseudomonas panac	3.10%	Flagelated bacteria; aerobic; can be a plant pathge
Bacteroidetes;g__Flavobacterium;s__Flavobacterium pisc	2.34%	Possible fish pathogen; isolated from trou
Proteobacteria;g__Rahnella;s__Rahnella variiger	2.19%	Possibly associated with Acute Oak Decline; likely plant pathoge
Proteobacteria;g__Sphingomonas;s__Sphingomonas faeni	2.08%	Chemoheterotrophic, strictly aerobic bacteria; Possess ubiquinone 10 as their major respiratory quinone, contain glycosphingolipids; produce yellow-pigmented colonies
Proteobacteria;g__Rugamonas;s__Rugamonas rubr	1.91%	An oxalobacteria; red-pigments; Documented in rivel

Appendix E - Table 11
Thornapple Eukaryotes
PFAS Surface Water Foam Study

#OTU ID	Thornapple River-08	Thornapple River-09	Thornapple River-09 DUPE	Thornapple River-10	Thornapple River-11	MEDIAN	Notes
k__Eukaryota;p__Ascomycota;g__Fusarium;s__Fusarium avenaceum	29.30%	42.16%	76.46%	39.92%	41.23%	41.233%	A temperate grain and legume pathogen
k__Eukaryota;p__Ascomycota;g__Colletotrichum;s__Colletotrichum graminicc	44.34%	30.32%	0.00%	0.00%	38.25%	30.316%	Maize anthracnose fungus
k__Eukaryota;p__Ascomycota;g__Candida;s__[Candida] sak	8.25%	15.96%	23.54%	7.87%	10.37%	10.374%	Cold-weather yeast; can be a human pathoge

Appendix E - Table 12
Pseudomonas
PFAS Surface Water Foam Study

Pseudomonad	Occurrence	Rogue River-01	Rogue River-02	Rogue River-03	Rogue River-04	Huron River-05	Rogue River-06	Rogue River-07	Thornapple River-08	Thornapple River-09	Thornapple River-09 DUPE	Thornapple River-10	Thornapple River-11	Lake Margrethe-15	Cedar Lake-16
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas lurida	14.0	0.014095	0.014519	0.01235	0.01921	0.010279	0.008884	0.009182	0.007268	0.006674	0.006506	0.003748	0.00789	0.012571	0.026557
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas baeti	13.0	0.013611	0.010766	0.011719	0.015297	0.021723	0.00789	0.007451	0.005403	0.00183	0.001988	0	0.003115	0.04809	0.00786
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas panac	13.0	0.017075	0.017255	0.017177	0.021895	0	0.014054	0.011037	0.076958	0.030142	0.03096	0.015528	0.035848	0.010574	0.016902
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas canadens	12.0	0.008545	0	0.008713	0.010173	0.004733	0.005117	0	0.024945	0.009154	0.009213	0.005386	0.011154	0.005554	0.006081
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas margina	12.0	0.010079	0	0.008583	0.011101	0.006964	0.007056	0	0.012825	0.006373	0.006466	0.004524	0.00806	0.006957	0.003906
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas putic	12.0	0.011462	0.009867	0.012063	0.013387	0.022013	0	0	0.004455	0.00597	0.005636	0.007147	0.005559	0.028991	0.059936
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas simia	12.0	0.008677	0.011173	0.009429	0.012666	0.008262	0.00662	0.005842	0.011693	0.010576	0.010356	0.005481	0.008787	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas helmanticens	11.0	0.030696	0.022405	0.023623	0.040031	0.031287	0.016254	0.01518	0	0.002619	0.0028	0	0	0.041699	0.008382
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas tolaa	10.0	0.012429	0.012695	0.012063	0.015205	0.00464	0	0	0.006104	0.00575	0.005946	0.004065	0.00555	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas extremorienta	9.0	0.008315	0	0	0.009544	0	0.005728	0.006702	0.030388	0.012487	0.012919	0.006995	0.017345	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas coleopteror	8.0	0	0	0	0	0.002938	0	0	0.002168	0.001875	0.00182	0.001433	0.002294	0.001011	0.001644
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas yamanor	8.0	0.015067	0	0	0	0	0	0	0.031301	0.034363	0.034454	0.021566	0.026368	0.065245	0.010282
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas brenn	7.0	0	0	0	0	0	0	0	0.005033	0.005941	0.005881	0.004383	0.00503	0.007644	0.003577
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas proteolyti	7.0	0	0	0	0	0.004622	0	0	0.00455	0.003325	0.002831	0	0.00308	0.005821	0.005773
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas trivia	7.0	0	0	0	0	0.006337	0	0	0.008391	0.007806	0.007515	0.002575	0.005498	0	0.00297
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas congela	6.0	0	0.004776	0	0	0.00454	0	0	0.003098	0.001588	0.001792	0	0	0	0.002184
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas mand	6.0	0	0	0	0	0.020503	0.008161	0.009219	0	0	0	0.00306	0	0.01874	0.01829
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas salomo	6.0	0	0	0	0	0	0	0	0.01542	0.016338	0.016148	0.015014	0.025718	0.015706	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas cae	5.0	0	0	0	0	0	0	0	0.004628	0.004005	0.003909	0.001688	0.00202	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas lundens	5.0	0	0	0	0	0	0	0	0.002171	0.000733	0.000706	0	0.001096	0	0.000803
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas protege	5.0	0	0	0	0	0	0	0	0.007353	0.003013	0.003262	0.002645	0.002856	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas synxant	5.0	0	0	0	0	0	0	0	0.012709	0.006762	0.006851	0.006688	0.007667	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas syringa	5.0	0	0	0	0	0.004263	0	0	0.004322	0.004081	0.003488	0	0.004532	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas taetrole	5.0	0	0	0	0	0	0	0	0.006728	0.00742	0.007313	0.005074	0.005001	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas viridifla	5.0	0	0	0	0	0	0	0	0.001865	0.002369	0.002603	0	0.00252	0.003733	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas cicho	3.0	0.004876	0	0.004404	0.005079	0	0	0	0	0	0	0	0	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas helle	3.0	0	0	0	0	0	0	0	0	0.001356	0.001359	0	0.001259	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas moraviens	3.0	0	0	0	0	0.024155	0	0	0.004057	0	0	0	0	0	0.011756
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas poa	3.0	0	0	0	0	0.004694	0	0	0	0	0	0.002139	0.006056	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas asturiens	2.0	0	0	0	0	0.006791	0	0	0	0	0	0	0	0	0.003461
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas fra	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0.003399	0.002091
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas gramir	2.0	0	0	0	0	0.013992	0	0	0	0	0	0	0	0	0.004268
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas lute	2.0	0	0	0	0	0.002076	0	0	0	0	0	0	0	0	0.001144
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas migula	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0.014392	0.014326
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas p	2.0	0	0	0	0	0.004859	0	0	0	0	0	0	0	0	0.008405
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas prose	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0.023849	0.007074
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas saxoni	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0.002536	0.000687
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas weihenstephanens	2.0	0	0	0	0	0	0	0	0	0.000974	0.000973	0	0	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas abietaniph	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.001475
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas arsenicoxyda	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0.011237	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas azotoforma	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00764
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas coronafacie	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.001046
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas costanti	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0.006817	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas deceptionens	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0.014607	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas fluoresce	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0.005817	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas ful	1.0	0	0	0	0	0	0	0	0	0.000406	0	0	0	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas gessar	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.005836
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas ging	1.0	0	0	0	0.009896	0	0	0	0	0	0	0	0	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas grimor	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0.010497	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas jesse	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.008845
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas kairouanens	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.012839
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas koreens	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0.011251	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas laurylsulfatiph	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.011781
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas laurylsulfativora	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.009088
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas li	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0.01237	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas moh	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.013485
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas moo	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.013748
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas orienta	1.0	0	0	0	0	0	0	0	0	0	0	0	0.014603	0	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas reinek	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.067625
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas silesiens	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0.014027	0
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas umsongens	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.019388
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas vero	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.005307
k__Bacteria;p__Proteobacteria;g__Pseudomonas;s__Pseudomonas versu	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0.018117	0

Appendix F

Foam Production

From Grocery Store Shiitake Fungi

Hypothesis

- Statement: Surface water foams (SWF) collected from three rivers in Michigan show high fraction of fungal DNA, via 16S rRNA Illumina Sequencing.
- Hypothesis 1: Natural fungal chemicals are contributing to foam generation on natural surface waters.
- Hypothesis 2: Terrestrial fungal DNA is washed into rivers from land-sources.

Experimental Design

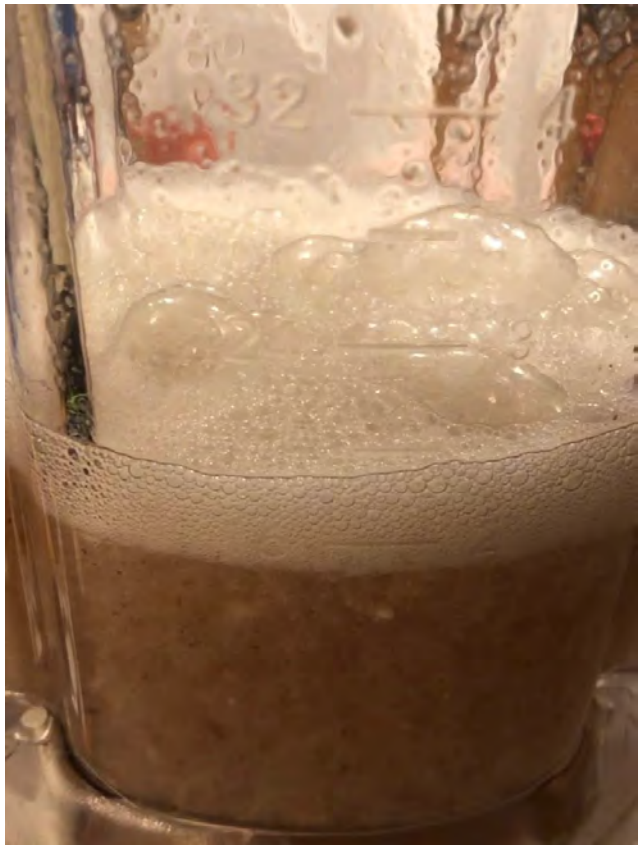
- Question: Does terrestrial fungi contribute to foaming effect?

- 500 ml chlorinated, municipal tap water (Control)
- 500 ml chlorinated, municipal tap water + one 20g Shiitake (Test) mushroom
- Blend water high 30 seconds
- Visually compare results

Results

Control – Tap Water only

Test – Tap Water + Shiitake



Discussion

- Potential mushroom-based “foaming agents”
  - Linoleic, palmitic, oleic, tetradecenoic, stearic and myristic acids.
  - Various surface-active peptides such as malpinins, a group of amphiphilic acetylated hexapeptides

https://pubs.acs.org/doi/pdf/10.1021/acs.orglett.9b00193

https://phys.org/news/2019-06-fungus-highly-effective-surfactant.html

AECOM
3950 Sparks Drive Southeast
Grand Rapids, MI 49546
aecom.com