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

Project name:
Wurtsmith Air Force Base

Project ref:
60518528

From:
Jeremiah Morse, AECOM

Date:
February 6, 2019

To:
Michael Jury
Michigan Department of Environmental Quality – Remediation and Redevelopment Division
401 Ketchum St.
Bay City, Michigan 48708

CC:
Susan Leeming, MDEQ
Robert Delaney, MDEQ
Beth Place, MDEQ
John Bradley, MDEQ
John Cuthbertson, AECOM
Dorin Bogdan, AECOM
Michael Wolf, AECOM

Memo

Subject: December 2018 Van Etten Lake Surface Water Sampling

1. Introduction

This Technical Memorandum (TM) is being submitted to the Michigan Department of Environmental Quality (MDEQ) presenting surface water and pore water sample analytical findings from Van Etten Lake near the former Wurtsmith Air Force Base (WAFB) located in Oscoda Township, Michigan. AECOM understands that the MDEQ is the regulatory authority in charge of protection of human health and the environment with regard to contamination present at and migrating from the former WAFB. Since 2010, per- and polyfluoroalkyl substances (PFAS) have been identified in groundwater, surface water, soil, sediments and biota at WAFB.

During low winter water levels on Van Etten Lake, MDEQ personnel observed areas where ice was not forming along the shoreline. It was believed this may be occurring due to potential groundwater discharge areas along the eastern boundary of the former Air Force base and Van Etten Lake. MDEQ requested AECOM to collect pore water and surface water samples from these potential groundwater discharge areas. This technical memorandum summarizes the findings of this sampling effort on Van Etten Lake completed December, 2018.

2. Investigation

AECOM mobilized to the site on 27 December 2018. Four (4) locations were identified as potential groundwater discharge areas (**Figure 1**). These locations were identified by observing areas with the absence of near-shore ice and/or had visible water discharging from on-shore sediments. During the winter months it is expected that groundwater discharging into surface water and/or from surface sediments would be relatively warmer than adjacent surface water and/or surface sediments. A Forward Looking Infrared (FLIR) camera was utilized to further verify potential warmer groundwater discharge areas at each of the four sampling locations (**Photo Log Appendix A**).

Two samples were collected from each of the four locations. The first was a pore water sample collected with a Henry sampler installed onshore to intercept where groundwater may be discharging. The Henry sampler consisted of a narrow gauge stainless steel tube with a series of interlaced machined slots on the sampling end of the tube that was inserted into the sediment. New, flexible tubing was then connected to the other end of the sampler and a peristaltic pump was used to extract the sample. The second sample at each location was collected from the lake directly off-shore from the Henry sample location, close to the lake bottom at or near the same elevation in which the Henry sample was taken.

Due to the prevalence of PFAS in articles of commerce, cross contamination may occur between sampling equipment and the water samples. To ensure no cross-contamination occurred, AECOM decontaminated all non-dedicated equipment with a Liquinox-deionized water mixture. Field personnel performing the collection procedures donned a new pair of sampling gloves prior to handling any sampling equipment, between sampling and decontamination procedures, and between sampling locations.

Samples were collected in appropriate certified PFA-free sample containers (provided by the laboratory), labeled, transferred to a cooler on ice, and submitted to the laboratory, under chain-of-custody documentation, for analysis. Detailed sampling and handling procedures are provided in MDEQ PFAS Sampling Guidance documents.

2.1 Methodology

All surface water samples were analyzed for PFAS. Vista Analytical Laboratory (Vista) in El Dorado Hills, California conducted the PFAS analysis using Modified Environmental Protection Agency's (EPA) Method 537 Rev. 1.1 with isotope dilution. Currently, a published USEPA reference method is not available for the analysis of PFAS in surface water. In 2009, USEPA published reference Method 537 Rev. 1.1 for finished drinking water, but this method is not appropriate for more complex solid and aqueous matrices. The Method 537 Rev. 1.1 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.

The Michigan Department of Environmental Quality (MDEQ) is using an isotope dilution method for analysis of 24 PFAS for many of their ongoing investigations. 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 5.1 recognizes that isotope dilution is a better technique for quantifying PFAS at low concentrations especially in complex environmental matrices due to these 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.

3. Results

Analytical results from this event are summarized in the **Table 1**. The laboratory analytical summary report is included for reference (**Appendix B**). All samples analyzed detected Perfluorooctanesulfonic acid (PFOS) at concentrations greater than the Michigan GSI Criteria of 12 ng/L. **Figure 2** depicts detected concentrations of specific PFAS compounds (Total PFAS|PFOA|PFOS|PFHxS) at each sample location.

Figures

DEQ

1/30/2019

Surface Water Samples

●

Pore Water Samples

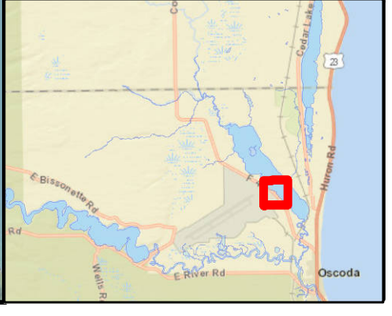
▲

FIGURE 1
DECEMBER 2018 VAN ETTEN LAKE SURFACE WATER & PORE WATER SAMPLE LOCATIONS

FORMER WURTSMITH AIR FORCE BASE IOSCO COUNTY, MICHIGAN

N

0 440 880
Feet



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Total PFAS Plume
Concentration (ppt)
- 10 - <70
- 70 - <1,000
- 1,000 - <5,000
- >5,000

Sample Location - Sample Date
Total PFAS (PFOA | PFOS | PFHxS) ppt

Van Etten Lake

SW-4 - 12/27/2018
553 (47 | 50 | 212)

SW-3 - 12/27/2018
314 (28 | 59 | 96)

PW-4 - 12/27/2018
159 (11 | 61 | 55)

PW-3 - 12/27/2018
2,232 (108 | 55 | 591)

SW-2 - 12/27/2018
574 (46 | 102 | 176)

PW-2 - 12/27/2018
356 (19 | 195 | 54)

SW-1 - 12/27/2018
1,855 (131 | 497 | 531)

PW-1 - 12/27/2018
1,064 (84 | 566 | 282)

DEQ

1/30/2019

Total PFAS (ppt)
Surface Water Samples
- Non-Detect
- <12
- 12 - <50
- 50 - <100
- 100 - <1,000
- 1,000 - <2,500
- >2,500

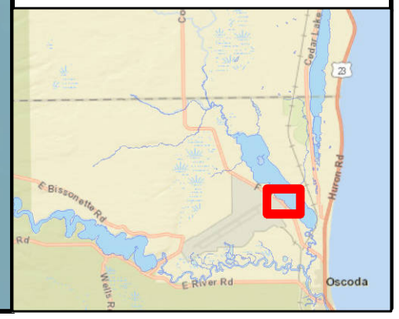
Pore Water Samples
- Non-Detect
- <12
- 12 - <50
- 50 - <100
- 100 - <1,000
- 1,000 - <2,500
- >2,500

FIGURE 2
DECEMBER 2018 VAN ETTEN LAKE
SURFACE WATER &
PORE WATER
TOTAL PFAS
SAMPLING RESULTS

FORMER WURTSMITH
AIR FORCE BASE
IOSCO COUNTY,
MICHIGAN

N

0 440 880
Feet



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Tables

Van Etten Lake Suface Water Sampling
December 2018
Former Wurtsmith Air Force Base
Iosco County, Michigan
60518528

PFAS Compound	PW-01	SW-01	PW-02	SW-02	PW-03	SW-03	PW-04	SW-04
	12/27/2018	12/27/2018	12/27/2018	12/27/2018	12/27/2018	12/27/2018	12/27/2018	12/27/2018
	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l
PFBA	2	24	7	10	143	10	5	22
PFPeA	2	83	6	30	592	32	6	79
PFHxA	11	77	8	30	467	27	7	61
PFHpA	3	49	9	16	205	17	6	32
PFOA	84	131	19	46	108	28	11	47
PFNA	3	3	4	< 4.19	< 4.09	< 4.23	2	< 4.10
PFDA	< 4.09	< 4.19	< 4.05	< 4.19	< 4.09	< 4.23	< 4.06	< 4.10
PFUnDA	< 4.09	< 4.19	< 4.05	< 4.19	< 4.09	< 4.23	< 4.06	< 4.10
PFDoDA	< 4.09	< 4.19	< 4.05	< 4.19	< 4.09	< 4.23	< 4.06	< 4.10
PFTrDA	< 4.09	< 4.19	< 4.05	< 4.19	< 4.09	< 4.23	< 4.06	< 4.10
PFTeDA	< 4.09	< 4.19	< 4.05	< 4.19	< 4.09	< 4.23	< 4.06	< 4.10
PFBS	3	6	3	3	17	2	2	4
PFPeS	< 4.09	13	1	4	35	4	1	9
PFHxS	282	531	54	176	591	96	55	212
PFHpS	14	33	8	10	15	5	3	5
PFOS	566	497	195	102	55	59	61	50
PFNS	< 4.09	< 4.19	< 4.05	< 4.19	< 4.09	< 4.23	< 4.06	< 4.10
PFDS	< 4.09	< 4.19	< 4.05	< 4.19	< 4.09	< 4.23	< 4.06	< 4.10
PFOSA	< 4.09	< 4.19	< 4.05	< 4.19	< 4.09	< 4.23	< 4.06	< 4.10
4:2 FTSA	< 4.09	< 4.19	< 4.05	< 4.19	< 4.09	< 4.23	< 4.06	< 4.10
6:2 FTSA	89	407	42	146	5	34	< 4.06	32
8:2 FTSA	6	2	< 4.05	< 4.19	< 4.09	< 4.23	< 4.06	< 4.10
EtFOSAA	< 4.09	< 4.19	< 4.05	< 4.19	< 4.09	< 4.23	< 4.06	< 4.10
MeFOSAA	< 4.09	< 4.19	< 4.05	< 4.19	< 4.09	< 4.23	< 4.06	< 4.10
Total PFAS	**1,064**	**1,855**	**356**	**574**	**2,232**	**314**	**159**	**553**

Perfluoroalkyl Carboxylic Acids (**PFCAs**)
Perfluoroalkane Sulfonic Acids (**PFSAs**)
Perfluoroalkane Sulfonamides (**FASAs**)
Fluorotelomer Sulfonic Acids (**FTSAs**)
N-Ethyl Perfluoroalkane Sulfonamidoacetic Acids (**EtFASAAs**)
N-Methyl Perfluoroalkane Sulfonamidoacetic Acids (**MeFASAAs**)

Appendix A – Photograph Log

AECOM

PHOTOGRAPH LOG

Project Name:	Site Location:	Sample Location ID:	Project No.
Former Wurtsmith Air Force Base	Oscoda Township, MI	PW/SW-1	60518528

Photo No. 1	Date: 12/27/18

Direction Photo Taken:

North

Description:

Infrared picture of PW/SW-1 sampling location

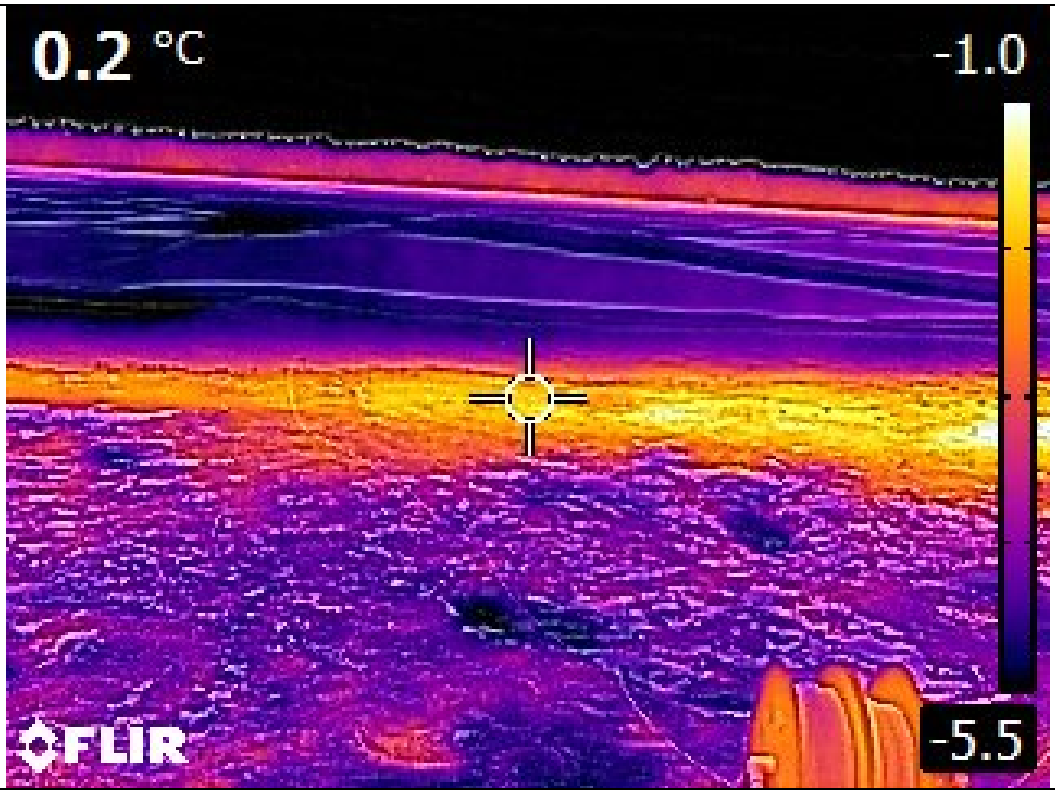

Photo No. 2	Date: 12/27/18

Direction Photo Taken:

North

Description:

Color picture of PW/SW-1 sampling location

AECOM

PHOTOGRAPH LOG

Project Name:	Site Location:	Sample Location ID:	Project No.
Former Wurtsmith Air Force Base	Oscoda Township, MI	PW/SW-2	60518528

Photo No. 1	Date: 12/27/18

Direction Photo Taken:

North

Description:

Infrared picture of PW/SW-2 sampling location

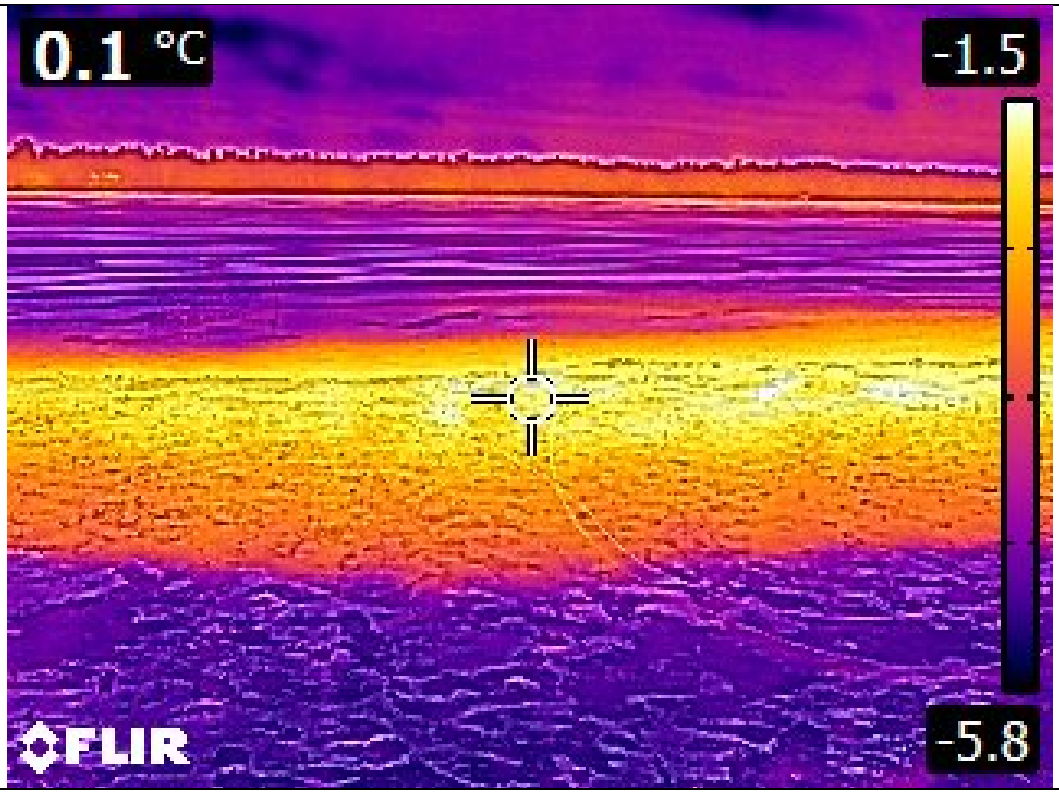

Photo No. 2	Date: 12/27/18

Direction Photo Taken:

North

Description:

Color picture of PW/SW-2 sampling location

AECOM

PHOTOGRAPH LOG

Project Name:	Site Location:	Sample Location ID:	Project No.
Former Wurtsmith Air Force Base	Oscoda Township, MI	PW/SW-3	60518528

Photo No.	Date:
1	12/27/18

Direction Photo Taken:

North

Description:

Infrared picture of PW/SW-3 sampling location

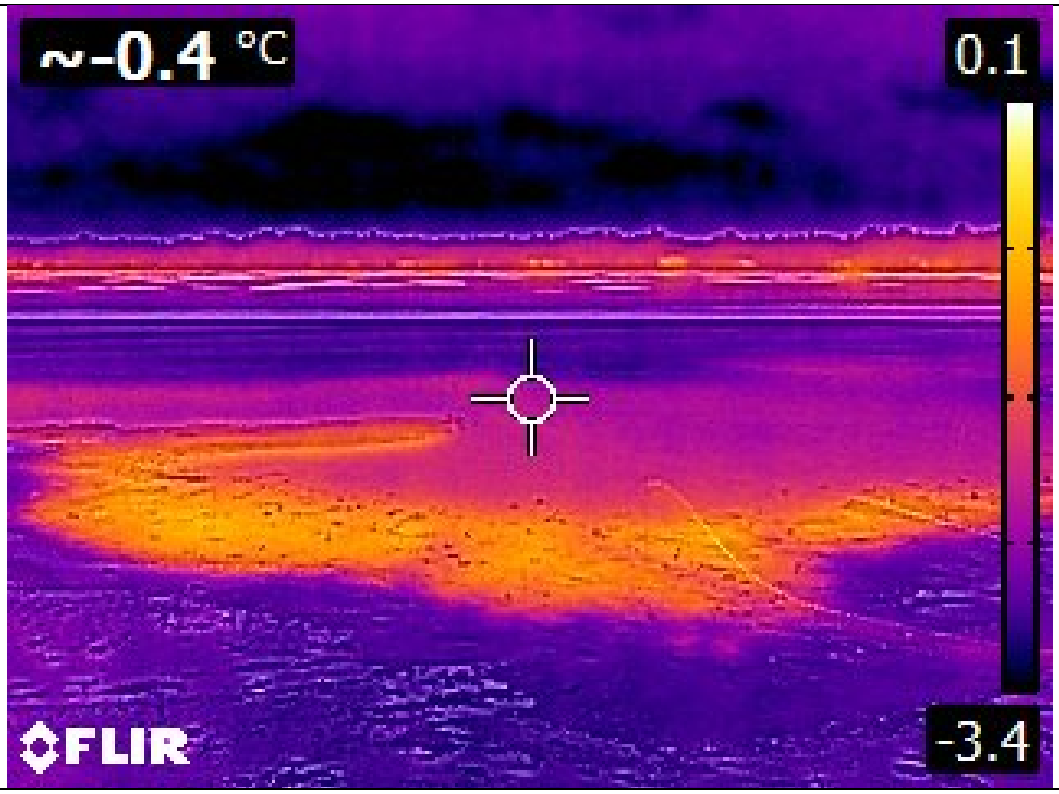

Photo No.	Date:
2	12/27/18

Direction Photo Taken:

North

Description:

Color picture of PW/SW-3 sampling location

AECOM

PHOTOGRAPH LOG

Project Name:	Site Location:	Sample Location ID:	Project No.
Former Wurtsmith Air Force Base	Oscoda Township, MI	PW/SW-4	60518528

Photo No.	Date:
1	12/27/18

Direction Photo Taken:

North

Description:

Infrared picture of PW/SW-4 sampling location

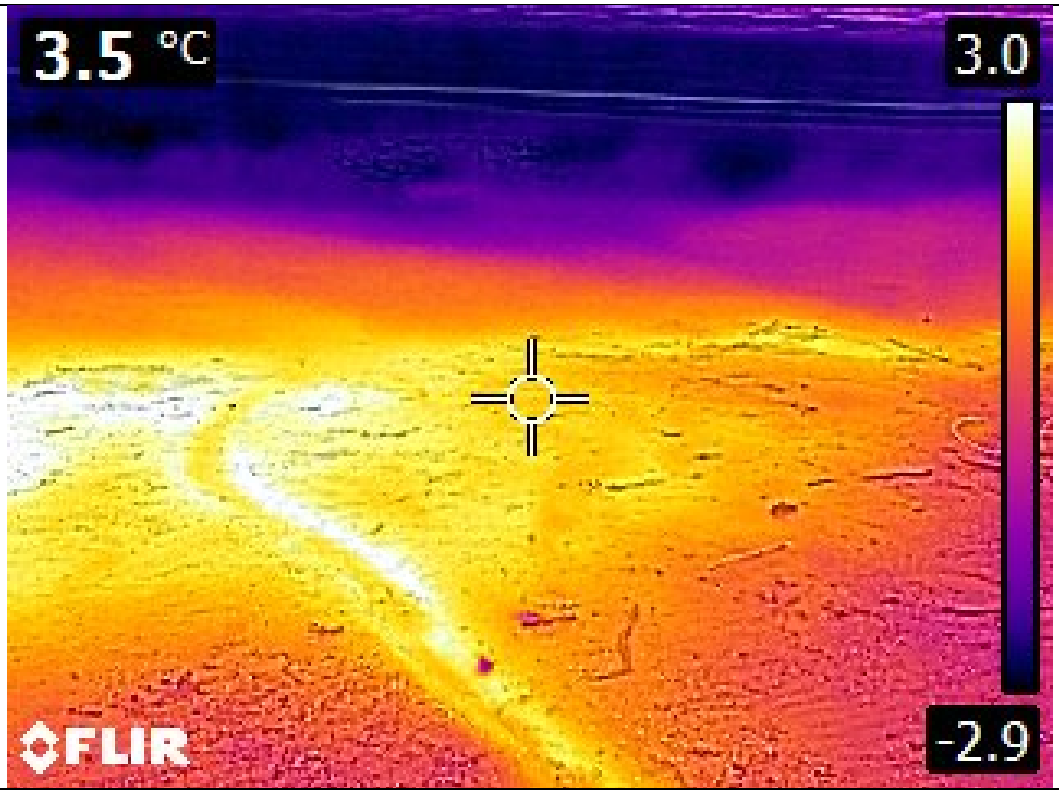

Photo No.	Date:
2	12/27/18

Direction Photo Taken:

North

Description:

Color picture of PW/SW-4 sampling location

Appendix B – Analytical Report

January 14, 2019

Vista Work Order No. 1900023

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 03, 2019 under your Project Name 'Wurtsmith'.

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 Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1900023
Case Narrative

Sample Condition on Receipt:

Eight 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.

Analytical Notes:

PFAS Isotope Dilution Method

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 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 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
1900023-01	PW1812271330GSC	27-Dec-18 13:30	03-Jan-19 09:42	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1900023-02	SW1812271410GSC	27-Dec-18 14:10	03-Jan-19 09:42	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1900023-03	PW1812271435GSC	27-Dec-18 14:35	03-Jan-19 09:42	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1900023-04	SW1812271450GSC	27-Dec-18 14:50	03-Jan-19 09:42	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1900023-05	PW1812271510GSC	27-Dec-18 15:10	03-Jan-19 09:42	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1900023-06	SW1812271530GSC	27-Dec-18 15:30	03-Jan-19 09:42	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1900023-07	PW1812271555GSC	27-Dec-18 15:55	03-Jan-19 09:42	HDPE Bottle, 250 mL
				HDPE Bottle, 250 mL
1900023-08	SW1812271610GSC	27-Dec-18 16:10	03-Jan-19 09:42	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: Wurtsmith
Matrix: Aqueous

Laboratory Data

Lab Sample: B9A0023-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		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFPeA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFBS	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-4:2 FTS	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFHxA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFPeS	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFHpA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFHxS	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
Br-PFHxS	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
Total PFHxS	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-6:2 FTS	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFOA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
Br-PFOA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
Total PFOA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFHpS	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFNA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFOSA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFOS	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
Br-PFOS	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
Total PFOS	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFDA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-8:2FTS	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFNS	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-MeFOSAA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
Br-MeFOSAA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
Total MeFOSAA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-EtFOSAA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
Br-EtFOSAA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
Total EtFOSAA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFUnA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFDS	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFDoA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFTrDA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
L-PFTeDA	ND	1.37	2.00	4.00		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.1	60 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
13C3-PFPeA	IS	92.4	60 - 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
13C3-PFBS	IS	98.2	60 - 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1

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

Client Data

Name: Merit Laboratories, Inc. Matrix: Aqueous

Project: Wurtsmith

Laboratory Data

Lab Sample: B9A0023-BLK1 Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-4:2 FTS	IS	82.2	40 - 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
13C2-PFHxA	IS	94.5	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
13C4-PFHpA	IS	96.2	60 - 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
18O2-PFHxS	IS	98.0	60 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
13C2-6:2 FTS	IS	104	40 - 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
13C2-PFOA	IS	94.0	60 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
13C5-PFNA	IS	89.4	50 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
13C8-PFOSA	IS	45.0	20 - 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
13C8-PFOS	IS	90.5	60 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
13C2-PFDA	IS	73.4	60 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
13C2-8:2 FTS	IS	90.2	40 - 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
d3-MeFOSAA	IS	71.3	50 - 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
d5-EtFOSAA	IS	71.5	50 - 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
13C2-PFUnA	IS	74.9	60 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
13C2-PFDoA	IS	63.7	30 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1
13C2-PFTeDA	IS	79.3	20 - 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:29	1

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

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

Client Data

Name: Merit Laboratories, Inc. Matrix: Aqueous
Project: Wurtsmith

Laboratory Data

Lab Sample: B9A0023-BS1 Column: BEH C18

Analyte	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	44.1	40.0	110	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFPeA	43.8	40.0	110	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFBS	45.7	40.0	114	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-4:2 FTS	45.9	40.0	115	60 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFHxA	43.4	40.0	109	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFPeS	48.3	40.0	121	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFHpA	43.4	40.0	109	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
Total PFHxS	41.0	40.0	103	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-6:2 FTS	48.8	40.0	122	60 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
Total PFOA	40.9	40.0	102	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFHpS	45.1	40.0	113	60 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFNA	44.3	40.0	111	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFOSA	42.7	40.0	107	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
Total PFOS	45.6	40.0	114	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFDA	44.4	40.0	111	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-8:2FTS	47.1	40.0	118	60 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFNS	44.6	40.0	111	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
Total MeFOSAA	39.1	40.0	97.7	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
Total EtFOSAA	47.8	40.0	119	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFUnA	44.8	40.0	112	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFDS	38.6	40.0	96.6	60 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFDoA	40.0	40.0	99.9	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFTrDA	45.0	40.0	113	60 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
L-PFTeDA	44.7	40.0	112	70 - 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	101	60- 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
13C3-PFPeA	IS	97.7	60- 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
13C3-PFBS	IS	94.5	60- 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
13C2-4:2 FTS	IS	86.4	40- 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
13C2-PFHxA	IS	101	70- 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
13C4-PFHpA	IS	104	60- 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
18O2-PFHxS	IS	107	60- 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
13C2-6:2 FTS	IS	103	40- 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
13C2-PFOA	IS	95.9	60- 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
13C5-PFNA	IS	85.2	50- 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1

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

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Matrix: Aqueous

Laboratory Data

Lab Sample: B9A0023-BS1
Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C8-PFOSA	IS	44.1	20- 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
13C8-PFOS	IS	108	60- 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
13C2-PFDA	IS	76.7	60- 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
13C2-8:2 FTS	IS	97.3	40- 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
d3-MeFOSAA	IS	77.7	50- 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
d5-EtFOSAA	IS	70.0	50- 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
13C2-PFUnA	IS	76.8	60- 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
13C2-PFDoA	IS	72.4	30- 130		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1
13C2-PFTeDA	IS	87.6	20- 150		B9A0023	04-Jan-19	0.250 L	07-Jan-19 17:19	1

Sample ID: PW1812271330GSC — **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: PW1
Matrix: Aqueous
Date Collected: 27-Dec-18 13:30

Laboratory Data

Lab Sample: 1900023-01
Date Received: 03-Jan-19 09:42
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	1.85	1.40	2.05	4.09	J	B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFPeA	2.37	1.40	2.05	4.09	J	B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFBS	2.72	1.40	2.05	4.09	J	B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-4:2 FTS	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFHxA	10.6	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFPeS	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFHpA	2.89	1.40	2.05	4.09	J	B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFHxS	251	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
Br-PFHxS	31.7	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
Total PFHxS	282	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-6:2 FTS	88.5	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFOA	81.1	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
Br-PFOA	2.90	1.40	2.05	4.09	J	B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
Total PFOA	84.0	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFHpS	14.4	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFNA	2.84	1.40	2.05	4.09	J	B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFOSA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFOS	347	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
Br-PFOS	219	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
Total PFOS	566	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFDA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-8:2FTS	6.27	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFNS	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-MeFOSAA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
Br-MeFOSAA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
Total MeFOSAA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-EtFOSAA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
Br-EtFOSAA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
Total EtFOSAA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFUnA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFDS	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFDoA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFTrDA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
L-PFTeDA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	97.8	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
13C3-PFPeA	IS	101	60 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
13C3-PFBS	IS	103	60 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1

Sample ID: PW1812271330GSC

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: PW1
Matrix: Aqueous
Date Collected: 27-Dec-18 13:30

Laboratory Data

Lab Sample: 1900023-01
Date Received: 03-Jan-19 09:42
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-4:2 FTS	IS	82.6	40 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
13C2-PFHxA	IS	98.5	70 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
13C4-PFHpA	IS	99.3	60 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
18O2-PFHxS	IS	101	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
13C2-6:2 FTS	IS	96.3	40 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
13C2-PFOA	IS	96.3	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
13C5-PFNA	IS	91.2	50 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
13C8-PFOSA	IS	66.4	20 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
13C8-PFOS	IS	96.4	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
13C2-PFDA	IS	80.0	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
13C2-8:2 FTS	IS	95.1	40 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
d3-MeFOSAA	IS	79.0	50 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
d5-EtFOSAA	IS	82.7	50 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
13C2-PFUnA	IS	83.1	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
13C2-PFDoA	IS	73.0	30 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1
13C2-PFTeDA	IS	85.1	20 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:15	1

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

Sample ID: SW1812271410GSC **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: SW1
Matrix: Aqueous
Date Collected: 27-Dec-18 14:10

Laboratory Data

Lab Sample: 1900023-02
Date Received: 03-Jan-19 09:42
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	24.4	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFPeA	82.7	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFBS	5.88	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-4:2 FTS	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFHxA	76.5	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFPeS	12.7	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFHpA	48.8	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFHxS	455	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
Br-PFHxS	76.4	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
Total PFHxS	531	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-6:2 FTS	407	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFOA	123	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
Br-PFOA	7.51	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
Total PFOA	131	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFHpS	32.6	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFNA	3.09	1.43	2.09	4.19	J	B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFOSA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFOS	229	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
Br-PFOS	268	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
Total PFOS	497	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFDA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-8:2FTS	2.01	1.43	2.09	4.19	J	B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFNS	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-MeFOSAA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
Br-MeFOSAA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
Total MeFOSAA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-EtFOSAA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
Br-EtFOSAA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
Total EtFOSAA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFUnA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFDS	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFDoA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFTrDA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
L-PFTeDA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.3	60 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
13C3-PFPeA	IS	93.5	60 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
13C3-PFBS	IS	99.2	60 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1

Sample ID: SW1812271410GSC

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: SW1
Matrix: Aqueous
Date Collected: 27-Dec-18 14:10

Laboratory Data

Lab Sample: 1900023-02
Date Received: 03-Jan-19 09:42
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-4:2 FTS	IS	85.9	40 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
13C2-PFHxA	IS	94.0	70 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
13C4-PFHpA	IS	96.2	60 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
18O2-PFHxS	IS	96.1	60 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
13C2-6:2 FTS	IS	96.4	40 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
13C2-PFOA	IS	86.6	60 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
13C5-PFNA	IS	89.1	50 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
13C8-PFOSA	IS	72.6	20 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
13C8-PFOS	IS	93.6	60 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
13C2-PFDA	IS	81.2	60 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
13C2-8:2 FTS	IS	86.9	40 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
d3-MeFOSAA	IS	84.7	50 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
d5-EtFOSAA	IS	92.3	50 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
13C2-PFUnA	IS	77.6	60 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
13C2-PFDoA	IS	72.4	30 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1
13C2-PFTeDA	IS	92.0	20 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:26	1

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

Sample ID: PW1812271435GSC **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: PW2
Matrix: Aqueous
Date Collected: 27-Dec-18 14:35

Laboratory Data

Lab Sample: 1900023-03
Date Received: 03-Jan-19 09:42
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	7.18	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFPeA	6.33	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFBS	2.53	1.39	2.02	4.05	J	B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-4:2 FTS	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFHxA	7.76	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFPeS	1.45	1.39	2.02	4.05	J	B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFHpA	9.25	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFHxS	48.5	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
Br-PFHxS	5.30	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
Total PFHxS	53.8	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-6:2 FTS	41.5	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFOA	19.4	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
Br-PFOA	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
Total PFOA	19.4	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFHpS	8.15	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFNA	3.53	1.39	2.02	4.05	J	B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFOSA	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFOS	94.4	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
Br-PFOS	101	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
Total PFOS	195	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFDA	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-8:2FTS	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFNS	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-MeFOSAA	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
Br-MeFOSAA	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
Total MeFOSAA	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-EtFOSAA	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
Br-EtFOSAA	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
Total EtFOSAA	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFUnA	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFDS	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFDoA	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFTrDA	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
L-PFTeDA	ND	1.39	2.02	4.05		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	95.5	60 - 130		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
13C3-PFPeA	IS	92.5	60 - 150		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
13C3-PFBS	IS	90.3	60 - 150		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1

Sample ID: PW1812271435GSC

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: PW2
Matrix: Aqueous
Date Collected: 27-Dec-18 14:35

Laboratory Data

Lab Sample: 1900023-03
Date Received: 03-Jan-19 09:42
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-4:2 FTS	IS	78.5	40 - 150		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
13C2-PFHxA	IS	92.2	70 - 130		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
13C4-PFHpA	IS	88.7	60 - 150		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
18O2-PFHxS	IS	97.1	60 - 130		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
13C2-6:2 FTS	IS	92.8	40 - 150		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
13C2-PFOA	IS	86.8	60 - 130		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
13C5-PFNA	IS	92.6	50 - 130		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
13C8-PFOSA	IS	55.6	20 - 150		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
13C8-PFOS	IS	94.5	60 - 130		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
13C2-PFDA	IS	76.5	60 - 130		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
13C2-8:2 FTS	IS	83.4	40 - 150		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
d3-MeFOSAA	IS	81.5	50 - 150		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
d5-EtFOSAA	IS	85.9	50 - 150		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
13C2-PFUnA	IS	74.6	60 - 130		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
13C2-PFDoA	IS	74.1	30 - 130		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1
13C2-PFTeDA	IS	86.6	20 - 150		B9A0023	04-Jan-19	0.247 L	07-Jan-19 19:36	1

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

Sample ID: SW1812271450GSC

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: SW2
Matrix: Aqueous
Date Collected: 27-Dec-18 14:50

Laboratory Data

Lab Sample: 1900023-04
Date Received: 03-Jan-19 09:42
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	10.4	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFPeA	30.3	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFBS	3.07	1.43	2.09	4.19	J	B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-4:2 FTS	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFHxA	29.7	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFPeS	4.48	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFHpA	15.9	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFHxS	153	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
Br-PFHxS	23.0	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
Total PFHxS	176	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-6:2 FTS	146	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFOA	43.2	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
Br-PFOA	2.78	1.43	2.09	4.19	J	B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
Total PFOA	46.0	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFHpS	10.3	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFNA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFOSA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFOS	42.3	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
Br-PFOS	59.2	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
Total PFOS	102	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFDA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-8:2FTS	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFNS	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-MeFOSAA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
Br-MeFOSAA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
Total MeFOSAA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-EtFOSAA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
Br-EtFOSAA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
Total EtFOSAA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFUnA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFDS	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFDoA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFTrDA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
L-PFTeDA	ND	1.43	2.09	4.19		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	95.3	60 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
13C3-PFPeA	IS	95.6	60 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
13C3-PFBS	IS	94.2	60 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1

Sample ID: SW1812271450GSC

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: SW2
Matrix: Aqueous
Date Collected: 27-Dec-18 14:50

Laboratory Data

Lab Sample: 1900023-04
Date Received: 03-Jan-19 09:42
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-4:2 FTS	IS	78.1	40 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
13C2-PFHxA	IS	96.2	70 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
13C4-PFHpA	IS	99.2	60 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
18O2-PFHxS	IS	94.8	60 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
13C2-6:2 FTS	IS	87.9	40 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
13C2-PFOA	IS	92.8	60 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
13C5-PFNA	IS	86.1	50 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
13C8-PFOSA	IS	64.3	20 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
13C8-PFOS	IS	97.1	60 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
13C2-PFDA	IS	80.8	60 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
13C2-8:2 FTS	IS	93.0	40 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
d3-MeFOSAA	IS	77.6	50 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
d5-EtFOSAA	IS	84.9	50 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
13C2-PFUnA	IS	76.1	60 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
13C2-PFDoA	IS	74.6	30 - 130		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1
13C2-PFTeDA	IS	85.1	20 - 150		B9A0023	04-Jan-19	0.239 L	07-Jan-19 19:47	1

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

Sample ID: PW1812271510GSC

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: PW3
Matrix: Aqueous
Date Collected: 27-Dec-18 15:10

Laboratory Data

Lab Sample: 1900023-05
Date Received: 03-Jan-19 09:42
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	143	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFPeA	592	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFBS	16.9	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-4:2 FTS	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFHxA	467	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFPeS	35.1	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFHpA	205	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFHxS	492	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
Br-PFHxS	99.6	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
Total PFHxS	591	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-6:2 FTS	5.11	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFOA	97.8	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
Br-PFOA	10.1	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
Total PFOA	108	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFHpS	14.7	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFNA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFOSA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFOS	4.51	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
Br-PFOS	50.0	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
Total PFOS	54.5	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFDA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-8:2FTS	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFNS	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-MeFOSAA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
Br-MeFOSAA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
Total MeFOSAA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-EtFOSAA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
Br-EtFOSAA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
Total EtFOSAA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFUnA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFDS	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFDoA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFTrDA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
L-PFTeDA	ND	1.40	2.05	4.09		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.3	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
13C3-PFPeA	IS	94.8	60 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
13C3-PFBS	IS	105	60 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1

Sample ID: PW1812271510GSC

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: PW3
Matrix: Aqueous
Date Collected: 27-Dec-18 15:10

Laboratory Data

Lab Sample: 1900023-05
Date Received: 03-Jan-19 09:42
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-4:2 FTS	IS	89.2	40 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
13C2-PFHxA	IS	96.3	70 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
13C4-PFHpA	IS	95.4	60 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
18O2-PFHxS	IS	102	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
13C2-6:2 FTS	IS	97.6	40 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
13C2-PFOA	IS	85.4	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
13C5-PFNA	IS	87.8	50 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
13C8-PFOSA	IS	57.3	20 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
13C8-PFOS	IS	92.2	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
13C2-PFDA	IS	74.3	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
13C2-8:2 FTS	IS	80.6	40 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
d3-MeFOSAA	IS	72.7	50 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
d5-EtFOSAA	IS	80.4	50 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
13C2-PFUnA	IS	70.3	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
13C2-PFDoA	IS	64.4	30 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1
13C2-PFTeDA	IS	79.8	20 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 19:57	1

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

Sample ID: SW1812271530GSC

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: SW3
Matrix: Aqueous
Date Collected: 27-Dec-18 15:30

Laboratory Data

Lab Sample: 1900023-06
Date Received: 03-Jan-19 09:42
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	10.1	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFPeA	32.3	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFBS	2.47	1.45	2.12	4.23	J	B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-4:2 FTS	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFHxA	27.3	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFPeS	3.50	1.45	2.12	4.23	J	B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFHpA	17.1	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFHxS	82.0	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
Br-PFHxS	13.6	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
Total PFHxS	95.6	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-6:2 FTS	33.5	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFOA	26.5	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
Br-PFOA	1.83	1.45	2.12	4.23	J	B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
Total PFOA	28.4	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFHpS	4.92	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFNA	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFOSA	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFOS	20.0	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
Br-PFOS	39.2	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
Total PFOS	59.1	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFDA	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-8:2FTS	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFNS	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-MeFOSAA	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
Br-MeFOSAA	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
Total MeFOSAA	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-EtFOSAA	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
Br-EtFOSAA	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
Total EtFOSAA	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFUnA	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFDS	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFDoA	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFTrDA	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
L-PFTeDA	ND	1.45	2.12	4.23		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	99.2	60 - 130		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
13C3-PFPeA	IS	93.8	60 - 150		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
13C3-PFBS	IS	101	60 - 150		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1

Sample ID: SW1812271530GSC **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: SW3
Matrix: Aqueous
Date Collected: 27-Dec-18 15:30

Laboratory Data

Lab Sample: 1900023-06
Date Received: 03-Jan-19 09:42
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-4:2 FTS	IS	87.5	40 - 150		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
13C2-PFHxA	IS	89.2	70 - 130		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
13C4-PFHpA	IS	91.2	60 - 150		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
18O2-PFHxS	IS	108	60 - 130		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
13C2-6:2 FTS	IS	88.1	40 - 150		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
13C2-PFOA	IS	89.4	60 - 130		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
13C5-PFNA	IS	89.2	50 - 130		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
13C8-PFOSA	IS	74.2	20 - 150		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
13C8-PFOS	IS	87.3	60 - 130		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
13C2-PFDA	IS	87.4	60 - 130		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
13C2-8:2 FTS	IS	65.3	40 - 150		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
d3-MeFOSAA	IS	93.1	50 - 150		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
d5-EtFOSAA	IS	97.8	50 - 150		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
13C2-PFUnA	IS	86.5	60 - 130		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
13C2-PFDoA	IS	81.4	30 - 130		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1
13C2-PFTeDA	IS	101	20 - 150		B9A0023	04-Jan-19	0.236 L	07-Jan-19 20:08	1

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

Sample ID: PW1812271555GSC **PFAS Isotope Dilution Method**

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: PW4
Matrix: Aqueous
Date Collected: 27-Dec-18 15:55

Laboratory Data

Lab Sample: 1900023-07
Date Received: 03-Jan-19 09:42
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	4.67	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFPeA	5.77	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFBS	1.80	1.39	2.03	4.06	J	B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-4:2 FTS	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFHxA	6.66	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFPeS	1.43	1.39	2.03	4.06	J	B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFHpA	6.20	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFHxS	49.9	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
Br-PFHxS	5.35	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
Total PFHxS	55.2	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-6:2 FTS	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFOA	11.0	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
Br-PFOA	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
Total PFOA	11.4	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFHpS	3.08	1.39	2.03	4.06	J	B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFNA	1.57	1.39	2.03	4.06	J	B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFOSA	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFOS	23.7	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
Br-PFOS	37.4	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
Total PFOS	61.1	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFDA	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-8:2FTS	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFNS	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-MeFOSAA	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
Br-MeFOSAA	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
Total MeFOSAA	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-EtFOSAA	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
Br-EtFOSAA	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
Total EtFOSAA	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFUnA	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFDS	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFDoA	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFTrDA	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
L-PFTeDA	ND	1.39	2.03	4.06		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	97.6	60 - 130		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
13C3-PFPeA	IS	96.2	60 - 150		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
13C3-PFBS	IS	93.6	60 - 150		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1

Sample ID: PW1812271555GSC

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: PW4
Matrix: Aqueous
Date Collected: 27-Dec-18 15:55

Laboratory Data

Lab Sample: 1900023-07
Date Received: 03-Jan-19 09:42
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-4:2 FTS	IS	81.0	40 - 150		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
13C2-PFHxA	IS	94.7	70 - 130		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
13C4-PFHpA	IS	95.1	60 - 150		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
18O2-PFHxS	IS	99.4	60 - 130		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
13C2-6:2 FTS	IS	96.4	40 - 150		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
13C2-PFOA	IS	93.8	60 - 130		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
13C5-PFNA	IS	94.9	50 - 130		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
13C8-PFOSA	IS	49.7	20 - 150		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
13C8-PFOS	IS	100	60 - 130		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
13C2-PFDA	IS	82.3	60 - 130		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
13C2-8:2 FTS	IS	99.7	40 - 150		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
d3-MeFOSAA	IS	92.0	50 - 150		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
d5-EtFOSAA	IS	95.0	50 - 150		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
13C2-PFUnA	IS	85.2	60 - 130		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
13C2-PFDoA	IS	76.1	30 - 130		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1
13C2-PFTeDA	IS	86.0	20 - 150		B9A0023	04-Jan-19	0.246 L	07-Jan-19 20:19	1

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

Sample ID: SW1812271610GSC

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: SW4
Matrix: Aqueous
Date Collected: 27-Dec-18 16:10

Laboratory Data

Lab Sample: 1900023-08
Date Received: 03-Jan-19 09:42
Column: BEH C18

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
L-PFBA	21.9	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFPeA	79.4	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFBS	3.88	1.40	2.05	4.10	J	B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-4:2 FTS	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFHxA	61.1	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFPeS	8.59	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFHpA	32.4	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFHxS	180	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
Br-PFHxS	31.8	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
Total PFHxS	212	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-6:2 FTS	31.6	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFOA	44.1	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
Br-PFOA	3.03	1.40	2.05	4.10	J	B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
Total PFOA	47.1	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFHpS	5.10	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFNA	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFOSA	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFOS	14.4	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
Br-PFOS	36.0	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
Total PFOS	50.4	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFDA	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-8:2FTS	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFNS	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-MeFOSAA	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
Br-MeFOSAA	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
Total MeFOSAA	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-EtFOSAA	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
Br-EtFOSAA	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
Total EtFOSAA	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFUnA	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFDS	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFDoA	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFTrDA	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
L-PFTeDA	ND	1.40	2.05	4.10		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	97.3	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
13C3-PFPeA	IS	94.3	60 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
13C3-PFBS	IS	94.1	60 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1

Sample ID: SW1812271610GSC

PFAS Isotope Dilution Method

Client Data

Name: Merit Laboratories, Inc.
Project: Wurtsmith
Location: SW4
Matrix: Aqueous
Date Collected: 27-Dec-18 16:10

Laboratory Data

Lab Sample: 1900023-08
Date Received: 03-Jan-19 09:42
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-4:2 FTS	IS	82.8	40 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
13C2-PFHxA	IS	97.1	70 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
13C4-PFHpA	IS	95.3	60 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
18O2-PFHxS	IS	97.0	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
13C2-6:2 FTS	IS	101	40 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
13C2-PFOA	IS	83.5	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
13C5-PFNA	IS	82.4	50 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
13C8-PFOSA	IS	61.2	20 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
13C8-PFOS	IS	104	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
13C2-PFDA	IS	86.6	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
13C2-8:2 FTS	IS	91.1	40 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
d3-MeFOSAA	IS	94.2	50 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
d5-EtFOSAA	IS	97.0	50 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
13C2-PFUnA	IS	85.2	60 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
13C2-PFDoA	IS	82.1	30 - 130		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	1
13C2-PFTeDA	IS	97.9	20 - 150		B9A0023	04-Jan-19	0.244 L	07-Jan-19 20:29	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
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
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limits of Detection
LOQ	Limits of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	Ion ratio outside of 70-130% of Standard Ratio. (DOD PFAS projects only)
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	18-008-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1322288
New Hampshire Environmental Accreditation Program	207718
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-009
Pennsylvania Department of Environmental Protection	015
Texas Commission on Environmental Quality	T104704189-18-9
Virginia Department of General Services	9618
Washington Department of Ecology	C584-18
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 #: 1900023 Temp: 0.2 °C
Storage ID: WK-2 Storage Secured: Yes ☑ No ☐

Project ID: **Wurtsmith** PO#: **60518528** Sampler: **Garth Cousineau** (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	**MDEQ**	**4001 Ketchum St, Suite B**	**Bay City**	**MI**	**989-894-6255**	**989-891-9237**

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Garth Cousineau	1-2-18	1600	Marissa Sparks	01/03/19	0942
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: Jennifer Miller

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	Full List of 24	Other: Please List Below	Branch and Linear	EPA Method 537(DW only): PFOA/ PFOS	UCMR3 PFAS List:6	PFAS List: 14	Comments
PW1812271330GSC	12/27/18	1330	**PW1**	2	P	AQ						X				
SW1812271410GSC	12/27/18	1410	**SW1**	2	P	AQ						X				
PW1812271435GSC	12/27/18	1435	**PW2**	2	P	AQ						X				
SW1812271450GSC	12/27/18	1450	**SW2**	2	P	AQ						X				
PW1812271510GSC	12/27/18	1510	**PW3**	2	P	AQ						X				
SW1812271530GSC	12/27/18	1530	**SW3**	2	P	AQ						X				
PW1812271555GSC	12/27/18	1555	**PW4**	2	P	AQ						X				
SW1812271610GSC	12/27/18	1610	**SW4**	2	P	AQ						X				

Special Instructions/Comments: **Send Results and Acknowledgements to:**

Nic.Ropotos@aecom.com Dorin.Bogdan@aecom.com
Robert.Kennedy@aecom.com
Geoffrey.Groff@aecom.com
Jim.Carbone@aecom.com

SEND DOCUMENTATION AND RESULTS TO:

Name: **Mike Jury**
Company: **MDEQ**
Address: **4001 Ketchum St, Suite B**
City: **Bay City** State: **MI** Zip: **48708**
Phone: **989-894-6255** Fax: **989-891-9237**
Email: **MikeJ@michigan.gov**

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

Bottle Preservation Type: T = Thiosulfate,
TZ = Trizma: None

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 #: 1900023 TAT Std

Samples Arrival:	**Date/Time** 01/03/19 0942	**Initials:** WDS	**Location:** WR-2 **Shelf/Rack:** N/a
Logged In:	**Date/Time** 01/03/19 1032	**Initials:** BLB	**Location:** WR-2 **Shelf/Rack:** A3 / B4

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

Temp °C: 0.3 (uncorrected)	**Probe used:** Y / (N)	**Thermometer ID:** IR-4
Temp °C: 0.2 (corrected)		

	YES	NO	NA
Adequate Sample Volume Received?	✓		
Holding Time Acceptable?	✓		
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?			✓
Shipping Documentation Present?	✓		
Airbill — Trk # 4377 0528 8209	✓		
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Chain of Custody / Sample Documentation Present?	✓		
COC Anomaly/Sample Acceptance Form completed?		✓	
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓
Preservation Documented: $Na_2S_2O_3$ Trizma None Other	Yes	No	(NA)

Shipping Container	Vista	(Client)	Retain	(Return)	Dispose

Comments: