

Friends of Merrymeeting Bay
The Wild West of PFAS Testing-A Lab Comparison
Ed Friedman, FOMB
9/19/22



Photo: Martha Spiess

Friends of Merrymeeting Bay
The Wild West of PFAS Testing-A Lab Comparison

9/19/22

Table of Contents

Report

Appendices

Appendix 1: Comparative Results Condensed Spreadsheet

Appendix 2: Comparative Results Complete Spreadsheet

Appendix 3: Cyclopure Analysis of Comparative Results

Appendix 4: Cyclopure Methodology Summary

Appendix 5: DEXSORB® Media Details

Appendix 6: Cyclopure Test Results Report

Appendix 7: Eurofins Test Results Report

Appendix 8: Battelle Test Results Report

Appendix 9: Alpha Analytical FOMB Results Report

Appendix 10: Alpha Analytical BSD Results Report

Appendix 11: PFAS Lab Evaluations

The Wild West of PFAS Sampling- A Lab Comparison

Abstract

PFAS are widely used, long lasting per-and polyfluoroalkyl synthetic organofluorine chemical compounds that have multiple fluorine atoms attached to an alkyl chain. They break down very slowly over time and many of them have been linked to harmful health effects in humans and animals. These characteristics have earned them the moniker of “forever chemicals” but they might also be termed “everywhere chemicals.” To our knowledge, all PFAS testing labs but one require the collection and submission of actual water samples for testing. The testing is prohibitively expensive typically running \$400-\$700/sample which likely acts as a significant barrier to widespread testing. One lab, Cyclopure, offers a reasonably priced (\$80) alternative testing method but they are not EPA certified for this. Prior to possible widespread environmental surface water testing using Cyclopure water test kits, Friends of Merrymeeting Bay conducted a study in cooperation with the Brunswick Maine Sewage District comparing Cyclopure test results to those of several high-priced certified labs. Cyclopure methodology was validated and while not appropriate yet for regulatory purposes, makes an excellent screening tool for detecting and quantifying PFAS in potable or surface waters.

Introduction

With the relatively recent greater awareness of PFAS prevalence and toxicity, a plethora of laboratories are offering a wide variety of testing services for these chemicals. This study focusses on water sampling rather than sludge, milk, tissue or any other mediums where these “forever” chemicals may be detected. The most common EPA standard analytical method 537.1 can test for 18 PFAS analytes in potable water. The EPA draft method 1633 can detect 40 PFAS chemicals in wastewater, surface water, groundwater, soil, biosolids, sediment, landfill leachate, and fish tissue. Details on EPA methodologies and links to other agency methods can be found at <https://www.epa.gov/water-research/pfas-analytical-methods-development-and-sampling-research>.

Most laboratories charge hundreds of dollars per test (typically \$400-\$700) and some states like Maine may offer at least partial reimbursements (Maine is \$350) if PFAS are found in a residential sample. Some labs stick to the basic 18 analytes and others test for more than 70. Virtually all labs require a water sample collected in a plastic bottle and returned on ice via overnight delivery to the lab for analysis. [Cyclopure](#) is the exception, instead using a plastic container with proprietary corn-based filter media DEXSORB®, through which suspect water is poured and then cup kit returned via normal priority mail. The Cyclopure test kits cost about \$80/sample.

After having conducted a couple of area samples associated with a former Naval Air Station and a local wastewater plant and detecting some PFAS levels of concern ([see Report](#)), Friends of Merrymeeting Bay ([FOMB](#)), engaged in research, advocacy, education and land protection, decide to budget for a wider PFAS survey of the Bay using Cyclopure kits and would proceed

only if split sampling with EPA certified labs yielded similar results. FOMB asked the Maine Department of Environmental Protection (DEP) to cooperate in this trial and the Department refused stating they were only interested in results from certified labs. Instead, the Brunswick, Maine Sewage District ([BSD](#)) was interested in the idea of lower cost testing and decided to partner with FOMB providing sewage water, personnel and the facility for this project.

Materials & Methods

Sampling took place on 4/20/22 between 10 am and 12 noon at the Brunswick Sewer District wastewater treatment plant in Brunswick, ME. Working on the project were Ed Friedman and Martha Spiess from FOMB and Jason Prout from the BSD. The four labs for which split samples were prepared were Cyclopure, [Alpha Analytical](#), [Eurofins](#) and [Battelle](#). The Sewer District normally uses [Maine Environmental Laboratory](#) for sampling but MEL sends PFAS samples to Alpha and since the District had ordered their own PFAS kit from MEL, this served as an Alpha replicate. FOMB had ordered kits sufficient for one sample each from Alpha, Battelle and Eurofins and a sample plus replicate from Cyclopure. Field blanks were gathered for each lab.

A common sample was dipped from the BSD mixing tank of composite wastewater inflow (from all pump stations). The tank did not include septage, waste collected and pumped from septic tanks, but only from the municipal sewer system. The common sample was dipped using a stainless steel bucket dropped into the agitation tank on a stainless chain and all samples were manually poured from this bucket through a stainless funnel directly into sampling bottles or the Cyclopure water test kits (WTK).

Field blanks are samples of PFAS-free water poured from their original container into sample bottles on site to ensure contaminants are not inadvertently added during the sampling process. All field blanks were processed first in the same location as testing to ensure no accidental cross contamination with the wastewater samples. All field blank bottles were pre-labeled by lab and FB suffix, i.e. EF-FB, CP-FB for Eurofins and Cyclopure field blanks vs EF-S1 or CP-S1 and CP-S1R for samples (and replicate).

Because Cyclopure water samples typically take about 15 minutes (for pure water) to drain through their kit media (DEXSORB®), these were poured first so they could begin draining while we gathered the other samples.

While Cyclopure samples were draining, Martha Spiess prepped bottles handing them to Ed Friedman who positioned them under the funnel he held while Jason Prout poured directly from sample bucket until each bottle was full. When each lab's bottles were full, they were capped, marked with collection date and times, put on ice and packaged up for return shipment in coolers provided by each company. At this point the Cyclopure containers had pretty much stopped draining (after about 45 minutes) at about $\frac{3}{4}$ of the way down and in accordance with Cyclopure

instructions we marked the drain level on outside of cup so proportionate levels of sample volume could be accounted for by their lab. It is normal for the Cyclopure media to become

clogged after a while when sample has extensive particulates as wastewater does. Cyclopure claims this does not affect detection ability.

Battelle and Eurofins samples were delivered to Goin Postal in Topsham, for overnight shipping via FEDEX. The Battelle cooler to MA was \$86 and the Eurofins cooler to PA was \$232 (more water and a further delivery zone). Ed drove home to find the Alpha courier waiting for pick-up and hand-off was at 12:45. Cyclopure samples in their return carton were brought to the Richmond P.O. shortly thereafter and mailed USPS Priority at 1:05. Jason from BSD delivered their Alpha sample to MEL in Yarmouth missing the Alpha courier so the BSD sample would be picked up on the following day.

Results

See Appendices 1 (consolidated) and 2 (complete) spreadsheet versions combining all labs. See also Cyclopure's analysis (Appendix 3), including the only statistical analysis, reports from each lab are also included.

Cyclopure analyzes for 55 PFAS compounds and they found 10 in our sample with total counts of 40ppt for Sample 1 and 44ppt for the replicate. (Appendix 6)

Eurofins sampled here for 70 compounds and of the 55 in common with Cyclopure, they detected 14 with a total value of 67.47ppt. Adding in the additional 14 compounds, Eurofins detected values for 7 analytes bringing their PFAS total value to 77.55ppt. (Appendix 7)

Battelle analyzed for 43 compounds and detected only 1 for a value of 9.4. (Appendix 8)

Alpha Analytical sampled for 41 PFAS compounds in the FOMB sample detecting 9 with a value of 52.3ppt but we also had them look at an additional 10 branched PFAS compounds of which they detected 2 bringing the total to 70.75ppt. (Appendix 9). The Alpha Brunswick Sewage District sample which we treated as a replicate included only the basic 28 compounds, also detecting 9 but with a total of 64.1ppt. (Appendix 10).

Discussion

Cyclopure, Alpha Analytical and Eurofins all were fairly similar in compounds (9-14) detected although concentrations detected had a somewhat greater variability (for those common to them all) of CP-40, CP-44, AA-52, AA-71 and EF-78. There were a couple of outliers. For example looking at PFOS, Cyclopure values were 15 and 15, Eurofins was 16 but Alpha values were 10.9 and 19.8 for the replicate. Overall, Cyclopure tended to run a bit low and Eurofins, leader in this field, appeared the most sensitive in their detection. Eurofins also showed a Field Blank detection of .48 for NEtFOSAA but being the only lab to see this and the only Field Blank value detected, this is probably not accurate. Battelle, with a strong reputation for handling government, university and military work had numerous technical and quality assurance issues and only detected one compound, PFOA although the value they did detect was in line with the other labs. Battelle also had major problems with deliverables. All the other labs had results to us

within a week or two. Battelle promised 28 days but took twice that, holding our project up by a month.

Appendix 11 discusses quantitative and qualitative aspects of each lab including contents of kits, clarity of instructions, quality of service and costs. This is meant to be kind of a useful “consumer reports” look at the labs. Overall, Alpha Analytical and Cyclopure were excellent, Eurofins was good and Battelle was poor.

Conclusion

Our testing did validate Cyclopure water test kits. Since not EPA certified, Cyclopure kits cannot be used for regulatory purposes in most venues (although the Department of Defense and others are using the DEXSORB® filter media for PFAS remediation). The kits are however excellent and affordable screening tools for PFAS detection. This is an important point. Considering the prevalence of PFAS chemicals, widespread testing is important. High water testing costs serve as a huge disincentive for testing. Even if an agency like the Maine DEP may offer partial reimbursement if PFAS above a certain level is found, that is a big chance the home, farm or business owner must take. On the one hand everyone hopes their water tests negative for PFAS but on the other, if it does, they will be out hundreds of dollars for one test. Positive PFAS results or and or \$600 out of pocket are both huge disincentives for testing and good ways for state agencies to minimize perceived and actual scope of the problem. Consider too the high cost to taxpayers with state agencies rebating many hundreds of dollars per test when they could be refunding \$80. The relatively low cost of Cyclopure testing combined with its accuracy offers an excellent solution.

Since this test validated Cyclopure testing, FOMB purchased 30 test kits and has recently completed sampling all the Merrymeeting Bay tributaries and Bay itself. Results will be posted in the PFAS section of the [Chemical](#) page in our web Cybray.

Thanks to FOMB volunteer Martha Spies, Jason Prout, Jennifer Nicholson and Rob Pontau of BSD and Katie and Frank Cassou of Cyclopure

Photos



Sewage tank. Photo: EF



Cyclopure samples drain. Photo: EF



Pouring Samples. Photo: MS



Processing/packing samples. Photo: JP

Appendices

Appendix 1: Comparative Results Condensed Spreadsheet

Appendix 2: Comparative Results Complete Spreadsheet

Appendix 3: Cyclopure Analysis of Comparative Results

Appendix 4: Cyclopure Methodology Summary

Appendix 5: DEXSORB® Media Details

Appendix 6: Cyclopure Test Results Report

Appendix 7: Eurofins Test Results Report

Appendix 8: Battelle Test Results Report

Appendix 9: Alpha Analytical FOMB Results Report

Appendix 10: Alpha Analytical BSD Results Report

Appendix 11: PFAS Lab Evaluations

Appendix 1

Comparative Results Condensed Spreadsheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Friends of Merrymeeting Bay PFAS Lab Comparisons 2022. ND=Non Detect. Blank Cell indicates analyte not sampled for.													
2	Compound		CP	CPR		EF		BT		AA		AAB	High	Low
3		Abbreviation	CS-1	CS-1R	RL ng/l	ES-1	RL ng/l	BS-1	RL ng/L	AS-1	RL ng/l	BSD		
4	Perfluorobutanoic Acid	PFBA	1.1	1.2	1-2 ng/l	5	4.5 ng/l	ND	1.34 ng/l	5.8	1.8 ng/l	6.1	6.1AA	1.1CP
5	Perfluoropentanoic Acid	PFFPeA	2.3	3.2	1-2 ng/l	6	1.8 ng/l	ND	1.13	5.4	1.8	6.1	6.1AA	2.3CP
6	Perfluorohexanoic Acid	PFHxA	3.7	4.1	1-2 ng/l	9	1.8 ng/l	ND	0.809	7.2	1.8	7.2	9.0EF	3.7CP
7	Perfluoroheptanoic Acid	PFHpA	2.1	2.5	1-2 ng/l	3.5	1.8 ng/l	ND	0.834	3.2	1.8	3.4	3.5EF	2.1CP
8	Perfluorooctanoic Acid	PFOA	6.3	6.3	1-2 ng/l	10	1.8 ng/l	9.4	0.895	7	1.8	7.4	10EF	6.3CP
9	Perfluorononanoic Acid	PFNA	<1 ng/l	<1 ng/l	1-2 ng/l	0.75	1.8 ng/l	ND	0.738	ND	1.8	ND	.75EF	<1CP
10	Perfluorodecanoic Acid	PFDA	<1 ng/l	<1 ng/l	1-2 ng/l	ND	1.9 ng/l	ND	0.695	ND	1.8	ND		
11	Perfluoroundecanoic Acid	PFUnA	<1 ng/l	<1 ng/l	1-2 ng/l	ND	1.9 /ng/l	ND	0.667	ND	1.8	ND		
12	Perfluorododecanoic Acid	PFDoA	<1 ng/l	<1 ng/l	1-2 ng/l	ND	1.9 ng/l	ND	0.674	ND	1.8	ND		
13	Perfluorotridecanoic Acid	PFTDA	<1 ng/l	<1 ng/l	1-2 ng/l			ND	0.658	ND	1.8	ND		
14	Perfluorotetradecanoic Acid	PFTeA	<1 ng/l	<1 ng/l	1-2 ng/l			ND	0.701					
15	Perfluoropropane Sulfonic Acid	PFPrS	ND	ND	1-2 ng/l	0.3	1.8 ng/l						.3EF	.3EF
16	Perfluorobutane Sulfonic Acid	PFBS	2.4	2.4	1-2 ng/l	3.5	1.8 ng/l	ND	0.768	3.5	1.8	3.6	3.6AAB	2.4CP
17	Perfluoropentane Sulfonic Acid	PFFPeS	ND	ND	1-2 ng/l	1.1	1.8 ng/l	ND	0.904	ND	1.8	ND		
18	Perfluorohexane Sulfonic Acid	PFHxS	4.9	5.1	1-2 ng/l	5.3	1.8	ND	0.884	6.9	1.8	8.1	8.1AAB	4.9CP
19	Perfluoroheptane Sulfonic Acid	PFHpS	ND	ND	1-2 ng/l	ND	1.9 ng/l	ND	0.746	ND	1.8	ND		
20	Perfluorooctane Sulfonic Acid	PFOS	15	15	1-2 ng/l	16	1.8 ng/l	ND	0.949	10.9	1.8	19.8	19.8AAB	15CP
21	Perfluorononane Sulfonic Acid	PFNS	ND	ND	1-2 ng/l			ND	0.621	ND		ND		
22	Perfluorodecane Sulfonic Acid	PFDS	ND	ND	1-2 ng/l	ND	1.9 ng/l	ND	0.691	ND	1.8	ND		
23	Perfluorododecane Sulfonic Acid	PFDoS	ND	ND	1-2 ng/l									
24	4:2 Fluorotelomer Sulfonate	4:2 FTS	ND	ND	1-2 ng/l			ND	0.904	ND	1.8	ND		
25	6:2 Fluorotelomer Sulfonate	6:2 FTS	1.5	2.8	1-2 ng/l			ND	1.3	2.4	1.8	2.4	2.4AA	1.5CP
26	8:2 Fluorotelomer Sulfonate	8:2 FTS	ND	ND	1-2 ng/l			ND	0.895	ND	1.8	ND		
27	10:2 Fluorotelomer Sulfonate	10:2 FTS	ND	ND	1-2 ng/l									
28	Perfluorobutane Sulfonamide	FBSA	ND	ND	1-2 ng/l									
29	Methylperfluorobutanesulfonamide	MeFBSA	ND	ND	1-2 ng/l									
30	Perfluorohexane Sulfonamide	FHxSA	ND	ND	1-2 ng/l									
31	Perfluorooctane Sulfonamide	PFOSA	ND	ND	1-2 ng/l			ND	1.4	ND	1.8	ND		
32	Perfluorodecane Sulfonamide	FDSA	ND	ND	1-2 ng/l									
33	N-Ethylperfluorooctane-1-Sulfonamide	NEFOSA	ND	ND	1-2 ng/l	ND	4.7 ng/l			ND	18	ND		
34	N-Methylperfluorooctane-1-Sulfonamide	NMeFOSA	ND	ND	1-2 ng/l			ND	0.94	ND	18	ND		
35	Perfluorooctane Sulfonamido Acetic Acid	FOSAA	ND	ND	1-2 ng/l									
36	N-Ethyl Perfluorooctane Sulfonamido Acetic Acid	NEFOSAA	1.1	1.1	1-2 ng/l	0.96, .48FB	2.7 ng/l	ND	0.878	ND	1.8	1.8AA	1.1CP	
37	N-Methyl Perfluorooctane Sulfonamido Acetic Acid	NMeFOSAA	<1 ng/l	<1 ng/l	1-2 ng/l	ND	1.9 ng/l							
38	perfluorooctanesulfonamido	NMeFOSE	ND	ND	1-2 ng/l					ND	45			
39	perfluorooctanesulfonamido	NEFOSE	ND	ND	1-2 ng/l					ND	45			
40	Hexafluoropropylene Oxide Dimer Acid	HFPO-DA	ND	ND	1-2 ng/l	5.1, 1.1FB	2.7 ng/l	ND	0.767	ND	45	ND		
41	4,8-Dioxa-3H-Perfluorononanoate	ADONA	ND	ND	1-2 ng/l			ND	0.77	ND	1.8	ND		

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
2	Compound		CP	CPR		EF		BT		AA		AAB	High	Low
42	Perfluoro-3-Methoxypropanoic Acid	PFMPA	ND	ND	1-2 ng/l									
43	Perfluoro-4-Methoxybutanoic Acid	PFMBA	ND	ND	1-2 ng/l									
44	Perfluoro-3,6-Dioxahexanoic Acid	NFDHA	ND	ND	1-2 ng/l									
45	9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	ND	ND	1-2 ng/l			ND	0.913					
46	11-Chloroicosadecafluoro-3-Oxanonane-1-Sulfonic Acid	11Cl-PF3OUdS	ND	ND	1-2 ng/l			ND	0.799					
47	Perfluoro(2-ethoxyethane) Sulfonic acid	PFEESA	ND	ND	1-2 ng/l	ND	1.9							
48	Perfluoro-4-ethylcyclohexane Sulfonic Acid	PFECHS	ND	ND	1-2 ng/l	ND	1.9							
49	8-Chloroperfluoro-1-Octanesulfonic Acid	8Cl-PFOS	ND	ND	1-2 ng/l									
50	3-Perfluoropropyl Propanoic Acid	3:3FTCA	ND	ND	1-2 ng/l	ND	1.9							
51	2h,2h,3h,3h-Perfluorooctanoic Acid	5:3FTCA	ND	ND	1-2 ng/l	0.32	1.8							
52	3-Perfluoroheptyl propanoic acid	7:3FTCA	ND	ND	1-2 ng/l									
53	2H-Perfluoro-2-dodecanoic acid	FDUEA	ND	ND	1-2 ng/l									
54	2H-perfluoro-2-decanoic acid	FOUEA	ND	ND	1-2 ng/l									
55	Bis(perfluorohexyl)phosphinic acid	6:6PFPI	ND	ND	1-2 ng/l									
56	Bis(perfluorooctyl)phosphinic acid	6:8PFPI	ND	ND	1-2 ng/l									
57	Bis(perfluorooctyl)phosphinic acid	8:8PFPI	ND	ND	1-2 ng/l									
58	N-(3-(perfluorooctyl)propyl) perfluoro-1-	N-AP-FHxSA	ND	ND	1-2 ng/l									
59			40	44	1-2 ng/l	67.47		9.4		52.3		69.1		
60													EF	EF
61	R-EVE					0.36	1.8 ng/l						EF	EF
62	PEPA					1.6	1.8 ng/l						EF	EF
63	6:2 Fluorotelomer sulfonic acid					2.3	4.5 ng/l						EF	EF
64	PFECA F					0.2	1.8 ng/l						EF	EF
65	PPF Acid					4.1	4.5 ng/l						EF	EF
66	6:2 FTCA					1.2	1.8 ng/l						EF	EF
67	5:3 FTCA					0.32	1.8 ng/l						EF	EF
68	2H,2H-Perfluorohexanesulfonic Acid	4:2FTS								ND	1.8			
69	Perfluorohexanesulfonic Acid	br-PFHxS								ND	1.8			
70	Perfluorooctanoic Acid-Branch	br-PFOA								ND	1.8			
71	Perfluorononanoic Acid	PFNA								ND	1.8			
72	Perfluorooctanesulfonic Acid-Branch	br-PFOS								8.35	1.8			
73	N-Methylperfluorooctane-1-Sulfonic Acid	br-NMeFOSAA								ND	1.8			
74	Perfluorotetradecanoic Acid	PFTA								ND	1.8	ND		
75	Perfluorohexadecanoic Acid	PFHxDA								ND	3.6	ND		
76	Perfluorooctadecanoic Acid	PFODA								ND	3.6			
77	Perfluorododecane Sulfonic Acid	PFDDoS								10.1	1.8			
78	1H,1H,2H,2H-Perfluorododecane Sulfonic Acid	10:2FTS								ND	4.5			
79	9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid	9Cl-PF3ONS								ND	1.8			
80	11-Chloroicosadecafluoro-3-Oxanonane-1-Sulfonic Acid	11Cl-PF3OUdS								ND	1.8			
81	Perfluoropropane Sulfonic Acid	PFPrS								ND	1.8			
82	Perfluoro-3-Methoxypropanoic Acid	PFMPA								ND	1.8			
83	Perfluoro-4-Methoxybutanoic Acid	PFMBA								ND	1.8			
84	Perfluoro(2-Ethoxyethane) Sulfonic Acid	PFEESA								ND	1.8			
85	Nonafluoro-3,6-Dioxahexanoic Acid	NFDHA								ND	1.8			
86	N-Ethyl Perfluorooctanesulfonic Acid	br-NEFOSAA								ND	1.8			
87					EF-Sub	10.08			Alpha-Sub	18.45				
88					EF-Total	77.55			Alpha-Total	70.75				

Appendix 2

Comparative Results Complete Spreadsheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Friends of Merrymeeting Bay PFAS Lab Comparison 2022. ND=Non Detect. Blank cell indicates analyte not sampled for.																			
2	Compound			CYCLOPURE RESULTS					EUROFINRESULTS				BATTELLE RESULTS				ALPHA RESULTS			
3		Abbreviation	CAS#	CS-1	CS-1R	CS-FB	RL ng/l	EPA 1633	ES-1	ES-FB	RL ng/l	FW14355 r13	BS-1	BS-FB	RL ng/L	AS-1	AS-FB	RL ng/l	L2220432-02	BSD
4	Perfluorobutanoic Acid	PFBA	375-22-4	1.1	1.2	<1 ng/l	1-2 ng/l	Y	5	ND	4.5 ng/l	Y	ND	ND	1.34	5.8	ND	1.8	Y	6.1
5	Perfluoropentanoic Acid	PFPeA	2706-90-3	2.3	3.2	<1 ng/l	1-2 ng/l	Y	6	ND	1.8 ng/l	Y	ND	ND	1.13	5.4	ND	1.8	Y	6.1
6	Perfluorohexanoic Acid	PFHxA	307-24-4	3.7	4.1	<1 ng/l	1-2 ng/l	Y	9	ND	1.8 ng/l	Y	ND	ND	0.809	7.2	ND	1.8	Y	7.2
7	Perfluoroheptanoic Acid	PFHpA	375-85-9	2.1	2.5	<1 ng/l	1-2 ng/l	Y	3.5	ND	1.8 ng/l	Y	ND	ND	0.834	3.2	ND	1.8	Y	3.4
8	Perfluorooctanoic Acid	PFOA	335-67-1	6.3	6.3	<1 ng/l	1-2 ng/l	Y	10	ND	1.8 ng/l	Y	9.4	ND	0.895	7	ND	1.8	Y	7.4
9	Perfluorononanoic Acid	PFNA	375-95-1	<1 ng/l	<1 ng/l	<1 ng/l	1-2 ng/l	Y	0.75	ND	1.8 ng/l	Y	ND	ND	0.738	ND	ND	1.8		ND
10	Perfluorodecanoic Acid	PFDA	335-76-2	<1 ng/l	<1 ng/l	<1 ng/l	1-2 ng/l	Y	ND	ND			ND	ND	0.695	ND	ND	1.8	Y	ND
11	Perfluoroundecanoic Acid	PFUnA	2058-94-8	<1 ng/l	<1 ng/l	<1 ng/l	1-2 ng/l	Y	ND	ND			ND	ND	0.667	ND	ND	1.8	Y	ND
12	Perfluorododecanoic Acid	PFDoA	307-55-1	<1 ng/l	<1 ng/l	<1 ng/l	1-2 ng/l	Y	ND	ND			ND	ND	0.674	ND	ND	1.8	Y	ND
13	Perfluorotridecanoic Acid	PFTrDA	72629-94-8	<1 ng/l	<1 ng/l	<1 ng/l	1-2 ng/l	Y					ND	ND	0.658	ND	ND	1.8	Y	ND
14	Perfluorotetradecanoic Acid	PFTeA	376-06-7	<1 ng/l	<1 ng/l	<1 ng/l	1-2 ng/l	Y					ND	ND	0.701					
15	Perfluoropropane Sulfonic Acid	PFPpS	423-41-6	ND	ND	<1 NG/L	1-2 ng/l		0.3	ND	1.8 ng/l	Y								
16	Perfluorobutane Sulfonic Acid	PFBS	375-73-5	2.4	2.4	<1 ng/l	1-2 ng/l	Y	3.5	ND	1.8 ng/l	Y	ND	ND	0.768	3.5	ND	1.8	Y	3.6
17	Perfluoropentane Sulfonic Acid	PFPeS	2706-91-4	ND	ND	<1 ng/l	1-2 ng/l	Y	1.1	ND	1.8 ng/l	Y	ND	ND	0.904	ND	ND	1.8	Y	ND
18	Perfluorohexane Sulfonic Acid	PFHxS	355-46-4	4.9	5.1	<1 ng/l	1-2 ng/l	Y	5.3	ND			ND	ND	0.884	6.9	ND	1.8	Y	8.1
19	Perfluoroheptane Sulfonic Acid	PFHpS	375-92-8	ND	ND	<1 ng/l	1-2 ng/l	Y	ND	ND			ND	ND	0.746	ND	ND	1.8	Y	ND
20	Perfluorooctane Sulfonic Acid	PFOS	1763-23-1	15	15	<1 ng/l	1-2 ng/l	Y	16	ND	1.8 ng/l	Y	ND	ND	0.949	10.9	ND	1.8	Y	19.8
21	Perfluorononane Sulfonic Acid	PFNS	474511-07-4	ND	ND	<1 NG/L	1-2 ng/l	Y					ND	ND	0.621	ND	ND			ND
22	Perfluorodecane Sulfonic Acid	PFDS	335-77-3	ND	ND	<1 ng/l	1-2 ng/l	Y	ND	ND			ND	ND	0.691	ND	ND	1.8	Y	ND
23	Perfluorododecane Sulfonic Acid	PFDoS	79780-39-5	ND	ND	<1 ng/l	1-2 ng/l	Y												
24	4:2 Fluorotelomer Sulfonate	4:2 FTS	414911-30-1	ND	ND	<1 ng/l	1-2 ng/l	Y					ND	ND	0.904	ND	ND	1.8	Y	ND
25	6:2 Fluorotelomer Sulfonate	6:2 FTS	425670-75-3	1.5	2.8	<1 ng/l	1-2 ng/l	Y					ND	ND	1.3	2.4	ND	1.8	Y	2.4
26	8:2 Fluorotelomer Sulfonate	8:2 FTS	481071-78-7	ND	ND	<1 ng/l	1-2 ng/l	Y					ND	ND	0.895	ND	ND	1.8	Y	ND
27	10:2 Fluorotelomer Sulfonate	10:2 FTS	120226-60-0	ND	ND	<1 NG/L	1-2 ng/l													
28	Perfluorobutane Sulfonamide	FBSA	30334-69-1	ND	ND	<1 ng/l	1-2 ng/l													
29	Methylperfluorobutanesulfonamide	MeFBSA	68298-12-4	ND	ND	<1 ng/l	1-2 ng/l													
30	Perfluorohexane Sulfonamide	FHxSA	41997-13-1	ND	ND	<1 ng/l	1-2 ng/l													
31	Perfluorooctane Sulfonamide	PFOSA	754-91-6	ND	ND	<1 ng/l	1-2 ng/l	Y					ND	ND	1.4	ND	ND	1.8	Y	ND
32	Perfluorodecane Sulfonamide	FDSA	N/A	ND	ND	<1 ng/l	1-2 ng/l													
33	N-Ethylperfluorooctane-1-Sulfonamide	NEFOSA	4151-50-2	ND	ND	<1 NG/L	1-2 ng/l	Y	0.96	ND						ND	ND	18	Y	ND
34	N-Methylperfluorooctane-1-Sulfonamide	NMeFOSA	31506-32-8	ND	ND	<1 ng/l	1-2 ng/l	Y					ND	ND	0.94	ND	ND	18	Y	ND
35	Perfluorooctane Sulfonamido Acetic Acid	FOSAA	2806-24-8	ND	ND	<1 ng/l	1-2 ng/l													
36	N-Ethyl Perfluorooctane Sulfonamido Acetic Acid	NEFOSAA	2991-50-6	1.1	1.1	<1 ng/l	1-2 ng/l	Y	0.96	0.48	2.8 ng/l	Y	ND	ND	0.878	ND	ND	1.8	Y	
37	N-Methyl Perfluorooctane Sulfonamido Acetic Acid	NMeFOSAA	2355-31-9	<1 ng/l	<1 ng/l	<1 ng/l	1-2 ng/l	Y												
38	Perfluorooctanesulfonamidoethyl	NMeFOSE	24448-09-7	ND	ND	<1 ng/l	1-2 ng/l	Y								ND	ND	45	Y	
39	Perfluorooctanesulfonamidoethyl	NEFOSE	1691-99-2	ND	ND	<1 ng/l	1-2 ng/l	Y								ND	ND	45	Y	
40	Hexafluoropropylene Oxide Dimer Acid	HFPO-DA	13252-13-6	ND	ND	<1 ng/l	1-2 ng/l	Y	5.1	1.1	2.8	Y	ND	ND	0.767	ND	ND	45	Y	ND
41	4,8-Dioxa-3H-Perfluorononanoate	ADONA	919005-14-4	ND	ND	<1 ng/l	1-2 ng/l	Y					ND	ND	0.77	ND	ND	1.8	Y	ND

Appendix 3

Cyclopure Analysis of Comparative Results

Cyclopure WTK for PFAS Measurement in WWTP

This note provides technical comments on PFAS test results of influent from a WWTP in Brunswick, Maine. This water sample was analyzed through on-site extraction by DEXSORB using Cyclopure PFAS WTK (in duplicates). The same water sample was also shipped to three commercial labs – Eurofin, Battelle, and Alpha Analytics for off-site sample preparation and analysis. PFAS measurement results across different labs are analyzed using statistic methods to provide insights on PFAS detection coverage, data consistency, and data variance.

PFAS Detections. Values from spreadsheet ‘*FOMB APR 22 WW PFAS RESULTS CONDENSED 6-22-22*’ (Table 1):

Cyclopure - **10 PFAS** were detected at levels above Reporting Limits (RLs) using Cyclopure WTK. All detections are confirmed and assigned with high confidence levels, as each PFAS detected by WTK was also detected by at least one of the other three commercial labs. Through cross-validation comparison, **the CP WTK measured the highest number of reportable PFAS values for this water sample with no false negatives or positives.**

Eurofin - **9 PFAS** were detected above their RLs. The detection of HFPO-DA (GenX) within this group is analyzed as a false positive. No other lab reported detection of HFPO-DA. Considering the high concentration value (above the GenX RL at CP and the other labs), it is likely a result of lab contamination. 11 PFAS were listed below their reporting limits; such values should be excluded for express lack of reliability.

Battelle – **1 PFAS** (PFOA) was detected and reported.

Alpha Analytics – **9 PFAS** confirmed in duplicate tests. The branched PFOS (br-PFOS) is generally counted as part of PFOS measurement. The PFDoDS detection is analyzed as a false positive, as it was only measured in one replicate.

Measurement Consistency. In addition to the most comprehensive PFAS detection (10 PFAS), the CP WTK also demonstrated the highest data consistency among duplicate samples. Consistency among duplicate samples is a key measure of confidence for field sample analysis and environmental monitoring.

Pearson Correlation is a common tool to evaluate the similarity of two sets of data. The Correlation coefficient between the CP duplicate measurements is over 99.5%, indicating minimal difference among measurements. In addition, the paired t-test provides a high confidence level over 96%. These results show the high measurement consistency between the duplicate WTK PFAS testing.

In contrast, the duplicate measurement by Alpha Analytics has a Pearson Correlation coefficient of 93%, and a paired t-test confidence level of 80%.

Demonstration of Precision. In EPA Method 537, the Demonstration of Capability Quality Control Requirements provide stringent Acceptance Criteria for Demonstration of Precision. The %RSD among replicates must be < 20%. Based on the data consistency analysis described above, Cyclopure WTK provides minimal data variance among replicate measurements, and fully comply

with the EPA requirements. Notably, these measurements were performed in a WWTP influent, further supporting the robustness of WTK for PFAS analysis.

PFAS Extraction: On-site vs In-lab. Cyclopure testing for PFAS follows the same *analytical methods* as other commercial labs.

The difference in methods is that commercial labs require collection of water samples by customers for transport to their labs. Cyclopure customers perform PFAS extractions in the field by passing water sample through the DEXSORB-loaded media* disc in the WTK cup. When water passes the extraction disc at the bottom of WTK cups, PFAS are adsorbed and securely locked into DEXSORB’s cyclodextrin cups. This results in two superior advantages: (A) no need to ship water and (B) no trip contamination. Both advantages contribute to (i) preservation of sample extraction in on-site state, (ii) cost saving, and (iii) highly consistent PFAS analysis.

For commercial labs, a field blank sample and a trip blank sample are typically required with water sample shipment. This is to account for sample alterations that can occur during water shipment. These blank samples are measured using the same analytical method, which adds cost.

*The use of DEXSORB as an extraction media in field sampling has been validated and is in commercial use outside of Cyclopure. See [iFLUX Sampling \(Belgium\)](#).

WTK vs Others: Isotope Dilution. When a WTK is received at the CP lab, analytical chemists perform standard solid-phase extraction (SPE) to recover PFAS compounds from the DEXSORB extraction disc followed by isotope dilution. The eluted PFAS sample is analyzed on a HPLC-MS/MS (QExactive hybrid quadrupole orbitrap, ThermoFisher).

The isotope labelled internal standards account for background matrix effects and provide consistency of replicate measurements. This ensures the same high-quality and high-confidence measurements in clean matrices (tap water) and complex matrices (WWTP influent).

For test labs that perform PFAS extractions on shipped water samples at the lab, isotope dilution is generally performed prior to sample extraction. This is intended to account for the potential loss of PFAS analytes during sample extraction. A second use of internal standards is applied after PFAS elution in a process similar to Cyclopure to account for background matrix effects.

Variations Among Lab Tests. Variations in lab measurements are common. In 2021, the city of Delray Beach had Eurofin and Pace Analytics perform PFAS analysis on its finished drinking water. Eurofin’s measurements of PFOA and PFOS were significantly higher Pace’s. See table below for details.

Point of Entry March 11, 2021 Results			
	PFOA (ng/L)	PFOS (ng/L)	Total ng/L
Eurofin Environment Testing America Laboratory Results	13	28	41
Pace Analytical Laboratory Results	10	21	31

In this study, Eurofin’s measurement were also on the high end as compared with CP and Alpha Analytics plus a false negative of HFPO-DA. The Battelle lab test only produced one positive measurement for PFAS, 9.4 ppt for PFOA.

Reporting Limits. The Reporting Limits of using Cyclopure WTK are 1 ppt for all in-scope PFAS except for HFPO-DA, which has a RL of 2 ppt.

Reliability; Confidence Factor. Reliability is a function of (i) consistency, (ii) lack of false positives, (iii) comprehensive detection (lack of false negatives), and (iv) accuracy of performance within EPA Quality Control Requirements provided in Section 9.2 of Method 537.1. The CP WTK is the only PFAS test that met all criteria – twice in fact with identical results. This demonstrates the high consistency and reliability of DEXSORB as an extraction media to measure PFAS.

Conclusion. The PFAS measurement results using Cyclopure WTK in Brunswick WWTP influent demonstrate highly sensitive and consistent PFAS measurement in water analysis. In this challenging water matrix, WTK provided **A.** the most comprehensive PFAS detection coverage with no false detections, and **B.** highly consistent PFAS measurements among duplicate sample analysis. The unique advantage of on-site PFAS extraction eliminates the requirement for water shipment and prevents trip contamination.

Cyclopure WTK Value Proposition. Highly Reliable and Accurate PFAS Test Using DEXSORB® Adsorbent for PFAS Extraction in an Affordable and Convenient Form Factor.

The Cyclopure PFAS WTK was designed to make a state-of-the-art test service available to homeowners and field researchers to measure PFAS contamination at home or in the environment. The value proposition is affordability, ease of use, and accuracy.

If testing is for regulatory purposes, testers will need to use commercial labs that fully implement EPA methods from collection, shipment, and analysis of water samples.

Environmental organizations and field researchers seeking to perform broad geographic or temporal surveys will be better served using CP WTKs. A 200-sample survey using CP WTKs will cost \$14,000, compared to a cost of \$90,000 using Tap Score-Simple Lab water testing (not including field or trip blanks).

Table 1 - 'FOMB APR 22 WW PFAS RESULTS CONDENSED 6-22-22'

Compound	Abbreviation	CY	CYR	EF	BT	AA	AAB
		CS-1	CS-1R	ES-1	BS-1	AS-1	BSD
Perfluorobutanoic Acid	PFBA	1.1	1.2	5	ND	5.8	6.1
Perfluoropentanoic Acid	PFPeA	2.3	3.2	6	ND	5.4	6.1
Perfluorohexanoic Acid	PFHxA	3.7	4.1	9	ND	7.2	7.2
Perfluoroheptanoic Acid	PFHpA	2.1	2.5	3.5	ND	3.2	3.4
Perfluorooctanoic Acid	PFOA	6.3	6.3	10	9.4	7	7.4
Perfluorobutane Sulfonic Acid	PFBS	2.4	2.4	3.5	ND	3.5	3.6
Perfluorohexane Sulfonic Acid	PFHxS	4.9	5.1	5.3	ND	6.9	8.1
Perfluorooctane Sulfonic Acid	PFOS	14.9	15	16	ND	10.9	19.8
6:2 Fluorotelomer Sulfonate	6:2 FTS	1.5	2.8	ND	ND	2.4	2.4
N-Ethyl Perfluorooctane Sulfonamido Acetic Acid	NEtFOSAA	1.1	1.1	ND	ND	ND	ND
Hexafluoropropylene Oxide Dimer Acid	HFPO-DA	ND	ND	5.1	ND	ND	ND
Perfluorooctanesulfonic Acid-Branched	br-PFOS					8.35	
Perfluorododecane Sulfonic Acid	PFDoDS					10.1	
Total PFAS Concentration		40.3	43.7	76.59	9.4	70.75	64.1
Total PFAS Concentration with Value greater than RLs		40.3	43.7	63.4	9.4	70.75	64.1
Total PFAS Detections		10	10	20	1	11	9
Total PFAS Detections with Value greater than RLs		10	10	9	1	11	9
Measurements Below Reporting Limit							
	PFNA			0.75			
	PFPriS			0.3			
	PFPeS			1.1			
	6:2 FTS			2.3			
	NEtFOSA			0.96			
	5:3 FTCA			0.32			
	R-EVE			0.36			
	PEPA			1.6			
	PFECA F			0.2			
	PPF Acid			4.1			
	6:2 FTCA			1.2			
	PFAS <RL			13.19			

Table 12. Initial Demonstration of Capability Quality Control Requirements

Method Reference	Requirement	Specification and Frequency	Acceptance Criteria
Sect. 9.2.2	Initial Demonstration of Low System Background	Analyze LRB prior to any other IDC steps.	Demonstrate that all method analytes are below 1/3 the MRL and that possible interferences from extraction media do not prevent the identification and quantification of method analytes.
Sect. 9.2.3	Initial Demonstration of Precision (IDP)	Analyze four to seven replicate LFBs fortified near the midrange calibration concentration.	%RSD must be <20%
Sect. 9.2.4	Initial Demonstration of Accuracy (IDA)	Calculate average recovery for replicates used in IDP.	Mean recovery \pm 30% of true value
Sect. 9.2.5	Initial Demonstration of Peak Asymmetry Factor	Calculate the peak asymmetry factor using the equation in Section 9.3.9 for the first two eluting chromatographic peaks in a mid-level CAL standard.	Peak asymmetry factor of 0.8 - 1.5
Sect. 9.2.6	Minimum Reporting Limit (MRL) Confirmation	Fortify, extract and analyze seven replicate LFBs at the proposed MRL concentration. Calculate the Mean and the Half Range (HR). Confirm that the upper and lower limits for the Prediction Interval of Result (Upper PIR, and Lower PIR, Sect. 9.2.6.2) meet the recovery criteria.	Upper PIR \leq 150% Lower PIR \geq 50%
Sect. 9.2.7 and 9.3.10	Quality Control Sample (QCS)	Analyze a standard from a second source, as part of IDC.	Results must be within 70-130% of true value.
Sect. 9.2.8	Detection Limit (DL) Determination (optional)	Over a period of three days, prepare a minimum of seven replicate LFBs fortified at a concentration estimated to be near the DL. Analyze the replicates through all steps of the analysis. Calculate the DL using the equation in Sect. 9.2.8.1.	Data from DL replicates are <u>not required</u> to meet method precision and accuracy criteria. If the DL replicates are fortified at a low enough concentration, it is likely that they will not meet precision and accuracy criteria.

NOTE: Table 12 is intended as an abbreviated summary of QC requirements provided as a convenience to the method user. Because the information has been abbreviated to fit the table format, there may be issues that need additional clarification, or areas where important additional information from the method text is needed. In all cases, the full text of the QC in Section 9 supersedes any missing or conflicting information in this table.

Appendix 4

Cyclopure Methodology Summary

CycloPure Methods Summary

Cyclopure's water sampling system analyzes surface water samples using the EPA-validated Liquid Chromatography with tandem mass spectrometry (LC-MS-MS), Method 537. The Cyclopure lab in Skokie, Illinois provides testing results to a 1-2 parts per trillion level of accuracy for 54 PFAS compounds.

Cyclopure uses isotope dilution in their instrument measurements per EPA 537. You can see the details of our process in the attached handout. We have calibrated our instrument (Thermo QExactive) for quantification of 54 PFAS analytcs with standards.

The difference between Cyclopure's process and the procedures followed by a Eurofins or a Pace is in collection and extraction. We all follow EPA 537 instrument methods and use isotope dilution in our analysis.

Cyclopure uses their PFAS adsorbent DEXSORB in an extraction disc for point of site sampling. That allows users to return the collection cups to the lab, where we recover the PFAS from the disc using standard SPE methods.

DEXSORB is an excellent adsorbent for PFAS. It was engineered to remove PFAS from contaminated water and is distinguished by rapid kinetics and high capacity. Cyclopure has engineering projects with environmental firms (AECOM, TetraTech, GHD, HDR) in multiple states using DEXSORB in PBF to remove PFAS. The media has been featured in numerous peer-review articles, SERDP studies and other publications over the years.

Cyclopure's results are highly accurate, they quantify to 1-2 ppt for each of the 54 analytes. The kits are used by universities and research organizations. They've tested over 800 water samples in close to 40 States. Prior to launch, they did verifications with Phenova proficiency testing. Also, awhile back they ran side by side procedures on a PFAS contaminated sample sent to us by AECOM: (A) full 537 and (B) running the sample through our kit followed by SPE and MassSpec measurement. The full 537 method reported 22.9 ppt of PFOS and our kit reported 22.3 ppt.

Cyclopure routinely checks the accuracy of their measurements by running fortified water samples with known PFAS concentrations through kits. We do this as a QA/QC of DEXSORB-loaded filter papers that are prepared by third parties for Cyclopure.

At the end of the day, contaminant testing is straightforward - sample collection, sample preparation (e.g., SPE) and MassSpec analysis. EPA has detailed criteria for accuracy confirmation in its 537 standard. We are expert (not technicians) in each phase of the test process – collection of PFAS by DEXSORB adsorption, recovery by DEXSORB elution and instrument analytics. Each aspect has been published in peer-reviewed journals like Environmental Science & Technology and Water Research.

Cyclopure's analytics go beyond EPA 537 target methods that use reference standards. They have developed advanced analytics to do suspect screening for PFAS chemical structures. Using a PFAS structure database from the Colorado School of Mines, they can identify up to 3,000 PFAS chemicals in a sample. Suspect screening does not allow strict quantification like target methods, but does identify presence and a degree of concentration based on signal intensity.

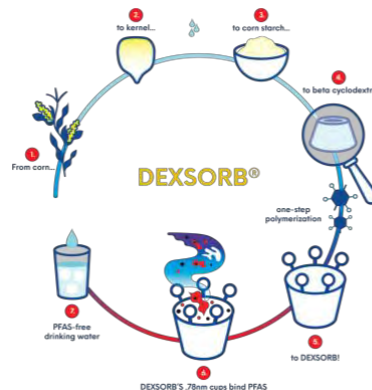
Appendix 5

DEXSORB® Media Details

DEXSORB® Municipal Project Update For Isle Utilities

NSF 61 certified DEXSORB® is a class of novel cyclodextrin adsorbents, designed for use in engineered solutions for the removal of PFAS from water supplies. The application of DEXSORB® provides a **cost-effective, sustainable and scalable** treatment process for PFAS-impacted water.

Tech Intro. DEXSORB® is made using renewable cyclodextrins for their hydrophobic cavities and molecular selectivity for PFAS, and features rapid PFAS uptake with high capacity and resistance to fouling in complex water environments, ranging from groundwater and surface water to wastewater effluent to landfill leachate. This behavior derives from its removal mechanism of host-guest binding within uniform 0.78 nm cyclodextrin cavities, providing high selectivity to PFAS by size-inclusion and shielding from natural organic matter (NOM) by size-exclusion. The hydrophobic adsorption mechanism also allows for easy regeneration of DEXSORB® and facile recovery of contaminants for destruction.



DEXSORB is effective against diverse PFAS structures regardless of chain lengths or functional groups, including carboxylic acids (e.g., PFBA, GenX, PFOA), sulfonic acids (e.g., PFBS, PFHxS, PFOS) and their pre-cursors.

Media Specs. DEXSORB® is available in both powder and granular forms in particle size ranges of 20 to 150 µm and 200 to 2000 µm, respectively. The powder version can be implemented in a batch adsorption process for PFAS removal. The rapid kinetics, high capacity, and resistance to fouling enable

Chemical and Physical Characteristics

Polymer Structure	crosslinked cyclodextrin
Appearance	yellow powder or granule
Adsorption Mechanism	hydrophobic & electrostatic
Bulk Density (wet)	0.40 g/mL; 0.40 kg/L
Specific Gravity	1.1
Effective Size (powder)	20 to 150 µm
Effective Size (granule)	200 to 2000 µm
Thermal Stability	300 °C (572 °F)

its direct application in any types of PFAS-impacted water matrices without requirement of pretreatment processes. The granular version, with high mechanical strength, spherical form, and well controlled particle size, is compatible with packed-bed filtration (PBF) processes. The DEXSORB® PBF system can work with an empty bed contact time (EBCT) of 5 minutes in complex water matrices like groundwater impacted by industrial or military activities, landfill leachate, and RO concentrate, with a pressure tolerance up to 500 psi.

Reuse and Waste Disposal. DEXSORB® can be regenerated for up to 10 cycles of reuse, providing superior life cycle benefits over traditional adsorbents such as activated carbon and single use ion-exchange resin adsorbents. Spent DEXSORB can be fully regenerated by quick wash at ambient temperature with a regeneration solution of ethanol and inorganic salts. Desorbed PFAS can then be isolated and fully destroyed by Cyclopure's EPA-funded mechanochemical destruction process. By desorption, DEXSORB is PFAS-free, which enables safe disposal of spent media by incineration or landfill without creating secondary PFAS contamination.

Municipal Projects.

Working with leading environmental firms like AECOM, GHD, HDR and SUEZ, Cyclopure has demonstrated the suitability of DEXSORB for PBF treatment systems in a variety of water matrices, including drinking water, wastewater, PFAS-impacted groundwater, and landfill leachate. The successful completion of early studies has expanded to multiple pilots for diverse treatment scenarios.

GHD Groundwater Remediation. This project involves the use of DEXSORB in PBF for pump-and-treat remediation of contaminated groundwater at a former GM manufacturing site in MI, where groundwater is heavily contaminated by PFAS with high content of oil and grease. The presence of these co-contaminates limit use of activated carbon and ion exchange resin, whereas DEXSORB showed effective removal of all PFAS. In a paper presented by GHD at the 2021 International Water Conference (IWC), DEXSORB exhibited 25x treatment capacity over GAC. Cyclopure will provide a fully configured pilot vessel system (**Figure 1**) for installation in Q1 2022 to evaluate DEXSORB performance under full-scale conditions. Media regeneration and PFAS waste destruction will also be evaluated in this pilot.



Figure 1. CP Dual Vessel System

Tetra Tech Wastewater Treatment. This project is being led by Tetra Tech using DEXSORB in a pilot PBF for the treatment of AFFF-impacted wastewater at NASA Facility. The system design uses a lead-lag connection of two pressure vessels, with each vessel providing an EBCT of 5 minutes. Breakthrough behaviors of PFAS on DEXSORB will be evaluated for both 5 minute and 10 minute EBCT utilizing the lead-lag set up. This pilot was initiated in September. An off-site media regeneration workflow will also be validated in this pilot.

AECOM Groundwater Remediation. This is an Air Force awarded project led by AECOM to validate the coupled use of DEXSORB[®] and DE-FLUORO[™] for the treatment of AFFF-impacted groundwater at a California airbase. This treatment solution involves PFAS removal by DEXSORB PBF process, followed by PFAS waste destruction by AECOM electro-chemical process applied to regenerant waste from spent DEXSORB vessels. Cyclopure will provide a skid-mounted DEXSORB-loaded vessel system (**Figure 1**), scheduled for installation in March 2022.

HDR Drinking Water Treatment. This project is being led by HDR to validate the coupled use of Reverse Osmosis and DEXSORB for the treatment of PFAS-impacted drinking water in the Southeast. This treatment solution involves PFAS removal by RO separation from the bulk flow, with DEXSORB gravity filtration process being applied to remove PFAS from the RO rejection stream/concentrate. By integrating RO separation with DEXSORB adsorption, zero PFAS discharge can be achieved in this treatment format. The RO membrane system has been installed, with the DEXSORB gravity filter scheduled to begin operation in December 2021.

Hydranautics RO + DEXSORB Drinking Water Treatment. Cyclopure and membrane company Hydranautics are partnering to demonstrate the coupled use of a Hydranautics' RO system with DEXSORB to treat PFAS-impacted groundwater at a California DWTP. Unlike the HDR pilot, this configuration will employ DEXSORB in a PBF post treatment of both RO rejection and permeate. The companies plan to offer a RO + DEXSORB technology combination for large-scale treatment of PFAS-impacted drinking water to provide a zero PFAS discharge and zero PFAS waste solution.

DEXSORB in Europe - Witteveen + Bos. [Witteveen Linked-In Nov 3, 2021](#). "Arjen van Nieuwenhuijzen gave a great presentation at the STOWA symposium at the Aquatech regarding the DEXfilter pilot project, applying the biobased absorbent DEXSORB from Cyclopure, Inc. Next year we're scaling up to pilot testing for removal of #medicines and #pfas from Dutch #wwtp."

Appendix 6

Cyclopure Test Results Report

Friends of Merrymeeting Bay-Cyclopure

WTK_ID	WTK_PFAS_1101	WTK_PFAS_1102
Name	FOMB	FOMB
Sampling Location	Brunswick, ME 04011 FOMB C-S1	Brunswick, ME 04011 FOMB CS-1R
Filtered/Unfiltered	Unfiltered	Unfiltered
Sampling Date	4/20/22 11:00 AM	4/20/22 11:00 AM
Order ID	P-111274658	P-111274658
GenX	< 2 ng/L	< 2 ng/L
N-EtFOSAA	1.1	1.1
N-MeFOSAA	< 1 ng/L	< 1 ng/L
PFBA	1.1	1.2
PFBS	2.4	2.4
PFDA	< 1 ng/L	< 1 ng/L
PFDaA	< 1 ng/L	< 1 ng/L
PFHpA	2.1	2.5
PFHxA	3.7	4.1
PFHxS	4.9	5.1
PFNA	< 1 ng/L	< 1 ng/L
PFOA	6.3	6.3
PFOS	14.9	15
PFPeA	2.3	3.2
PFTeA	< 1 ng/L	< 1 ng/L
PFTrDA	< 1 ng/L	< 1 ng/L
PFUnA	< 1 ng/L	< 1 ng/L
Total PFAS (17 Compounds)	38.8	40.9
Additional PFAS		
6:2 FTS	1.5	2.8
Total PFAS (All Detected)	40.3	43.7

WTK_PFAS_1103
FOMB
Brunswick, ME 04011
FOMB C-S-1 FB
Filtered
4/20/22 11:00 AM
P-111274658
< 2 ng/L
< 1 ng/L
< 1 ng/L
< 1 ng/L
< 1 ng/L
< 1 ng/L
< 1 ng/L
< 1 ng/L
< 1 ng/L
< 1 ng/L
< 1 ng/L
< 1 ng/L
< 1 ng/L
< 1 ng/L
< 1 ng/L
< 1 ng/L
< 1 ng/L
0
< 1 ng/L
0

Appendix 7

Eurofins Test Results Report

ANALYTICAL REPORT

Eurofins Lancaster Laboratories Environment Testing, LLC
2425 New Holland Pike
Lancaster, PA 17601
Tel: (717)656-2300

Laboratory Job ID: 410-81044-1
Client Project/Site: PFAS in Influent

For:
Friends of Merrymeeting Bay
42 Stevens Rd
Bowdoinham, Maine 04008

Attn: Ed Friedman

Kristin Sears

Authorized for release by:
5/5/2022 4:09:15 PM

Kristin Sears, Operations Support Specialist
(717)556-9424
Kristin.Sears@et.eurofinsus.com

LINKS

Review your project
results through
TotalAccess

Have a Question?



Visit us at:

www.eurofinsus.com/Env

The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



Analytical test results meet all requirements of the associated regulatory program (e.g., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis. Data qualifiers are applied to note exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- QC results that exceed the upper limits and are associated with non-detect samples are qualified but further narration is not required since the bias is high and does not change a non-detect result. Further narration is also not required with QC blank detection when the associated sample concentration is non-detect or more than ten times the level in the blank.
 - Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD is performed, unless otherwise specified in the method.
 - Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.
- Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Measurement uncertainty values, as applicable, are available upon request.

Test results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" and tested in the laboratory are not performed within 15 minutes of collection.

This report shall not be reproduced except in full, without the written approval of the laboratory.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied, except as otherwise agreed. We disclaim any other warranties, expressed or implied, including a warranty of fitness for particular purpose and warranty of merchantability. In no event shall Eurofins Lancaster Laboratories Environmental, LLC be liable for indirect, special, consequential, or incidental damages including, but not limited to, damages for loss of profit or goodwill regardless of (A) the negligence (either sole or concurrent) of Eurofins Lancaster Laboratories Environmental and (B) whether Eurofins Lancaster Laboratories Environmental has been informed of the possibility of such damages. We accept no legal responsibility for the purposes for which the client uses the test results. Except as otherwise agreed, no purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

Kristin Sears

Kristin Sears
Operations Support Specialist
5/5/2022 4:09:15 PM



Table of Contents

Cover Page	1
Table of Contents	3
Definitions/Glossary	4
Case Narrative	5
Detection Summary	6
Client Sample Results	7
Isotope Dilution Summary	12
QC Sample Results	14
QC Association Summary	21
Lab Chronicle	22
Certification Summary	23
Method Summary	24
Sample Summary	25
Chain of Custody	26
Receipt Checklists	27

Definitions/Glossary

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*-	LCS and/or LCSD is outside acceptance limits, low biased.
*+	LCS and/or LCSD is outside acceptance limits, high biased.
*5+	Isotope dilution analyte is outside acceptance limits, high biased.
B	Compound was found in the blank and sample.
cn	Refer to Case Narrative for further detail
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Job ID: 410-81044-1

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

Narrative

Job Narrative 410-81044-1

Receipt

The samples were received on 4/21/2022 11:15 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.4°C

PFAS

Method PFC_IDA: The recovery for labeled isotopes: d9-N-EtFOSE-M, d3-NMeFOSAA, d5-NEtFOSAA, 13C2-2H-Perfluoro-2-octenoic acid, 13C2-2-Perfluorodecylethanoic acid and 13C2-2H-Perfluoro-2-decenoic acid is outside the QC acceptance limits in the closing continuing calibration verification standard. Since the recovery for the labeled isotope is within QC limits in the following samples: FOMB ES 1 FB (410-81044-1) and FOMB ES 1 (410-81044-2), the data is reported. The recovery for target analyte 10:2 FTS is outside the QC acceptance limits in the closing continuing calibration verification standard. Since the result is high and target 10:2 FTS is not detected in the following samples: FOMB ES 1 FB (410-81044-1) and FOMB ES 1 (410-81044-2), the data is reported.

Method PFC_IDA: The recovery for a target analyte(s) in the laboratory control spike samples associated with the following samples: FOMB ES 1 FB (410-81044-1) and FOMB ES 1 (410-81044-2) is outside the QC acceptance limits. The following action was taken: This sample was re-extracted within the required holding time and the recovery for a target analyte(s) in the laboratory control spike sample(s) was again outside of the QC acceptance limits. Target analyte(s) were detected in the method blank associated with the following samples: FOMB ES 1 FB (410-81044-1) and FOMB ES 1 (410-81044-2). The following action was taken: This sample(s) was re-extracted within the required holding time and target analyte(s) were again detected in the re-extracted method blank.

Method PFC_IDA: The recovery for the labeled isotope(s) in the following sample: FOMB ES 1 (410-81044-2) is outside the QC acceptance limits. The following action was taken: This sample was re-extracted within the required holding time and the recovery for labeled isotope(s) was again outside of the QC acceptance limits.

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

Detection Summary

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Client Sample ID: FOMB ES 1 FB

Lab Sample ID: 410-81044-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
HFPODA	1.1	J B cn	2.8	0.47	ng/L	1		T-WI14355 r13	Total/NA
NETFOSAA	0.48	J I cn	2.8	0.47	ng/L	1		T-WI14355 r13	Total/NA

Client Sample ID: FOMB ES 1

Lab Sample ID: 410-81044-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
HFPODA	5.1	B cn	2.7	0.45	ng/L	1		T-WI14355 r13	Total/NA
Perfluorooctanesulfonic acid	16	cn	1.8	0.45	ng/L	1		T-WI14355 r13	Total/NA
R-EVE	0.36	J cn	1.8	0.36	ng/L	1		T-WI14355 r13	Total/NA
PEPA	1.6	J cn	1.8	0.18	ng/L	1		T-WI14355 r13	Total/NA
Perfluoropentanoic acid	6.0	cn	1.8	0.45	ng/L	1		T-WI14355 r13	Total/NA
Perfluoropentanesulfonic acid	1.1	J cn	1.8	0.45	ng/L	1		T-WI14355 r13	Total/NA
6:2 Fluorotelomer sulfonic acid	2.3	J cn	4.5	1.8	ng/L	1		T-WI14355 r13	Total/NA
NETFOSAA	0.96	J cn	2.7	0.45	ng/L	1		T-WI14355 r13	Total/NA
Perfluorohexanoic acid	9.0	B cn	1.8	0.45	ng/L	1		T-WI14355 r13	Total/NA
Perfluorooctanoic acid	10	cn	1.8	0.45	ng/L	1		T-WI14355 r13	Total/NA
Perfluorohexanesulfonic acid	5.3	cn	1.8	0.45	ng/L	1		T-WI14355 r13	Total/NA
Perfluorobutanoic acid	5.0	cn	4.5	1.8	ng/L	1		T-WI14355 r13	Total/NA
Perfluorobutanesulfonic acid	3.5	cn	1.8	0.45	ng/L	1		T-WI14355 r13	Total/NA
Perfluoroheptanoic acid	3.5	cn	1.8	0.45	ng/L	1		T-WI14355 r13	Total/NA
Perfluorononanoic acid	0.75	J cn	1.8	0.45	ng/L	1		T-WI14355 r13	Total/NA
PFECA F	0.20	J cn	1.8	0.18	ng/L	1		T-WI14355 r13	Total/NA
PPF Acid	4.1	J cn	4.5	1.8	ng/L	1		T-WI14355 r13	Total/NA
Perfluoropropanesulfonic acid	0.30	J cn	1.8	0.18	ng/L	1		T-WI14355 r13	Total/NA
6:2 FTCA	1.2	J cn	1.8	0.36	ng/L	1		T-WI14355 r13	Total/NA
5:3 FTCA	0.32	J cn	1.8	0.18	ng/L	1		T-WI14355 r13	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Lancaster Laboratories Environment Testing, LLC

Client Sample Results

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Client Sample ID: FOMB ES 1 FB

Lab Sample ID: 410-81044-1

Date Collected: 04/20/22 10:30

Matrix: Water

Date Received: 04/21/22 11:15

Method: T-WI14355 r13 - SOP(00037) T-PFAS-WI14355 Rev.13

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NVHOS	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluoro (2-ethoxyethane) sulfonic acid	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
10:2 FTS	ND	cn	4.7	0.94	ng/L		04/24/22 08:27	04/29/22 21:53	1
PMPA	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
HFPODA	1.1	J B cn	2.8	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluoro-4-ethylcyclohexanesulfonic acid	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
PFECA B	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorooctadecanoic acid	ND	cn	2.8	0.94	ng/L		04/24/22 08:27	04/29/22 21:53	1
NEtFOSE	ND	cn	2.8	0.94	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorooctanesulfonic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluoroundecanoic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
NMeFOSAA	ND	cn	1.9	0.56	ng/L		04/24/22 08:27	04/29/22 21:53	1
R-PSDA	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Hydrolyzed PSDA	ND	cn	1.9	0.85	ng/L		04/24/22 08:27	04/29/22 21:53	1
R-PSDCA	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
R-EVE	ND	cn	1.9	0.38	ng/L		04/24/22 08:27	04/29/22 21:53	1
NMeFOSE	ND	cn	2.8	0.94	ng/L		04/24/22 08:27	04/29/22 21:53	1
PEPA	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluoropentanoic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluoropentanesulfonic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
6:2 Fluorotelomer sulfonic acid	ND	cn	4.7	1.9	ng/L		04/24/22 08:27	04/29/22 21:53	1
8:2 FTCA	ND	cn	1.9	0.38	ng/L		04/24/22 08:27	04/29/22 21:53	1
PS Acid	ND	*- cn	9.4	2.8	ng/L		04/24/22 08:27	04/29/22 21:53	1
NEtFOSAA	0.48	J I cn	2.8	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorohexanoic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorododecanoic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
NMeFOSA	ND	cn	2.8	0.94	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorooctanoic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorodecanoic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorodecanesulfonic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorohexanesulfonic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
3:3 FTCA	ND	cn	1.9	0.28	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorobutanoic acid	ND	cn	4.7	1.9	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorobutanesulfonic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluoroheptanoic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluoroheptanesulfonic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorononanoic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorotetradecanoic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
PFECA F	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
8:2 Fluorotelomer sulfonic acid	ND	cn	2.8	0.94	ng/L		04/24/22 08:27	04/29/22 21:53	1
PFO2HxA	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
PFO3OA	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
PFO4DA	ND	cn	1.9	0.66	ng/L		04/24/22 08:27	04/29/22 21:53	1
TAF	ND	cn	4.7	1.9	ng/L		04/24/22 08:27	04/29/22 21:53	1
NEtFOSA	ND	cn	4.7	0.94	ng/L		04/24/22 08:27	04/29/22 21:53	1
PPF Acid	ND	cn	4.7	1.9	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluoropropanesulfonic acid	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
6:2 FTCA	ND	cn	1.9	0.38	ng/L		04/24/22 08:27	04/29/22 21:53	1

Client Sample Results

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Client Sample ID: FOMB ES 1 FB

Lab Sample ID: 410-81044-1

Date Collected: 04/20/22 10:30

Matrix: Water

Date Received: 04/21/22 11:15

Method: T-WI14355 r13 - SOP(00037) T-PFAS-WI14355 Rev.13 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
10:2 FTCA	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
PFMOAA	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorohexadecanoic acid	ND	cn	2.8	0.94	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorononanesulfonic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
EVE Acid	ND	*- cn	9.4	2.8	ng/L		04/24/22 08:27	04/29/22 21:53	1
8:2 FTUCA	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
6:2 FTUCA	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
10:2 FTUCA	ND	cn	1.9	0.66	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorotridecanoic acid	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Hydro-PS Acid	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorooctanesulfonamide	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
9Cl-PF3ONS	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
4:2 Fluorotelomer sulfonic acid	ND	*+ cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
11Cl-PF3OUdS	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
Hydro-EVE Acid	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
Perfluorododecanesulfonic acid	ND	cn	2.8	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
PFECA G	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
7:3 FTCA	ND	cn	1.9	0.28	ng/L		04/24/22 08:27	04/29/22 21:53	1
PFECA A	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
5:3 FTCA	ND	cn	1.9	0.19	ng/L		04/24/22 08:27	04/29/22 21:53	1
DONA	ND	cn	1.9	0.47	ng/L		04/24/22 08:27	04/29/22 21:53	1
MTP	ND	cn	4.7	1.9	ng/L		04/24/22 08:27	04/29/22 21:53	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
d5-NEtFOSAA	132	cn	29 - 195	04/24/22 08:27	04/29/22 21:53	1
d3-NMeFOSAA	138	cn	31 - 174	04/24/22 08:27	04/29/22 21:53	1
13C3 HFPO-DA	116	cn	17 - 185	04/24/22 08:27	04/29/22 21:53	1
d7-N-MeFOSE-M	112	cn	10 - 178	04/24/22 08:27	04/29/22 21:53	1
d9-N-EtFOSE-M	120	cn	10 - 177	04/24/22 08:27	04/29/22 21:53	1
M2-6:2 FTS	111	cn	17 - 200	04/24/22 08:27	04/29/22 21:53	1
M2-8:2 FTS	99	cn	33 - 200	04/24/22 08:27	04/29/22 21:53	1
13C3 PFBS	97	cn	16 - 200	04/24/22 08:27	04/29/22 21:53	1
M2-4:2 FTS	106	cn	10 - 200	04/24/22 08:27	04/29/22 21:53	1
13C5 PFHxA	105	cn	24 - 179	04/24/22 08:27	04/29/22 21:53	1
13C9 PFNA	113	cn	51 - 167	04/24/22 08:27	04/29/22 21:53	1
13C6 PFDA	117	cn	49 - 163	04/24/22 08:27	04/29/22 21:53	1
13C7 PFUnA	112	cn	34 - 174	04/24/22 08:27	04/29/22 21:53	1
13C3 PFHxS	108	cn	28 - 188	04/24/22 08:27	04/29/22 21:53	1
13C2-PFDoDA	113	cn	17 - 176	04/24/22 08:27	04/29/22 21:53	1
d5-NEtPFOSA	77	cn	10 - 159	04/24/22 08:27	04/29/22 21:53	1
d3-NMePFOSA	75	cn	10 - 155	04/24/22 08:27	04/29/22 21:53	1
13C2-2-Perfluorohexylethanoic acid	126	cn	10 - 200	04/24/22 08:27	04/29/22 21:53	1
13C2-2-Perfluorooctylethanoic acid	157	cn	10 - 200	04/24/22 08:27	04/29/22 21:53	1
13C2-2-Perfluorodecylethanoic acid	121	cn	10 - 200	04/24/22 08:27	04/29/22 21:53	1
13C2-2H-Perfluoro-2-octenoic acid	115	cn	20 - 173	04/24/22 08:27	04/29/22 21:53	1
13C2-2H-Perfluoro-2-decenoic acid	132	cn	21 - 166	04/24/22 08:27	04/29/22 21:53	1
13C2-2H-Perfluoro-2-dodecenoic acid	112	cn	14 - 166	04/24/22 08:27	04/29/22 21:53	1
13C4 PFBA	99	cn	42 - 165	04/24/22 08:27	04/29/22 21:53	1
13C5 PFPeA	95	cn	38 - 187	04/24/22 08:27	04/29/22 21:53	1

Client Sample Results

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Client Sample ID: FOMB ES 1 FB

Lab Sample ID: 410-81044-1

Date Collected: 04/20/22 10:30

Matrix: Water

Date Received: 04/21/22 11:15

Method: T-WI14355 r13 - SOP(00037) T-PFAS-WI14355 Rev.13 (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFHpA	107	cn	31 - 182	04/24/22 08:27	04/29/22 21:53	1
13C8 PFOA	104	cn	48 - 162	04/24/22 08:27	04/29/22 21:53	1
13C8 PFOS	101	cn	51 - 159	04/24/22 08:27	04/29/22 21:53	1
13C8 FOSA	87	cn	10 - 168	04/24/22 08:27	04/29/22 21:53	1
13C2 PFTeDA	103	cn	10 - 179	04/24/22 08:27	04/29/22 21:53	1

Client Sample ID: FOMB ES 1

Lab Sample ID: 410-81044-2

Date Collected: 04/20/22 10:30

Matrix: Water

Date Received: 04/21/22 11:15

Method: T-WI14355 r13 - SOP(00037) T-PFAS-WI14355 Rev.13

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NVHOS	ND	cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluoro (2-ethoxyethane) sulfonic acid	ND	cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
10:2 FTS	ND	cn	4.5	0.89	ng/L		04/24/22 08:27	04/29/22 22:04	1
PMPA	ND	cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
HFPODA	5.1	B cn	2.7	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluoro-4-ethylcyclohexanesulfonic acid	ND	cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
PFECA B	ND	cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorooctadecanoic acid	ND	cn	2.7	0.89	ng/L		04/24/22 08:27	04/29/22 22:04	1
NEtFOSE	ND	cn	2.7	0.89	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorooctanesulfonic acid	16	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluoroundecanoic acid	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
NMeFOSAA	ND	cn	1.8	0.54	ng/L		04/24/22 08:27	04/29/22 22:04	1
R-PSDA	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
Hydrolyzed PSDA	ND	cn	1.8	0.80	ng/L		04/24/22 08:27	04/29/22 22:04	1
R-PSDCA	ND	cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
R-EVE	0.36	J cn	1.8	0.36	ng/L		04/24/22 08:27	04/29/22 22:04	1
NMeFOSE	ND	cn	2.7	0.89	ng/L		04/24/22 08:27	04/29/22 22:04	1
PEPA	1.6	J cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluoropentanoic acid	6.0	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluoropentanesulfonic acid	1.1	J cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
6:2 Fluorotelomer sulfonic acid	2.3	J cn	4.5	1.8	ng/L		04/24/22 08:27	04/29/22 22:04	1
8:2 FTCA	ND	cn	1.8	0.36	ng/L		04/24/22 08:27	04/29/22 22:04	1
PS Acid	ND	*- cn	8.9	2.7	ng/L		04/24/22 08:27	04/29/22 22:04	1
NEtFOSAA	0.96	J cn	2.7	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorohexanoic acid	9.0	B cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorododecanoic acid	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
NMeFOSA	ND	cn	2.7	0.89	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorooctanoic acid	10	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorodecanoic acid	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorodecanesulfonic acid	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorohexanesulfonic acid	5.3	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
3:3 FTCA	ND	cn	1.8	0.27	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorobutanoic acid	5.0	cn	4.5	1.8	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorobutanesulfonic acid	3.5	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluoroheptanoic acid	3.5	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluoroheptanesulfonic acid	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1

Client Sample Results

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Client Sample ID: FOMB ES 1

Lab Sample ID: 410-81044-2

Date Collected: 04/20/22 10:30

Matrix: Water

Date Received: 04/21/22 11:15

Method: T-WI14355 r13 - SOP(00037) T-PFAS-WI14355 Rev.13 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid	0.75	J cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorotetradecanoic acid	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
PFECA F	0.20	J cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
8:2 Fluorotelomer sulfonic acid	ND	cn	2.7	0.89	ng/L		04/24/22 08:27	04/29/22 22:04	1
PFO2HxA	ND	cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
PFO3OA	ND	cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
PFO4DA	ND	cn	1.8	0.62	ng/L		04/24/22 08:27	04/29/22 22:04	1
TAF	ND	cn	4.5	1.8	ng/L		04/24/22 08:27	04/29/22 22:04	1
NEtFOSA	ND	cn	4.5	0.89	ng/L		04/24/22 08:27	04/29/22 22:04	1
PPF Acid	4.1	J cn	4.5	1.8	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluoropropanesulfonic acid	0.30	J cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
6:2 FTCA	1.2	J cn	1.8	0.36	ng/L		04/24/22 08:27	04/29/22 22:04	1
10:2 FTCA	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
PFMOAA	ND	cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorohexadecanoic acid	ND	cn	2.7	0.89	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorononanesulfonic acid	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
EVE Acid	ND	*- cn	8.9	2.7	ng/L		04/24/22 08:27	04/29/22 22:04	1
8:2 FTUCA	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
6:2 FTUCA	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
10:2 FTUCA	ND	cn	1.8	0.62	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorotridecanoic acid	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
Hydro-PS Acid	ND	cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorooctanesulfonamide	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
9CI-PF3ONS	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
4:2 Fluorotelomer sulfonic acid	ND	*+ cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
11CI-PF3OUdS	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
Hydro-EVE Acid	ND	cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
Perfluorododecanesulfonic acid	ND	cn	2.7	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
PFECA G	ND	cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
7:3 FTCA	ND	cn	1.8	0.27	ng/L		04/24/22 08:27	04/29/22 22:04	1
PFECAA	ND	cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
5:3 FTCA	0.32	J cn	1.8	0.18	ng/L		04/24/22 08:27	04/29/22 22:04	1
DONA	ND	cn	1.8	0.45	ng/L		04/24/22 08:27	04/29/22 22:04	1
MTP	ND	cn	4.5	1.8	ng/L		04/24/22 08:27	04/29/22 22:04	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
d5-NEtFOSAA	77	cn	29 - 195				04/24/22 08:27	04/29/22 22:04	1
d3-NMeFOSAA	91	cn	31 - 174				04/24/22 08:27	04/29/22 22:04	1
13C3 HFPO-DA	83	cn	17 - 185				04/24/22 08:27	04/29/22 22:04	1
d7-N-MeFOSE-M	28	cn	10 - 178				04/24/22 08:27	04/29/22 22:04	1
d9-N-EtFOSE-M	35	cn	10 - 177				04/24/22 08:27	04/29/22 22:04	1
M2-6:2 FTS	235	*5+ cn	17 - 200				04/24/22 08:27	04/29/22 22:04	1
M2-8:2 FTS	153	cn	33 - 200				04/24/22 08:27	04/29/22 22:04	1
13C3 PFBS	104	cn	16 - 200				04/24/22 08:27	04/29/22 22:04	1
M2-4:2 FTS	221	*5+ cn	10 - 200				04/24/22 08:27	04/29/22 22:04	1
13C5 PFHxA	69	cn	24 - 179				04/24/22 08:27	04/29/22 22:04	1
13C9 PFNA	118	cn	51 - 167				04/24/22 08:27	04/29/22 22:04	1
13C6 PFDA	107	cn	49 - 163				04/24/22 08:27	04/29/22 22:04	1
13C7 PFUnA	88	cn	34 - 174				04/24/22 08:27	04/29/22 22:04	1
13C3 PFHxS	88	cn	28 - 188				04/24/22 08:27	04/29/22 22:04	1

Client Sample Results

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Client Sample ID: FOMB ES 1

Lab Sample ID: 410-81044-2

Date Collected: 04/20/22 10:30

Matrix: Water

Date Received: 04/21/22 11:15

Method: T-WI14355 r13 - SOP(00037) T-PFAS-WI14355 Rev.13 (Continued)

<u>Isotope Dilution</u>	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Dil Fac</u>
13C2-PFDoDA	29	cn	17 - 176	04/24/22 08:27	04/29/22 22:04	1
d5-NEtPFOSA	23	cn	10 - 159	04/24/22 08:27	04/29/22 22:04	1
d3-NMePFOSA	26	cn	10 - 155	04/24/22 08:27	04/29/22 22:04	1
13C2-2-Perfluorohexylethanoic acid	81	cn	10 - 200	04/24/22 08:27	04/29/22 22:04	1
13C2-2-Perfluorooctylethanoic acid	155	cn	10 - 200	04/24/22 08:27	04/29/22 22:04	1
13C2-2-Perfluorodecylethanoic acid	69	cn	10 - 200	04/24/22 08:27	04/29/22 22:04	1
13C2-2H-Perfluoro-2-octenoic acid	93	cn	20 - 173	04/24/22 08:27	04/29/22 22:04	1
13C2-2H-Perfluoro-2-decenoic acid	159	cn	21 - 166	04/24/22 08:27	04/29/22 22:04	1
13C2-2H-Perfluoro-2-dodecenoic acid	81	cn	14 - 166	04/24/22 08:27	04/29/22 22:04	1
13C4 PFBA	80	cn	42 - 165	04/24/22 08:27	04/29/22 22:04	1
13C5 PFPeA	88	cn	38 - 187	04/24/22 08:27	04/29/22 22:04	1
13C4 PFHpA	89	cn	31 - 182	04/24/22 08:27	04/29/22 22:04	1
13C8 PFOA	82	cn	48 - 162	04/24/22 08:27	04/29/22 22:04	1
13C8 PFOS	90	cn	51 - 159	04/24/22 08:27	04/29/22 22:04	1
13C8 FOSA	49	cn	10 - 168	04/24/22 08:27	04/29/22 22:04	1
13C2 PFTeDA	19	cn	10 - 179	04/24/22 08:27	04/29/22 22:04	1

Isotope Dilution Summary

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Method: T-WI14355 r13 - SOP(00037) T-PFAS-WI14355 Rev.13

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	d5NEFOS (29-195)	d3NMFOS (31-174)	HFPODA (17-185)	NMFM (10-178)	NEFM (10-177)	M262FTS (17-200)	M282FTS (33-200)	C3PFBS (16-200)
410-81044-1	FOMB ES 1 FB	132 cn	138 cn	116 cn	112 cn	120 cn	111 cn	99 cn	97 cn
410-81044-2	FOMB ES 1	77 cn	91 cn	83 cn	28 cn	35 cn	235 *5+ cn	153 cn	104 cn
LCS 410-247744/3-A	Lab Control Sample	137	138	122	119	133	117	111	107
LCSD 410-247744/4-A	Lab Control Sample Dup	129	135	108	119	128	116	102	102
MB 410-247744/1-A	Method Blank	131	135	114	114	122	110	108	103

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	M242FTS (10-200)	13C5PHA (24-179)	C9PFNA (51-167)	C6PFDA (49-163)	13C7PUA (34-174)	C3PFHS (28-188)	PFDODA (17-176)	d5NPFSA (10-159)
410-81044-1	FOMB ES 1 FB	106 cn	105 cn	113 cn	117 cn	112 cn	108 cn	113 cn	77 cn
410-81044-2	FOMB ES 1	221 *5+ cn	69 cn	118 cn	107 cn	88 cn	88 cn	29 cn	23 cn
LCS 410-247744/3-A	Lab Control Sample	103	105	122	120	113	103	107	75
LCSD 410-247744/4-A	Lab Control Sample Dup	106	104	124	119	110	105	108	69
MB 410-247744/1-A	Method Blank	103	101	115	110	101	105	105	76

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	d3NMFSA (10-155)	MFHEA (10-200)	MFOEA (10-200)	MFDEA (10-200)	MFHUEA (20-173)	MFOUEA (21-166)	MFDUEA (14-166)	PFBA (42-165)
410-81044-1	FOMB ES 1 FB	75 cn	126 cn	157 cn	121 cn	115 cn	132 cn	112 cn	99 cn
410-81044-2	FOMB ES 1	26 cn	81 cn	155 cn	69 cn	93 cn	159 cn	81 cn	80 cn
LCS 410-247744/3-A	Lab Control Sample	70	139	145	119	124	128	113	106
LCSD 410-247744/4-A	Lab Control Sample Dup	70	131	130	116	121	122	113	102
MB 410-247744/1-A	Method Blank	72	129	151	117	118	142	110	99

		Percent Isotope Dilution Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	PFPeA (38-187)	C4PFHA (31-182)	C8PFOA (48-162)	C8PFOS (51-159)	PFOSA (10-168)	PFTDA (10-179)
410-81044-1	FOMB ES 1 FB	95 cn	107 cn	104 cn	101 cn	87 cn	103 cn
410-81044-2	FOMB ES 1	88 cn	89 cn	82 cn	90 cn	49 cn	19 cn
LCS 410-247744/3-A	Lab Control Sample	101	102	110	107	90	105
LCSD 410-247744/4-A	Lab Control Sample Dup	107	106	102	112	83	101
MB 410-247744/1-A	Method Blank	97	106	100	102	86	98

Surrogate Legend

- d5NEFOS = d5-NEtFOSAA
- d3NMFOS = d3-NMeFOSAA
- HFPODA = 13C3 HFPO-DA
- NMFM = d7-N-MeFOSE-M
- NEFM = d9-N-EtFOSE-M
- M262FTS = M2-6:2 FTS
- M282FTS = M2-8:2 FTS
- C3PFBS = 13C3 PFBS
- M242FTS = M2-4:2 FTS
- 13C5PHA = 13C5 PFHxA
- C9PFNA = 13C9 PFNA
- C6PFDA = 13C6 PFDA
- 13C7PUA = 13C7 PFUnA
- C3PFHS = 13C3 PFHxS
- PFDODA = 13C2-PFDODA
- d5NPFSA = d5-NEtPFOSA
- d3NMFSA = d3-NMePFOSA

Isotope Dilution Summary

Client: Friends of Merrymeeting Bay

Project/Site: PFAS in Influent

Job ID: 410-81044-1

MFHEA = 13C2-2-Perfluorohexylethanoic acid
MFOEA = 13C2-2-Perfluorooctylethanoic acid
MFDEA = 13C2-2-Perfluorodecylethanoic acid
MFHUEA = 13C2-2H-Perfluoro-2-octenoic acid
MFOUEA = 13C2-2H-Perfluoro-2-decenoic acid
MFDUEA = 13C2-2H-Perfluoro-2-dodecenoic acid
PFBA = 13C4 PFBA
PFPeA = 13C5 PFPeA
C4PFHA = 13C4 PFHpA
C8PFOA = 13C8 PFOA
C8PFOS = 13C8 PFOS
PFOSA = 13C8 FOSA
PFTDA = 13C2 PFTeDA

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

QC Sample Results

Client: Friends of Merrymeeting Bay
 Project/Site: PFAS in Influent

Job ID: 410-81044-1

Method: T-WI14355 r13 - SOP(00037) T-PFAS-WI14355 Rev.13

Lab Sample ID: MB 410-247744/1-A
Matrix: Water
Analysis Batch: 249942

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 247744

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
NVHOS	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluoro (2-ethoxyethane) sulfonic acid	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
10:2 FTS	ND		5.0	1.0	ng/L		04/24/22 08:27	04/29/22 21:09	1
PMPA	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
HFPODA	1.73	J	3.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluoro-4-ethylcyclohexanesulfonic acid	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
PFECA B	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorooctadecanoic acid	ND		3.0	1.0	ng/L		04/24/22 08:27	04/29/22 21:09	1
NEtFOSE	ND		3.0	1.0	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorooctanesulfonic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluoroundecanoic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
NMeFOSAA	ND		2.0	0.60	ng/L		04/24/22 08:27	04/29/22 21:09	1
R-PSDA	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Hydrolyzed PSDA	ND		2.0	0.90	ng/L		04/24/22 08:27	04/29/22 21:09	1
R-PSDCA	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
R-EVE	ND		2.0	0.40	ng/L		04/24/22 08:27	04/29/22 21:09	1
NMeFOSE	ND		3.0	1.0	ng/L		04/24/22 08:27	04/29/22 21:09	1
PEPA	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluoropentanoic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluoropentanesulfonic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
6:2 Fluorotelomer sulfonic acid	ND		5.0	2.0	ng/L		04/24/22 08:27	04/29/22 21:09	1
8:2 FTCA	ND		2.0	0.40	ng/L		04/24/22 08:27	04/29/22 21:09	1
PS Acid	ND		10	3.0	ng/L		04/24/22 08:27	04/29/22 21:09	1
NEtFOSAA	ND		3.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorohexanoic acid	0.626	J	2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorododecanoic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
NMeFOSA	ND		3.0	1.0	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorooctanoic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorodecanoic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorodecanesulfonic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorohexanesulfonic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
3:3 FTCA	ND		2.0	0.30	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorobutanoic acid	ND		5.0	2.0	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorobutanesulfonic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluoroheptanoic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluoroheptanesulfonic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorononanoic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorotetradecanoic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
PFECA F	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
8:2 Fluorotelomer sulfonic acid	ND		3.0	1.0	ng/L		04/24/22 08:27	04/29/22 21:09	1
PFO2HxA	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
PFO3OA	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
PFO4DA	ND		2.0	0.70	ng/L		04/24/22 08:27	04/29/22 21:09	1
TAF	ND		5.0	2.0	ng/L		04/24/22 08:27	04/29/22 21:09	1
NEtFOSA	ND		5.0	1.0	ng/L		04/24/22 08:27	04/29/22 21:09	1
PPF Acid	ND		5.0	2.0	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluoropropanesulfonic acid	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1

QC Sample Results

Client: Friends of Merrymeeting Bay
 Project/Site: PFAS in Influent

Job ID: 410-81044-1

Method: T-WI14355 r13 - SOP(00037) T-PFAS-WI14355 Rev.13 (Continued)

Lab Sample ID: MB 410-247744/1-A
Matrix: Water
Analysis Batch: 249942

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 247744

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
6:2 FTCA	ND		2.0	0.40	ng/L		04/24/22 08:27	04/29/22 21:09	1
10:2 FTCA	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
PFMOAA	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorohexadecanoic acid	ND		3.0	1.0	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorononanesulfonic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
EVE Acid	ND		10	3.0	ng/L		04/24/22 08:27	04/29/22 21:09	1
8:2 FTUCA	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
6:2 FTUCA	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
10:2 FTUCA	ND		2.0	0.70	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorotridecanoic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Hydro-PS Acid	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorooctanesulfonamide	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
9Cl-PF3ONS	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
4:2 Fluorotelomer sulfonic acid	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
11Cl-PF3OUdS	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
Hydro-EVE Acid	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
Perfluorododecanesulfonic acid	ND		3.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
PFECA G	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
7:3 FTCA	ND		2.0	0.30	ng/L		04/24/22 08:27	04/29/22 21:09	1
PFECA A	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
5:3 FTCA	ND		2.0	0.20	ng/L		04/24/22 08:27	04/29/22 21:09	1
DONA	ND		2.0	0.50	ng/L		04/24/22 08:27	04/29/22 21:09	1
MTP	ND		5.0	2.0	ng/L		04/24/22 08:27	04/29/22 21:09	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
d5-NEtFOSAA	131		29 - 195	04/24/22 08:27	04/29/22 21:09	1
d3-NMeFOSAA	135		31 - 174	04/24/22 08:27	04/29/22 21:09	1
13C3 HFPO-DA	114		17 - 185	04/24/22 08:27	04/29/22 21:09	1
d7-N-MeFOSE-M	114		10 - 178	04/24/22 08:27	04/29/22 21:09	1
d9-N-EtFOSE-M	122		10 - 177	04/24/22 08:27	04/29/22 21:09	1
M2-6:2 FTS	110		17 - 200	04/24/22 08:27	04/29/22 21:09	1
M2-8:2 FTS	108		33 - 200	04/24/22 08:27	04/29/22 21:09	1
13C3 PFBS	103		16 - 200	04/24/22 08:27	04/29/22 21:09	1
M2-4:2 FTS	103		10 - 200	04/24/22 08:27	04/29/22 21:09	1
13C5 PFHxA	101		24 - 179	04/24/22 08:27	04/29/22 21:09	1
13C9 PFNA	115		51 - 167	04/24/22 08:27	04/29/22 21:09	1
13C6 PFDA	110		49 - 163	04/24/22 08:27	04/29/22 21:09	1
13C7 PFUnA	101		34 - 174	04/24/22 08:27	04/29/22 21:09	1
13C3 PFHxS	105		28 - 188	04/24/22 08:27	04/29/22 21:09	1
13C2-PFDoDA	105		17 - 176	04/24/22 08:27	04/29/22 21:09	1
d5-NEtPFOSA	76		10 - 159	04/24/22 08:27	04/29/22 21:09	1
d3-NMePFOSA	72		10 - 155	04/24/22 08:27	04/29/22 21:09	1
13C2-2-Perfluorohexylethanoic acid	129		10 - 200	04/24/22 08:27	04/29/22 21:09	1
13C2-2-Perfluorooctylethanoic acid	151		10 - 200	04/24/22 08:27	04/29/22 21:09	1
13C2-2-Perfluorodecylethanoic acid	117		10 - 200	04/24/22 08:27	04/29/22 21:09	1
13C2-2H-Perfluoro-2-octenoic acid	118		20 - 173	04/24/22 08:27	04/29/22 21:09	1
13C2-2H-Perfluoro-2-decenoic acid	142		21 - 166	04/24/22 08:27	04/29/22 21:09	1
13C2-2H-Perfluoro-2-dodecenoic acid	110		14 - 166	04/24/22 08:27	04/29/22 21:09	1

QC Sample Results

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Method: T-WI14355 r13 - SOP(00037) T-PFAS-WI14355 Rev.13 (Continued)

Lab Sample ID: MB 410-247744/1-A
Matrix: Water
Analysis Batch: 249942

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 247744

<i>Isotope Dilution</i>	<i>MB</i>	<i>MB</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
	%Recovery	Qualifier				
13C4 PFBA	99		42 - 165	04/24/22 08:27	04/29/22 21:09	1
13C5 PFPeA	97		38 - 187	04/24/22 08:27	04/29/22 21:09	1
13C4 PFHpA	106		31 - 182	04/24/22 08:27	04/29/22 21:09	1
13C8 PFOA	100		48 - 162	04/24/22 08:27	04/29/22 21:09	1
13C8 PFOS	102		51 - 159	04/24/22 08:27	04/29/22 21:09	1
13C8 FOSA	86		10 - 168	04/24/22 08:27	04/29/22 21:09	1
13C2 PFTeDA	98		10 - 179	04/24/22 08:27	04/29/22 21:09	1

Lab Sample ID: LCS 410-247744/3-A
Matrix: Water
Analysis Batch: 249942

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 247744

<i>Analyte</i>	<i>Spike Added</i>	<i>LCS Result</i>	<i>LCS Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec Limits</i>
NVHOS	25.6	24.6		ng/L		96	70 - 130
Perfluoro (2-ethoxyethane) sulfonic acid	22.8	22.6		ng/L		99	70 - 130
10:2 FTS	24.7	33.5		ng/L		136	50 - 146
PMPA	25.6	25.3		ng/L		99	70 - 130
HFPODA	25.6	24.5		ng/L		96	50 - 135
Perfluoro-4-ethylcyclohexanesulfonic acid	23.6	26.2		ng/L		111	70 - 130
PFECA B	25.6	27.1		ng/L		106	70 - 130
Perfluorooctadecanoic acid	25.6	24.6		ng/L		96	29 - 172
NEtFOSE	25.6	22.0		ng/L		86	60 - 136
Perfluorooctanesulfonic acid	23.7	24.8		ng/L		105	45 - 150
Perfluoroundecanoic acid	25.6	27.5		ng/L		108	60 - 141
NMeFOSAA	25.6	26.5		ng/L		104	59 - 140
R-PSDA	25.6	25.1		ng/L		98	70 - 130
Hydrolyzed PSDA	25.6	27.4		ng/L		107	70 - 130
R-PSDCA	25.6	27.0		ng/L		105	70 - 130
R-EVE	25.6	29.2		ng/L		114	70 - 130
NMeFOSE	25.6	26.4		ng/L		103	55 - 144
PEPA	25.6	25.0		ng/L		98	70 - 130
Perfluoropentanoic acid	25.6	29.7		ng/L		116	57 - 141
Perfluoropentanesulfonic acid	24.0	24.8		ng/L		103	55 - 140
6:2 Fluorotelomer sulfonic acid	24.3	24.1		ng/L		99	28 - 173
8:2 FTCA	25.6	21.7		ng/L		85	70 - 130
PS Acid	25.6	14.2	*-	ng/L		56	70 - 130
NEtFOSAA	25.6	26.3		ng/L		103	55 - 134
Perfluorohexanoic acid	25.6	27.1		ng/L		106	58 - 139
Perfluorododecanoic acid	25.6	27.3		ng/L		106	59 - 143
NMeFOSA	25.6	30.5		ng/L		119	64 - 143
Perfluorooctanoic acid	25.6	26.0		ng/L		102	51 - 145
Perfluorodecanoic acid	25.6	25.5		ng/L		100	56 - 138
Perfluorodecanesulfonic acid	24.7	26.5		ng/L		107	55 - 137
Perfluorohexanesulfonic acid	23.3	25.6		ng/L		109	58 - 134
3:3 FTCA	25.6	30.2		ng/L		118	70 - 130
Perfluorobutanoic acid	25.6	27.4		ng/L		107	59 - 136
Perfluorobutanesulfonic acid	22.7	23.2		ng/L		103	53 - 138

QC Sample Results

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Method: T-WI14355 r13 - SOP(00037) T-PFAS-WI14355 Rev.13 (Continued)

Lab Sample ID: LCS 410-247744/3-A
Matrix: Water
Analysis Batch: 249942

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 247744

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoroheptanoic acid	25.6	28.2		ng/L		110	59 - 145
Perfluoroheptanesulfonic acid	24.4	24.4		ng/L		100	56 - 140
Perfluorononanoic acid	25.6	27.0		ng/L		105	61 - 139
Perfluorotetradecanoic acid	25.6	28.1		ng/L		110	62 - 139
PFECA F	25.6	26.0		ng/L		102	70 - 130
8:2 Fluorotelomer sulfonic acid	24.5	25.3		ng/L		103	55 - 138
PFO2HxA	25.6	25.9		ng/L		101	70 - 130
PFO3OA	25.6	26.7		ng/L		104	70 - 130
PFO4DA	25.6	27.4		ng/L		107	70 - 130
TAF	25.6	30.7		ng/L		120	70 - 130
NEtFOSA	25.6	23.7		ng/L		93	61 - 134
PPF Acid	25.6	23.5		ng/L		92	70 - 130
Perfluoropropanesulfonic acid	23.4	23.8		ng/L		101	70 - 130
6:2 FTCA	25.6	21.8		ng/L		85	70 - 130
10:2 FTCA	25.6	24.4		ng/L		95	70 - 130
PFMOAA	25.6	22.8		ng/L		89	70 - 130
Perfluorohexadecanoic acid	25.6	28.9		ng/L		113	41 - 158
Perfluorononanesulfonic acid	24.6	25.5		ng/L		104	59 - 136
EVE Acid	25.6	17.1	*-	ng/L		67	70 - 130
8:2 FTUCA	25.6	26.2		ng/L		102	70 - 130
6:2 FTUCA	25.6	24.7		ng/L		97	70 - 130
10:2 FTUCA	25.6	27.4		ng/L		107	70 - 130
Perfluorotridecanoic acid	25.6	28.0		ng/L		109	58 - 146
Hydro-PS Acid	25.6	27.0		ng/L		106	70 - 130
Perfluorooctanesulfonamide	25.6	26.3		ng/L		103	43 - 167
9CI-PF3ONS	23.8	24.9		ng/L		105	59 - 135
4:2 Fluorotelomer sulfonic acid	23.9	40.9	*+	ng/L		171	55 - 139
11CI-PF3OUdS	23.8	25.7		ng/L		108	53 - 139
Hydro-EVE Acid	25.6	27.5		ng/L		107	70 - 130
Perfluorododecanesulfonic acid	24.8	24.5		ng/L		99	48 - 138
PFECA G	25.6	26.2		ng/L		102	70 - 130
7:3 FTCA	25.6	22.7		ng/L		89	70 - 130
PFECAA	25.6	25.2		ng/L		98	70 - 130
5:3 FTCA	25.6	29.6		ng/L		116	70 - 130
DONA	24.2	27.2		ng/L		112	55 - 143
MTP	25.6	23.2		ng/L		91	70 - 130

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
d5-NEtFOSAA	137		29 - 195
d3-NMeFOSAA	138		31 - 174
13C3 HFPO-DA	122		17 - 185
d7-N-MeFOSE-M	119		10 - 178
d9-N-EtFOSE-M	133		10 - 177
M2-6:2 FTS	117		17 - 200
M2-8:2 FTS	111		33 - 200
13C3 PFBS	107		16 - 200
M2-4:2 FTS	103		10 - 200
13C5 PFHxA	105		24 - 179
13C9 PFNA	122		51 - 167

Eurofins Lancaster Laboratories Environment Testing, LLC

QC Sample Results

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Method: T-WI14355 r13 - SOP(00037) T-PFAS-WI14355 Rev.13 (Continued)

Lab Sample ID: LCS 410-247744/3-A
Matrix: Water
Analysis Batch: 249942

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 247744

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>LCS Qualifier</i>	<i>Limits</i>
13C6 PFDA	120		49 - 163
13C7 PFUnA	113		34 - 174
13C3 PFHxS	103		28 - 188
13C2-PFDoDA	107		17 - 176
d5-NEtPFOSA	75		10 - 159
d3-NMePFOSA	70		10 - 155
13C2-2-Perfluorohexylethanoic acid	139		10 - 200
13C2-2-Perfluorooctylethanoic acid	145		10 - 200
13C2-2-Perfluorodecylethanoic acid	119		10 - 200
13C2-2H-Perfluoro-2-octenoic acid	124		20 - 173
13C2-2H-Perfluoro-2-decenoic acid	128		21 - 166
13C2-2H-Perfluoro-2-dodecenoic acid	113		14 - 166
13C4 PFBA	106		42 - 165
13C5 PFPeA	101		38 - 187
13C4 PFHpA	102		31 - 182
13C8 PFOA	110		48 - 162
13C8 PFOS	107		51 - 159
13C8 FOSA	90		10 - 168
13C2 PFTeDA	105		10 - 179

Lab Sample ID: LCSD 410-247744/4-A
Matrix: Water
Analysis Batch: 249942

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 247744

<i>Analyte</i>	<i>Spike Added</i>	<i>LCSD Result</i>	<i>LCSD Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec Limits</i>	<i>RPD</i>	<i>RPD Limit</i>
NVHOS	25.6	24.6		ng/L		96	70 - 130	0	30
Perfluoro (2-ethoxyethane) sulfonic acid	22.8	22.0		ng/L		97	70 - 130	3	30
10:2 FTS	24.7	36.0		ng/L		146	50 - 146	7	30
PMPA	25.6	25.3		ng/L		99	70 - 130	0	30
HFPODA	25.6	26.7		ng/L		104	50 - 135	9	30
Perfluoro-4-ethylcyclohexanesulfonic acid	23.6	26.4		ng/L		112	70 - 130	1	30
PFECAB	25.6	28.2		ng/L		110	70 - 130	4	30
Perfluorooctadecanoic acid	25.6	26.2		ng/L		102	29 - 172	6	30
NEtFOSE	25.6	22.5		ng/L		88	60 - 136	2	30
Perfluorooctanesulfonic acid	23.7	25.0		ng/L		106	45 - 150	1	30
Perfluoroundecanoic acid	25.6	26.1		ng/L		102	60 - 141	5	30
NMeFOSAA	25.6	26.1		ng/L		102	59 - 140	1	30
R-PSDA	25.6	24.1		ng/L		94	70 - 130	4	30
Hydrolyzed PSDA	25.6	27.3		ng/L		107	70 - 130	0	30
R-PSDCA	25.6	27.2		ng/L		106	70 - 130	1	30
R-EVE	25.6	28.1		ng/L		110	70 - 130	4	30
NMeFOSE	25.6	25.7		ng/L		101	55 - 144	2	30
PEPA	25.6	24.5		ng/L		96	70 - 130	2	30

Eurofins Lancaster Laboratories Environment Testing, LLC

QC Sample Results

Client: Friends of Merrymeeting Bay
 Project/Site: PFAS in Influent

Job ID: 410-81044-1

Method: T-WI14355 r13 - SOP(00037) T-PFAS-WI14355 Rev.13 (Continued)

Lab Sample ID: LCSD 410-247744/4-A
Matrix: Water
Analysis Batch: 249942

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 247744

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD		
Perfluoropentanoic acid	25.6	26.7		ng/L		104	57 - 141	11	30	
Perfluoropentanesulfonic acid	24.0	26.1		ng/L		109	55 - 140	5	30	
6:2 Fluorotelomer sulfonic acid	24.3	24.8		ng/L		102	28 - 173	3	30	
8:2 FTCA	25.6	21.7		ng/L		85	70 - 130	0	30	
PS Acid	25.6	13.3	*-	ng/L		52	70 - 130	7	30	
NEtFOSAA	25.6	26.3		ng/L		103	55 - 134	0	30	
Perfluorohexanoic acid	25.6	26.6		ng/L		104	58 - 139	2	30	
Perfluorododecanoic acid	25.6	26.1		ng/L		102	59 - 143	4	30	
NMeFOSA	25.6	28.5		ng/L		111	64 - 143	7	30	
Perfluorooctanoic acid	25.6	27.1		ng/L		106	51 - 145	4	30	
Perfluorodecanoic acid	25.6	24.4		ng/L		95	56 - 138	4	30	
Perfluorodecanesulfonic acid	24.7	24.7		ng/L		100	55 - 137	7	30	
Perfluorohexanesulfonic acid	23.3	24.9		ng/L		107	58 - 134	3	30	
3:3 FTCA	25.6	28.0		ng/L		109	70 - 130	8	30	
Perfluorobutanoic acid	25.6	26.8		ng/L		105	59 - 136	2	30	
Perfluorobutanesulfonic acid	22.7	24.0		ng/L		106	53 - 138	3	30	
Perfluoroheptanoic acid	25.6	27.7		ng/L		108	59 - 145	2	30	
Perfluoroheptanesulfonic acid	24.4	23.8		ng/L		98	56 - 140	3	30	
Perfluorononanoic acid	25.6	28.0		ng/L		109	61 - 139	4	30	
Perfluorotetradecanoic acid	25.6	27.3		ng/L		107	62 - 139	3	30	
PFECA F	25.6	25.8		ng/L		101	70 - 130	1	30	
8:2 Fluorotelomer sulfonic acid	24.5	26.5		ng/L		108	55 - 138	5	30	
PFO2HxA	25.6	25.4		ng/L		99	70 - 130	2	30	
PFO3OA	25.6	26.7		ng/L		104	70 - 130	0	30	
PFO4DA	25.6	27.4		ng/L		107	70 - 130	0	30	
TAF	25.6	29.8		ng/L		116	70 - 130	3	30	
NEtFOSA	25.6	24.1		ng/L		94	61 - 134	2	30	
PPF Acid	25.6	24.1		ng/L		94	70 - 130	2	30	
Perfluoropropanesulfonic acid	23.4	24.4		ng/L		104	70 - 130	3	30	
6:2 FTCA	25.6	23.8		ng/L		93	70 - 130	9	30	
10:2 FTCA	25.6	24.7		ng/L		97	70 - 130	1	30	
PFMOAA	25.6	22.5		ng/L		88	70 - 130	2	30	
Perfluorohexadecanoic acid	25.6	29.5		ng/L		115	41 - 158	2	30	
Perfluorononanesulfonic acid	24.6	23.8		ng/L		97	59 - 136	7	30	
EVE Acid	25.6	16.1	*-	ng/L		63	70 - 130	6	30	
8:2 FTUCA	25.6	25.7		ng/L		100	70 - 130	2	30	
6:2 FTUCA	25.6	25.5		ng/L		100	70 - 130	3	30	
10:2 FTUCA	25.6	26.1		ng/L		102	70 - 130	5	30	
Perfluorotridecanoic acid	25.6	27.5		ng/L		107	58 - 146	2	30	
Hydro-PS Acid	25.6	27.5		ng/L		108	70 - 130	2	30	
Perfluorooctanesulfonamide	25.6	27.6		ng/L		108	43 - 167	5	30	
9Cl-PF3ONS	23.8	24.5		ng/L		103	59 - 135	2	30	
4:2 Fluorotelomer sulfonic acid	23.9	38.8	*+	ng/L		162	55 - 139	5	30	
11Cl-PF3OUdS	23.8	25.8		ng/L		108	53 - 139	0	30	
Hydro-EVE Acid	25.6	27.3		ng/L		107	70 - 130	1	30	
Perfluorododecanesulfonic acid	24.8	24.5		ng/L		99	48 - 138	0	30	
PFECA G	25.6	25.9		ng/L		101	70 - 130	1	30	
7:3 FTCA	25.6	22.8		ng/L		89	70 - 130	1	30	
PFECA A	25.6	26.6		ng/L		104	70 - 130	5	30	

QC Sample Results

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Method: T-WI14355 r13 - SOP(00037) T-PFAS-WI14355 Rev.13 (Continued)

Lab Sample ID: LCSD 410-247744/4-A
Matrix: Water
Analysis Batch: 249942

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 247744

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
5:3 FTCA	25.6	27.4		ng/L		107	70 - 130	8	30
DONA	24.2	25.5		ng/L		105	55 - 143	7	30
MTP	25.6	23.0		ng/L		90	70 - 130	1	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
d5-NEtFOSAA	129		29 - 195
d3-NMeFOSAA	135		31 - 174
13C3 HFPO-DA	108		17 - 185
d7-N-MeFOSE-M	119		10 - 178
d9-N-EtFOSE-M	128		10 - 177
M2-6:2 FTS	116		17 - 200
M2-8:2 FTS	102		33 - 200
13C3 PFBS	102		16 - 200
M2-4:2 FTS	106		10 - 200
13C5 PFHxA	104		24 - 179
13C9 PFNA	124		51 - 167
13C6 PFDA	119		49 - 163
13C7 PFUnA	110		34 - 174
13C3 PFHxS	105		28 - 188
13C2-PFDoDA	108		17 - 176
d5-NEtPFOSA	69		10 - 159
d3-NMePFOSA	70		10 - 155
13C2-2-Perfluorohexylethanoic acid	131		10 - 200
13C2-2-Perfluorooctylethanoic acid	130		10 - 200
13C2-2-Perfluorodecylethanoic acid	116		10 - 200
13C2-2H-Perfluoro-2-octenoic acid	121		20 - 173
13C2-2H-Perfluoro-2-decenoic acid	122		21 - 166
13C2-2H-Perfluoro-2-dodecenoi c acid	113		14 - 166
13C4 PFBA	102		42 - 165
13C5 PFPeA	107		38 - 187
13C4 PFHpA	106		31 - 182
13C8 PFOA	102		48 - 162
13C8 PFOS	112		51 - 159
13C8 FOSA	83		10 - 168
13C2 PFTeDA	101		10 - 179

QC Association Summary

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

LCMS

Prep Batch: 247744

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-81044-1	FOMB ES 1 FB	Total/NA	Water	3535	
410-81044-2	FOMB ES 1	Total/NA	Water	3535	
MB 410-247744/1-A	Method Blank	Total/NA	Water	3535	
LCS 410-247744/3-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 410-247744/4-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 249942

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-81044-1	FOMB ES 1 FB	Total/NA	Water	T-WI14355 r13	247744
410-81044-2	FOMB ES 1	Total/NA	Water	T-WI14355 r13	247744
MB 410-247744/1-A	Method Blank	Total/NA	Water	T-WI14355 r13	247744
LCS 410-247744/3-A	Lab Control Sample	Total/NA	Water	T-WI14355 r13	247744
LCSD 410-247744/4-A	Lab Control Sample Dup	Total/NA	Water	T-WI14355 r13	247744

Prep Batch: 250969

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-81044-1 - RE	FOMB ES 1 FB	Total/NA	Water	3535	
410-81044-2 - RE	FOMB ES 1	Total/NA	Water	3535	
MB 410-250969/1-A	Method Blank	Total/NA	Water	3535	
LCS 410-250969/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 410-250969/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 251924

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-81044-1 - RE	FOMB ES 1 FB	Total/NA	Water	T-WI14355 r13	250969
410-81044-2 - RE	FOMB ES 1	Total/NA	Water	T-WI14355 r13	250969
MB 410-250969/1-A	Method Blank	Total/NA	Water	T-WI14355 r13	250969
LCS 410-250969/2-A	Lab Control Sample	Total/NA	Water	T-WI14355 r13	250969
LCSD 410-250969/3-A	Lab Control Sample Dup	Total/NA	Water	T-WI14355 r13	250969

Lab Chronicle

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Client Sample ID: FOMB ES 1 FB

Lab Sample ID: 410-81044-1

Date Collected: 04/20/22 10:30

Matrix: Water

Date Received: 04/21/22 11:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			247744	04/24/22 08:27	RC3V	ELLE
Total/NA	Analysis	T-WI14355 r13		1	249942	04/29/22 21:53	I5JH	ELLE
Total/NA	Prep	3535	RE		250969	05/03/22 08:28	D5VP	ELLE
Total/NA	Analysis	T-WI14355 r13	RE	1	251924	05/05/22 11:17	JVK6	ELLE

Client Sample ID: FOMB ES 1

Lab Sample ID: 410-81044-2

Date Collected: 04/20/22 10:30

Matrix: Water

Date Received: 04/21/22 11:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			247744	04/24/22 08:27	RC3V	ELLE
Total/NA	Analysis	T-WI14355 r13		1	249942	04/29/22 22:04	I5JH	ELLE
Total/NA	Prep	3535	RE		250969	05/03/22 08:28	D5VP	ELLE
Total/NA	Analysis	T-WI14355 r13	RE	1	251924	05/05/22 11:28	JVK6	ELLE

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Accreditation/Certification Summary

Client: Friends of Merrymeeting Bay
 Project/Site: PFAS in Influent

Job ID: 410-81044-1

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Pennsylvania	NELAP	36-00037	01-31-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
T-WI14355 r13	3535	Water	10:2 FTCA
T-WI14355 r13	3535	Water	10:2 FTUCA
T-WI14355 r13	3535	Water	3:3 FTCA
T-WI14355 r13	3535	Water	5:3 FTCA
T-WI14355 r13	3535	Water	6:2 FTCA
T-WI14355 r13	3535	Water	6:2 FTUCA
T-WI14355 r13	3535	Water	7:3 FTCA
T-WI14355 r13	3535	Water	8:2 FTCA
T-WI14355 r13	3535	Water	8:2 FTUCA
T-WI14355 r13	3535	Water	EVE Acid
T-WI14355 r13	3535	Water	Hydro-EVE Acid
T-WI14355 r13	3535	Water	Hydrolyzed PSDA
T-WI14355 r13	3535	Water	Hydro-PS Acid
T-WI14355 r13	3535	Water	MTP
T-WI14355 r13	3535	Water	NVHOS
T-WI14355 r13	3535	Water	PEPA
T-WI14355 r13	3535	Water	Perfluoro (2-ethoxyethane) sulfonic acid
T-WI14355 r13	3535	Water	Perfluoro-4-ethylcyclohexanesulfonic acid
T-WI14355 r13	3535	Water	Perfluoropropanesulfonic acid
T-WI14355 r13	3535	Water	PFECA A
T-WI14355 r13	3535	Water	PFECA B
T-WI14355 r13	3535	Water	PFECA F
T-WI14355 r13	3535	Water	PFECA G
T-WI14355 r13	3535	Water	PFMOAA
T-WI14355 r13	3535	Water	PFO2HxA
T-WI14355 r13	3535	Water	PFO3OA
T-WI14355 r13	3535	Water	PFO4DA
T-WI14355 r13	3535	Water	PMPA
T-WI14355 r13	3535	Water	PPF Acid
T-WI14355 r13	3535	Water	PS Acid
T-WI14355 r13	3535	Water	R-EVE
T-WI14355 r13	3535	Water	R-PSDA
T-WI14355 r13	3535	Water	R-PSDCA
T-WI14355 r13	3535	Water	TAF

Method Summary

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Method	Method Description	Protocol	Laboratory
T-WI14355 r13 3535	SOP(00037) T-PFAS-WI14355 Rev.13 Solid-Phase Extraction (SPE)	ELLE - Lancaster SW846	ELLE ELLE

Protocol References:

ELLE - Lancaster = Eurofins Lancaster, Facility Standard Operating Procedure.

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

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300



Sample Summary

Client: Friends of Merrymeeting Bay
Project/Site: PFAS in Influent

Job ID: 410-81044-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
410-81044-1	FOMB ES 1 FB	Water	04/20/22 10:30	04/21/22 11:15
410-81044-2	FOMB ES 1	Water	04/20/22 10:30	04/21/22 11:15

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15



iv, LLC

Chain of Custody Record

eurofins Environment Testing America

410-81044 Chain of Custody

Sampler: <i>Ed Friedman / Jason P. rowl</i>		Lab PM: Sears, Kristin M		Carrier Tracking No(s)		COC No: 410-54143-15218.1	
Phone: 207-666-3372		E-Mail: Kristin.Sears@et.eurofinsus.com		State of Origin:		Page: Page 1 of 1	
Company: Friends of Merrymeeting Bay				Analysis Requested			
Address: 42 Stevens Rd		Due Date Requested:		Preservation Codes: A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Z - other (specify)		Job #	
City: Bowdoinham		TAT Requested (days):					
State, Zip: ME, 04008		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
Phone: 207-666-3372(Tel)		PO #:					
Email: edfomb@comcast.net		Advance Payment Required					
Project Name: PFAS in Influent		Project #: 41010303		WO #:		Other:	
Site: <i>BWUTP</i>		SSOW#:					
Sample Identification		Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=soil/sediment, BT=Tissue, A=Air)	Special Instructions/Note:	
<i>FOMB ES1 FB 102</i>		<i>4/20/22</i>	<i>1030</i>		Water		
<i>FOMB ES1 FB 202</i>					Water		
<i>FOMB ES1 102</i>							
<i>FOMB ES1 202</i>							
<i>FOMB ES1 QC Rep 1</i>							
<i>FOMB ES1 QC Rep 2</i>							
<i>FOMB ES1 QC Rep 3</i>							
<i>FOMB ES1 QC Rep 4</i>							
Possible Hazard Identification				Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)			
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological				<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months			
Deliverable Requested: I, II, III, IV, Other (specify)				Special Instructions/QC Requirements:			
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:	
Relinquished by: <i>Edm Hernandez</i>		Date/Time: <i>4/6/22 1420</i>		Company:		Received by:	
Relinquished by:		Date/Time:		Company:		Received by:	
Relinquished by:		Date/Time:		Company:		Received by: <i>[Signature]</i>	
Custody Seals Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.: <i>KATH</i>		Cooler Temperature(s) °C and Other Remarks: <i>1.4</i>		Date/Time: <i>4/21/22 1115</i>	

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

Login Sample Receipt Checklist

Client: Cash in Advance (Lancaster)

Job Number: 410-81044-1

Login Number: 81044

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC

List Number: 1

Creator: Metzger, Katherine A

Question	Answer	Comment
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable ($\leq 6^{\circ}\text{C}$, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable ($\leq 6^{\circ}\text{C}$, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	True	
Sample custody seals are intact.	N/A	

Appendix 8

Battelle Test Results Report

FOMB - PFAS in water
Project No G31839.XX.XX.0047.FOMB01
PFAS by DoD QSM 5.3 Table B-15
WATER
Batch 22-0634
Package DP-22-0651

Submitted to:
Friends of Merrymeeting Bay
Friends of Merrymeeting Bay
Richmond, ME 04357

Submitted by:
Battelle Norwell Operations
141 Longwater Drive Suite 202
Norwell, MA 02061

BATTELLE

It can be done

FOMB - PFAS in water
Project No G31839.XX.XX.0047.FOMB01
PFAS by DoD QSM 5.3 Table B-15
WATER

Batch 22-0634
Package DP-22-0651

Submitted to:
Friends of Merrymeeting Bay
Friends of Merrymeeting Bay
Richmond, ME 04357

NELAP Accreditation Number: E87856 (Florida Department of Health)
DoD-ELAP Accreditation Number: 91667

Submitted by:
Battelle Norwell Operations
141 Longwater Drive Suite 202
Norwell, MA 02061


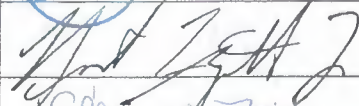






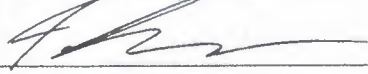



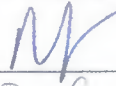

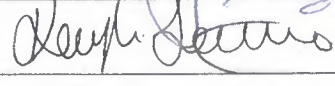
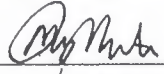
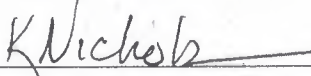

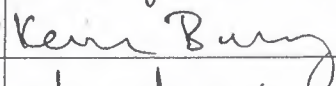
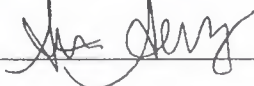
Analyst Approval:		Denise Schumitz 2022.06.02 15:06:39 -04'00'
QC Chemist Approval:		Deb Huntress 2022.06.09 15:11:35 -04'00'
Project Manager Approval:		Robert Lizotte, Jr. 2022.06.09 16:58:28 -04'00'

BATTELLE
It can be done


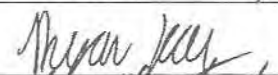
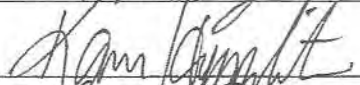

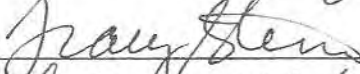
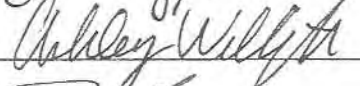
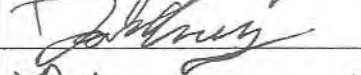
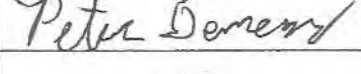

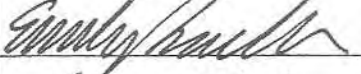
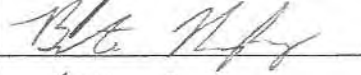
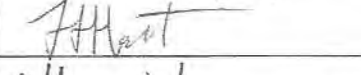
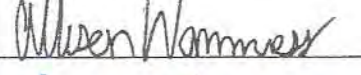

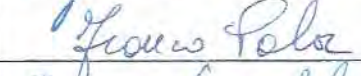
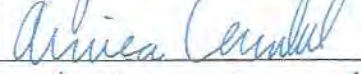


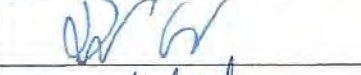
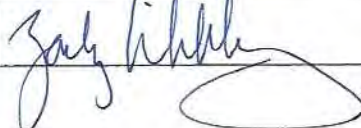
FOMB - PFAS in water
Project No G31839.XX.XX.0047.FOMB01
PFAS by DoD QSM 5.3 Table B-15
WATER
Batch 22-0634
Package DP-22-0651

1	<i>Work Plan</i> Laboratory Work Plan, Addendums To Work Plan, Memos From Project Manager, Special Instructions, Chain-of-Custody Reports.	1
2	<i>Tables</i> Analytical Data Tables, Qualifier Definitions.	18
3	<i>Miscellaneous Documentation</i> Case Narrative, Miscellaneous Documentation Form, Quality Control Summary, Example Calculations, Internal Standard Recovery Report, Retention Time Window Report.	30
4	<i>Sample Preparation Records</i> Sample Preparation Records, Dilution Worksheets, Standard Preparation Records, Certificates Of Analysis, GPC Check Report.	NA
5	<i>Analytical Calibrations</i> Analytical Sequence, Analytical Method, Tune Report, Initial Calibration, Pesticide Degradation Report, RF Summary, Calibration Verifications, Independent Calibration Verification Check.	NA
6	<i>Analytical Data</i> Raw Data Quantification Reports.	NA
7	<i>Chromatograms</i> Sample And Standard Chromatograms.	NA
8	<i>Unused Data</i>	NA

Master Signature Page

Name (Printed)	Signature	Initials	Date
Jonathan Thom		JRT	1/9/2020
Robert Lizette, Jr.		BL	1.9.2020
Elynn M. Fitch		EF	1/9/2020
Carla Devine		CRD	1/9/2020
Dennis Schumitz		DS	1/9/2020
Lauren Griffith		LMG	1.9.2020
Carrie P. McLarthy		CPM	1/9/2020
Rich Restucci		RR	1/9/2020
Sam Guimaraes		SAG	1/9/2020
Jordan Tower		JT	1/9/2020
Christie Usher		CU	1/9/2020
Kevin McInerney		KM	1/14/2020
Matt Schumitz		MDS	1/14/2020
Weidong Li		W.L	1/14/2020
Kayla Lamarre		KAL	1/14/2020
MUNAZ MUNTASIR		MM	01/14/2020
Kristen Nichols		KN	01/14/2020
Kelsey Harnden		KH	01/30/2020
Kevin Bailey		KB	1/30/2020
Stephanie Schultz		SAS	1/30/2020

Master Signature Page

Name (Printed)	Signature	Initials	Date
Ulimiceo Brown		UB	01/30/20
Ryan Kelly		RK	01/30/20
KAREN HYPPOLITE		K.H.	01/31/20
Gail DeRuzzo		GD	01/31/2020
Tracy Stenner		JS	1/31/2020
Ashley Wellington		AW	1/31/2020
Daniel Cooney		DAC	1/31/2020
Peter Demers		PD	1/31/2020
ANDY DELMON		AD	3/19/2021
Emily Reardon		ER	3/19/2021
Brenton Murphy		Bm	3/19/2021
Haley Hart		HH	3/19/21
Allison Wamness		AW	3/19/21
Taylor Noonan		TN	3/19/21
FRANCO PALA		FP	3/19/21
Amina Chamantlal		AC	11/03/21
Michelle Wentzell		MW	11-3-21
Zachary Dreiker		ZD	11/3/21
Drew Croke		DC	11/3/21
Zachary Willenberg		ZW	11/3/21

Master Signature Page

Name (Printed)	Signature	Initials	Date
Hayley Beal	<i>Hayley Beal</i>	HB	5/9/2022
Nathaniel Kinsman	<i>Nathaniel Kinsman</i>	NK	5/9/2022
Debra Huntress	<i>Debra Huntress</i>	DHU	5/9/22
Vincent Urso	<i>Vincent Urso</i>	VU	5/9/22

Sample Summary

Client: Friends of Merrymeeting Bay
SDG: 22-0634
Project/Site: FOMB - PFAS in water analysis
CTO: NA

Lab Sample ID	Client Sample ID	Matrix	Collection Date	Receipt Date
DH877PB-FS	Procedural Blank	WATER	5/6/2022	5/6/2022
DH878LCS-FS	Laboratory Control Sample	WATER	5/6/2022	5/6/2022
E0637-FS	FOMB-BS1	WATER	5/6/2022	4/21/2022
E0638-FS	FOMB-BS1 FB	WATER	5/6/2022	4/21/2022

Work Plan



WORK/QUALITY ASSURANCE PROJECT PLAN

1.0 GENERAL PROJECT INFORMATION

Project Title: FOMB - PFASin water analysis
Project Number: G31839.XX.XX.0047.FOMB01
Client: Friends of Merrymeeting Bay
 Friends of Merrymeeting Bay
 P.O. Box 233
 Richmond, ME 04357

Client Contact Information: Ed Friedman
 NA
 NA
 NA
 NA

Effective Date of QAPP: 4/21/2022
Version Number: G31839.XX.XX.0047.FOMB01(L)-01
Project Manager: Thorn, Jonathan
Laboratory Task Manager: Thorn, Jonathan
Deliverable Due Date: 5/20/2022

2.0 SCOPE OF WORK

Overview: FOMB - PFASin water analysis
Matrix: Water

2.1 TECHNICAL APPROACH

2.1.1 Sample Receipt, Storage, and Handling

The list of samples for this project plan are presented in Attachment 1.

Storage Directions: Store refrigerated.
Sub_Sampling: None
Procedures: NA
Contact: NA
Comment: NA
Archiving: Store excess samples for six month after delivery of final data.
Disposal: Dispose of samples and extracts in the appropriate waste stream.



It can be done

WORK/QUALITY ASSURANCE PROJECT PLAN

2.1.2 Sample Preparation

NA

Samples Expected:	Samples Per Batch:	Batches Expected:
1	20	1

Batch quality control samples are defined in Table 1.

Target samples are presented in Attachment 1.

Table 1: Quality Control Samples

Type:	Description:	Count:	Rgt:	Reference:	Comment:
PB	Laboratory control reagent blank.	1 per batch	--	NA	
LCS	Laboratory Control Sample	1 per batch	No	NA	

2.1.3 Extraction/Preparation

2.1.3.1 Extraction

SOP No.-Rev:	5-370-13
SOP Title:	<i>Extraction of Poly and Perfluoroalkyl Substances from Environmental Matrices</i>
Sample Size:	250.00 NA
SIS and LCS/MS Compounds:	Defined in Table 2.
Deviations:	None.
Comments:	None.

Table 2: SIS and LCS/MS Spiking Level

Standard Type	Standard Contents	Spike Amount (ng)	Volume (uL)	Comment
PFAS-DoD Surrogate (43 Targets)	LJ46 SIS	~ 25.0 ng	50 uL	NA
PFAS DoD Surrogate (28 Targets)	LN97 SIS	~ 25.0 ng	50 uL	NA
PFAS DoD Surrogate (18 Targets)	LP07 SIS	~ 25.0 ng	50 uL	NA



WORK/QUALITY ASSURANCE PROJECT PLAN

2.1.3.2 Cleanup

None.

RIS spiking levels are presented in Table 3.

Extract PIV (uL): 5000

Table 3: RIS Spiking Level

Standard Type	Standard Contents	Spike Amount (ng)	Volume (uL)	Comment
PFAS DoD Internal Standard	LP06 RIS	~ 25.0 ng	50 uL	NA

2.1.4 Instrumental Analysis

The list of analytes along with data quality criteria are presented in Attachment 2.

- 1) SOP_No-Rev: **5-369-09**
- SOP_Title: *Analysis of Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS)*
- Deviations: None.
- Comments: None.

2.2. DELIVERABLES

Deliverables Due: 5/20/2022

LIMS Reports: No

Histograms: No

Excel Tables: No

EICs: No

Chromatograms: No

EDDs: No

Comments:

- Excel data tables
- Summary data package

3.0 QUALITY

The Method Quality Objectives are defined in Attachment 3.



WORK/QUALITY ASSURANCE PROJECT PLAN

4.0 ORGANIZATION AND COMMUNICATION

4.1 ORGANIZATION

The project team is defined in Table 4. Supervisors may make substitutions with Project Manager concurrence.

Table 4: Project Team and Roles

Staff Member	Role	Comment
Jonathan R. Thorn	Project Manager	NA
Kelsey Harnden	Sample Preparation	NA
Denise M. Schumitz	LC-MS/MS Analysis	NA
Matt D. Schumitz	Sample Custody	NA
Emily Reardon	Quality Control Officer	NA
Zachary J. Willenberg	Quality Assurance Officer	NA

4.2 COMMUNICATION

A kick-off meeting will be held to discuss project scope and goals.

5.0 SCHEDULE

The project schedule is presented in Table 5.

Table 5. Schedule of Laboratory Activities

Activity:	Start Date:	End Date:	TAT (days):	Comment:
Sample Receipt	NA	NA	0	NA
Sample Preparation	NA	NA	0	NA
Instrument Analysis	NA	NA	0	NA
Quality Control Review	NA	NA	0	NA
Quality Assurance Review	NA	NA	0	NA

6.0 BUDGET

The labor budget for the analytical task is presented in Table 6.

Table 6. Labor Budget (Laboratory Analytical Task)



WORK/QUALITY ASSURANCE PROJECT PLAN

Labor Activity:	Hours/ Batch:	Batches:	Total Hours:	Comment:
Sample Receipt	2	1	2	NA
Sample Preparation	5	1	5	NA
Instrument Analysis	9	1	9	NA
Quality Control Review	2	1	2	NA
Quality Assurance Review	1	1	1	NA

7.0 STAFF DEVELOPMENT

None anticipated.



WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 1: Target Samples

Shipment: SHP-220421-03
Status: Pending
Description: BWWT
Range: E0637-E0638
Comment: NA

No:	BDO Id:	Client Sample ID:	Collection Date:	Matrix:	Storage Facility:	Location:	No:	Comments:
1	E0637	FOMB-BS1		WATER	R0119	(NA)		
2	E0638	FOMB-BS1 FB		WATER	R0119	(NA)		



WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name:	Master_369D
SOP Reference:	5-369 - Analysis of Perfluoroalkyl Substances in Environmental Samples by Liquid Chromatography and Tandem Mass Spectrometry (LC-MS/MS)
Description:	PFAS by DoD QSM 5.3 Table B-15
Matrix:	L - Liquid Samples, like water or sea water, prepared and analyzed under the same class of detection limits.
Detection Limit Study:	5-369
Instrument:	LC-MS/MS
MQO Criteria:	Universal_LC
Standard Report:	Standard Result Report

Method Specific Reporting		Holding Times (days)	Data Flags
Result Units:	ng/L	Unit Conversion: (none)	Sample: 14 DL_Flag: U
Weight Basis:	LIQUID	Result Format: Fixed Digits	Frozen: 14 RL_Flag: J
Standard Basis:	SIS	# of Figures/Digits: 2	Extract: 28 PB_Flag: B
Oil Weight Basis:	No	Oil Weight Source: Oil Weight	DIL_Flag: D
U-Value Substitution:	U-Flag=MD	Histograms: No	HT_Flag: T
ECD_Reporting:	No		

No:	Analyte:	Report Name:	Type	RIS	SIS	Hidden:	Graph:
1	Perfluoro-n-butanoic Acid	PFBA	T		13C4-PFBA	No	No
2	Perfluoro-n-pentanoic acid	PFPeA	T		13C5-PFPeA	No	No
3	Perfluoro-n-hexanoic acid	PFHxA	T		13C5-PFHxA	No	No
4	Perfluoro-n-heptanoic Acid	PFHpA	T		13C4-PFHpA	No	No
5	Perfluoro-n-octanoic Acid	PFOA	T		13C8-PFOA	No	No
6	Perfluorononanoic Acid	PFNA	T		13C9-PFNA	No	No
7	Perfluoro-n-decanoic Acid	PFDA	T		13C6-PFDA	No	No
8	Perfluoro-n-undecanoic acid	PFUnA	T		13C7-PFUnA	No	No
9	Perfluoro-n-dodecanoic acid	PFDoA	T		13C2-PFDoA	No	No
10	Perfluoro-n-tridecanoic acid	PFTTrDA	T		13C2-PFTeDA	No	No
11	Perfluoro-n-tetradecanoic acid	PFTeDA	T		13C2-PFTeDA	No	No
12	N-methylperfluoro-1-octanesulfonamidoacetic acid	NMeFOSAA	T		d3-MeFOSAA	No	No
13	N-ethylperfluoro-octanesulfonamidoacetic acid	NEtFOSAA	T		d5-EtFOSAA	No	No
14	N-methylperfluoro-1-octanesulfonamide	NMeFOSA	T		d3-MeFOSA	No	No
15	Perfluoro-1-octanesulfonamide	PFOSA	T		13C8-FOSA	No	No
16	Perfluoro-1-butanefulfonate	PFBS	T		13C3-PFBS	No	No
17	perfluoro-1-pentanesulfonate	PFPeS	T		13C3-PFHxS	No	No
18	Perfluoro-1-hexanesulfonate	PFHxS	T		13C3-PFHxS	No	No



It can be done

WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_369D

No:	Analyte:	Report Name:	Type	RIS	SIS	Hidden:	Graph:
19	Perfluoro-1-heptanesulfonate	PFHpS	T		13C3-PFHxS	No	No
20	Perfluoro-1-octanesulfonate	PFOS	T		13C8-PFOS	No	No
21	Perfluoro-1-nonanesulfonate	PFNS	T		13C8-PFOS	No	No
22	Perfluoro-1-decanesulfonate	PFDS	T		13C8-PFOS	No	No
23	1H,1H,2H,2H-Perfluorohexane sulfonate	4:2FTS	T		13C2-4:2FTS	No	No
24	1H,1H,2H,2H-Perfluorooctane sulfonate	6:2FTS	T		13C2-6:2FTS	No	No
25	1H,1H,2H,2H-Perfluorodecane sulfonate	8:2FTS	T		13C2-8:2FTS	No	No
26	Hexafluoropropylene oxide dimer acid	HFPO-DA	T		13C3-HFPO-DA	No	No
27	Adona	Adona	T		13C8-PFOA	No	No
28	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9Cl-PF3ONS	T		13C8-PFOA	No	No
29	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	T		13C8-PFOA	No	No
1	13C4-PFBA	13C4-PFBA	SIS	13C3-PFBA		No	No
2	13C5-PFPeA	13C5-PFPeA	SIS	13C3-PFBA		No	No
3	13C5-PFHxA	13C5-PFHxA	SIS	13C2-PFOA		No	No
4	13C4-PFHpA	13C4-PFHpA	SIS	13C2-PFOA		No	No
5	13C8-PFOA	13C8-PFOA	SIS	13C2-PFOA		No	No
6	13C9-PFNA	13C9-PFNA	SIS	13C2-PFOA		No	No
7	13C6-PFDA	13C6-PFDA	SIS	13C2-PFDA		No	No
8	13C7-PFUnA	13C7-PFUnA	SIS	13C2-PFDA		No	No
9	13C2-PFDoA	13C2-PFDoA	SIS	13C2-PFDA		No	No
10	13C2-PFTeDA	13C2-PFTeDA	SIS	13C2-PFDA		No	No
11	d3-MeFOSAA	d3-MeFOSAA	SIS	13C4-PFOS		No	No
12	d5-EtFOSAA	d5-EtFOSAA	SIS	13C4-PFOS		No	No
13	d3-MeFOSA	d3-MeFOSA	SIS	13C4-PFOS		No	No
14	13C8-FOSA	13C8-FOSA	SIS	13C4-PFOS		No	No
15	13C3-PFBS	13C3-PFBS	SIS	13C4-PFOS		No	No
16	13C3-PFHxS	13C3-PFHxS	SIS	13C4-PFOS		No	No
17	13C8-PFOS	13C8-PFOS	SIS	13C4-PFOS		No	No
18	13C2-4:2FTS	13C2-4:2FTS	SIS	13C4-PFOS		No	No
19	13C2-6:2FTS	13C2-6:2FTS	SIS	13C4-PFOS		No	No
20	13C2-8:2FTS	13C2-8:2FTS	SIS	13C4-PFOS		No	No
21	13C3-HFPO-DA	13C3-HFPO-DA	SIS	13C2-PFOA		No	No
Total Analytes:		50					

Subtract Peaks:

None

Sum Peaks:

None



It can be done

WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_369D

ICAL Acceptance Criteria:

Curve Fit:	Limit Mean(%):	Mean Qual:	Limit Ind.:	Ind. Qual:	Min Points:	Points Qual:	Comments:
Linear	NA	NA	0.99	N	5	N	y = Bx + C
Quadratic	NA	NA	0.99	N	6	N	y = Ax ² + Bx + C

Continuing Calibration Verification Criteria:

CCV Name: 5-369

Frequency Hrs:	Mean PD(%):	Individual PD(%):	RIS/SIS RT Window (min):	Area Limit Low(%):	Area Limit High(%):	Comment:
12 (N)	30 (N)	30 (N)	0.04 (N)	-50	100 (N)	NA

Independent Calibration Verification:

ICC Name: 5-369

Mean PD Limit(%):	Ind. PD Limit(%):	RIS/SIS Window Limit (Secs):	Area Limit High(%):	Area Limit Low(%):	Comment:
30 (N)	30 (N)	0.04 (N)	-50	100 (N)	NA

Mass Discrimination Criteria:

None

Degradation Check Criteria:

None



WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 3: Method Quality Objectives

MQO Application: <i>Universal_LC</i>			
MQO:	Acceptance Criteria:	Qual:	Corrective Action:
Procedural Blank	Samples must be greater than five times the blank concentration (>5xPB).	B	Review with Project Manager; re-analyze or justify results in project records.
PB Measurement Quality Objective	Organic results in the Procedural Blank are less than 1/2 times the LOQ (<1/2xLOQ)	N	Review with Project Manager; re-analyze or justify results in project records.
Laboratory Control Sample	Recovery values 70-130%.	N	Review with project manager; re-analyze or justify reporting the results in project records.
Matrix Spike / Matrix Spike Duplicate Recovery	Organics 70-130%. Analyte concentration in MS/MSD must be greater than five times reported background concentration. Organics Results in the Target is less than 5 times the Original	N n	Review with Project Manager; re-analyze or justify reporting results in the project records.
Matrix Spike/Spike Duplicate Precision	Organics results less than 30% Relative Percent Difference (RPD). Analyte concentration in MS/MSD must be greater than five times reported background concentration. Organics Results in the Target is less than 5 times the Original	N n	Review with Project Manager; re-analyze or justify reporting results in the project records.
Standard Reference Material Accuracy	Organics Percent Difference less than 30% from a range of certified values on average. Analyte concentration must be greater than five times the Method Detection Limit (>5xMDL). Organics Results in the Target is less than 5 times the MDL	N n	Review with Project Manager; re-analyze or justify reporting results in the project records.
Analytical Duplicate Precision	Organics results less than 30% Relative Percent Difference (RPD). Analyte concentration must be > 5x MDL. Organics Results in the Original is less than 5 times the MDL	N n	Review with Project Manager; re-analyze or justify reporting results in the project records.



WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 3: Method Quality Objectives

MQO Application:	<i>Universal_LC</i>		
MQO:	Acceptance Criteria:	Qual:	Corrective Action:
Analytical Triplicate Precision	Organics results less than 30% Relative Standard Deviation (RSD). Analyte concentration must be > 5x MDL. Organics Results in the Original is less than 5 times the MDL	N n	Review with Project Manager; re-analyze or justify reporting results in the project records.
Surrogate Compound Recovery	Recovery results between 50% and 150%.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
Control Oil	RPD < 30% for at least 90% of analytes	N	Results examined by project manager, task leader, or subcontractor lab manager. Reextraction, reanalysis, or justification documented.
Instrument Calibration	5-369-9: R-squared greater than or equal to 0.990		Results examined by project manager, task leader, or subcontractor lab manager. Reextraction, reanalysis, or justification documented.
Independent Calibration Check Solution	5-369-9: Individual PD less than or equal to 30%. Mean Percent Difference less than or equal to 30%.	N	Review with Project Manager; re-analyze or justify in project records.
Continuing Calibration Verification	5-369-9: Individual PD less than or equal to 30%. Mean Percent Difference less than or equal to 30%.	N	Review with Project Manager; re-analyze or justify in project records.

It can be done

Battelle Project No: FOMB

Sample Receipt Form

Approved: Authorized

Project Number: _____ Client: Friends of Merry Meeting Bay
Received by: Schumitz, Matt Date/Time Received: Thursday, April 21, 2022 10:00 AM
No. of Shipping Containers: 1

SHIPMENT

Method of Delivery: Commercial Carrier Tracking Number: Fed Ex
COC Forms: Shipped with samples No Forms

Cooler(s)/Box(es)

Cntr	Type	Tracking No.	Seal	Seal	Container	Therm.	Temp C	Smpls
1 of 1	Cooler	2722 2823 5952	Custody Seals	Intact	Intact	Therm_2	2.1	2

Samples

Sample Labels: Sample labels agree with COC forms
 Discrepancies (see Sample Custody Corrective Action Form)

Container Seals: Tape Custody Seals Other Seals (See sample Log)
 Seals intact for each shipping container
 Seals broken (See sample log for impacted samples)

Condition of Samples: Sample containers intact
 Sample containers broken/leaking (See Custody Corrective Action Form)

Temperature upon receipt (°C): 2.1 Temperature Blank used Yes No
(Note: If temperature upon receipt differs from required conditions, see sample log comment field)

Samples Acidified: Yes No Unknown

Initial pH 5-9?: Yes No NA
If no, individual sample adjustments on the Auxiliary Sample Receipt Form

Total Residual Chlorine Present?: Yes No NA
If yes, individual sample adjustments on the Auxiliary Sample Receipt Form

Head Space <1% in samples for water VOC analysis: Yes No NA
Individual sample deviations noted on sample log

Samples Containers:
Samples returned in PC-grade jars: Yes No Unknown /Lot No.: Unknown

Storage Location: Custody: Refrigerator - R0119 (NA) BDO IDs Assigned: E0637 - E0638

Samples logged in by: Schumitz, Matt Date/Time: 04/21/2022 10:00 AM

Approved By: _____ Approved On: _____

Authorized By: _____ Authorized On: _____



It can be done

ShpNo: SHP-220421-03

Battelle Project No: 147.FOMB01

Report Corrective Actions

Corrective Action No: 1 of 1

Authorized Approved:

COC Client: Friends of Merry Meeting Bay

COC Project: BWWTP

COC Date: 4/21/2022 10:38:

	Description of Problem:	Explanation:
Custody	Incomplete sample custody forms	The COC is missing much of the collection information.

Documentation of project manager notification

Sample Custodian Schumitz, Matt **Date:** 4/21/2022 10:48:00 A

Laboratory Manager: Thorn, Jonathan **Date:** 6/8/2022 5:36:00 PM

Project Manager: Thorn, Jonathan **Date:** 6/8/2022 5:36:00 PM

Documentation of client notification (should be completed by project manager within 24 hrs):

On 21-Apr-22 **I contacted** Friedman, Ed **at** Friends of Merrymeeting Bay

Results of communication with client (Describe any corrective action directed by the client):

Client notified

Date this form was received back to the custodian: _____

Reference Number: _____



It can be done

ShpNo SHP-220421-03

Battelle Project No: FOMB

Sample Receipt Form Details

Approved: Authorized

Project Number: _____ Client: Friends of Merry Meeting Bay

Received by: Schumitz, Matt Date/Time Received: Thursday, April 21, 2022 10:00 AM

No. of Shipping Containers: 1

BDO Id:	Client Sample ID:	Collection Date:	Login Date:	Ctrs:	Matrix:	Temp:	pH:	TRC:	VOC:	Stored In:	Loc:	No:	Comments:
E0637	FOMB-BS1		04/21/22 10:46	4	WATER	2.1	NA	NA	NA	R0119 (NA)			
E0638	FOMB-BS1 FB		04/21/22 10:46	2	WATER	2.1	NA	NA	NA	R0119 (NA)			

Total Samples: 2



Chain-of-Custody

Client Contact Information Friends of Merrymeeting Bay P.O. Box 233 Richmond, ME 04357		Project Manager: Project Manager: Sampler Information (print name): Ed Friedman Phone: 207-666-3372 Email: edfomb@comcast.net		Sampling Site: Brunswick, ME WWTP		Site Information: municipal inflow									
Project Name: BWWTIP Project No.:		Turnaround Time (TAT) Requested: Normal <input checked="" type="checkbox"/> Priority <input type="checkbox"/> RUSH <input type="checkbox"/> Time Zone: EST		Preservative		COC #									
Sample Identification		Sample Date		Sample Time		Sample Type		Matrix		Total # of Cont.		Analysis		Page#	
FOMB - BSI 1 of 4 2 of 4 3 of 4 4 of 4															
FOMB BSI FB 1 of 2 FB 2 of 2															
Receipt Temperature: (°C)		Samples Intact: Yes - No		Samples on Ice: Yes - No				Receipt Comments:							
Relinquished by (Print/Sign) Ed Friedman		Company: FOMB		Date/Time:		Received by (Print/Sign) 		Company: BNO		Date/Time: 4-21-22 1000					
Relinquished by (Print/Sign):		Company:		Date/Time:		Received by (Print/Sign):		Company:		Date/Time:					
Relinquished by (Print/Sign):		Company:		Date/Time:		Received by (Print/Sign):		Company:		Date/Time:					
Comments:															

ORIGIN ID:LEWA (207) 666-3372
ED FRIEDMAN

7 CENTER PARK RD

TOPSHAM, ME 04086
UNITED STATES US

SHIP DATE: 20APR22
ACTWGT: 22.00 LB
CAD: 112002790/WSXI3700
DIMS: 14x12x11 IN

BILL SENDER

TO MATTHEW SCHMITZ
BATTELLE
141 LONGWATER DR.
SUITE 202
NORWELL MA 02061

(781) 681-5588

INV:

PO:

REF:

DEPT:



REL#
3785346

TRK# 2722 2823 5952
0201

THU - 21 APR 4:30P
STANDARD OVERNIGHT

01 XPUA

AHS
02061
MA-US BOS



*Therm 2
2.10*

Data Tables



Project Client: Friends of Merrymeeting Bay
 Project Name: FOMB - PFAS in water
 Project No.: G31839.XX.XX.0047.FOMB01

Client ID		FOMB-BS1						
Battelle ID		E0637-FS						
Sample Type		SA						
Collection Date		05/06/2022						
Extraction Date		05/06/2022						
Analytical Instrument		Sciex 5500 (AC) LC/MS/MS						
% Moisture		NA						
Matrix		WATER						
Sample Size		0.282						
Size Unit-Basis		L						
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Analysis Date	DL	LOD	LOQ
PFBA	375-22-4	3.10 U	E0637-FS(0)	1.000	5/19/2022	1.34	3.10	4.43
PFPeA	2706-90-3	3.10 U	E0637-FS(0)	1.000	5/19/2022	1.13	3.10	4.43
PFHxA	307-24-4	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.809	2.22	4.43
PFHpA	375-85-9	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.834	2.22	4.43
PFOA	335-67-1	9.35	E0637-FS(0)	1.000	5/19/2022	0.895	2.22	4.43
PFNA	375-95-1	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.738	2.22	4.43
PFDA	335-76-2	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.695	2.22	4.43
PFUnA	2058-94-8	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.667	2.22	4.43
PFDoA	307-55-1	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.674	2.22	4.43
PFTTrDA	72629-94-8	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.658	2.22	4.43
PFTeDA	376-06-7	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.701	2.22	4.43
NMeFOSAA	2355-31-9	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.913	2.22	4.43
NEtFOSAA	2991-50-6	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.878	2.22	4.43
NMeFOSA	31506-32-8	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.940	2.22	4.43
PFOSA	754-91-6	3.10 U	E0637-FS(0)	1.000	5/19/2022	1.40	3.10	4.43
PFBS	375-73-5	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.768	2.22	4.43
PFPeS	2706-91-4	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.904	2.22	4.43
PFHxS	355-46-4	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.884	2.22	4.43
PFHpS	375-92-8	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.746	2.22	4.43
PFOS	1763-23-1	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.949	2.22	4.43
PFNS	68259-12-1	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.621	2.22	4.43
PFDS	335-77-3	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.691	2.22	4.43
4:2FTS	757124-72-4	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.904	2.22	4.43
6:2FTS	27619-97-2	3.10 U	E0637-FS(0)	1.000	5/19/2022	1.30	3.10	4.43
8:2FTS	39108-34-4	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.895	2.22	4.43
HFPO-DA	13252-13-6	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.767	2.22	4.43
Adona	919005-14-4	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.770	2.22	4.43
9CI-PF3ONS	756426-58-1	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.913	2.22	4.43
11CI-PF3OUdS	763051-92-9	2.22 U	E0637-FS(0)	1.000	5/19/2022	0.799	2.22	4.43



Project Client: Friends of Merrymeeting Bay
 Project Name: FOMB - PFAS in water
 Project No.: G31839.XX.XX.0047.FOMB01

Client ID FOMB-BS1
 Battelle ID E0637-FS
 Sample Type SA
 Collection Date 05/06/2022
 Extraction Date 05/06/2022
 Analytical Instrument Sciex 5500 (AC) LC/MS/MS

Surrogate Recoveries (%)	Recovery	Extract ID	Analysis Date
13C4-PFBA	52	E0637-FS(0)	5/19/2022
13C5-PFPeA	55	E0637-FS(0)	5/19/2022
13C5-PFHxA	65	E0637-FS(0)	5/19/2022
13C4-PFHpA	72	E0637-FS(0)	5/19/2022
13C8-PFOA	75	E0637-FS(0)	5/19/2022
13C9-PFNA	74	E0637-FS(0)	5/19/2022
13C6-PFDA	78	E0637-FS(0)	5/19/2022
13C7-PFUnA	52	E0637-FS(0)	5/19/2022
13C2-PFDoA	43 N	E0637-FS(0)	5/19/2022
13C2-PFTeDA	34 N	E0637-FS(0)	5/19/2022
d3-MeFOSAA	45 N	E0637-FS(0)	5/19/2022
d5-EtFOSAA	42 N	E0637-FS(0)	5/19/2022
d3-MeFOSA	32 N	E0637-FS(0)	5/19/2022
13C8-FOSA	74	E0637-FS(0)	5/19/2022
13C3-PFBS	74	E0637-FS(0)	5/19/2022
13C3-PFHxS	82	E0637-FS(0)	5/19/2022
13C8-PFOS	75	E0637-FS(0)	5/19/2022
13C2-4:2FTS	113	E0637-FS(0)	5/19/2022
13C2-6:2FTS	185 N	E0637-FS(0)	5/19/2022
13C2-8:2FTS	162 N	E0637-FS(0)	5/19/2022
13C3-HFPO-DA	73	E0637-FS(0)	5/19/2022



Project Client: Friends of Merrymeeting Bay
 Project Name: FOMB - PFAS in water
 Project No.: G31839.XX.XX.0047.FOMB01

Client ID		FOMB-BS1 FB						
Battelle ID		E0638-FS						
Sample Type		SA						
Collection Date		05/06/2022						
Extraction Date		05/06/2022						
Analytical Instrument		Sciex 5500 (AC) LC/MS/MS						
% Moisture		NA						
Matrix		WATER						
Sample Size		0.257						
Size Unit-Basis		L						
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Analysis Date	DL	LOD	LOQ
PFBA	375-22-4	3.40 U	E0638-FS(0)	1.000	5/19/2022	1.47	3.40	4.86
PFPeA	2706-90-3	3.40 U	E0638-FS(0)	1.000	5/19/2022	1.25	3.40	4.86
PFHxA	307-24-4	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.888	2.43	4.86
PFHpA	375-85-9	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.915	2.43	4.86
PFOA	335-67-1	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.982	2.43	4.86
PFNA	375-95-1	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.810	2.43	4.86
PFDA	335-76-2	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.763	2.43	4.86
PFUnA	2058-94-8	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.732	2.43	4.86
PFDoA	307-55-1	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.739	2.43	4.86
PFTTrDA	72629-94-8	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.722	2.43	4.86
PFTeDA	376-06-7	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.769	2.43	4.86
NMeFOSAA	2355-31-9	2.43 U	E0638-FS(0)	1.000	5/19/2022	1.00	2.43	4.86
NEtFOSAA	2991-50-6	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.963	2.43	4.86
NMeFOSA	31506-32-8	2.43 U	E0638-FS(0)	1.000	5/19/2022	1.03	2.43	4.86
PFOSA	754-91-6	3.40 U	E0638-FS(0)	1.000	5/19/2022	1.54	3.40	4.86
PFBS	375-73-5	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.842	2.43	4.86
PFPeS	2706-91-4	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.992	2.43	4.86
PFHxS	355-46-4	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.970	2.43	4.86
PFHpS	375-92-8	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.818	2.43	4.86
PFOS	1763-23-1	2.43 U	E0638-FS(0)	1.000	5/19/2022	1.04	2.43	4.86
PFNS	68259-12-1	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.682	2.43	4.86
PFDS	335-77-3	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.758	2.43	4.86
4:2FTS	757124-72-4	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.992	2.43	4.86
6:2FTS	27619-97-2	3.40 U	E0638-FS(0)	1.000	5/19/2022	1.43	3.40	4.86
8:2FTS	39108-34-4	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.982	2.43	4.86
HFPO-DA	13252-13-6	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.841	2.43	4.86
Adona	919005-14-4	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.845	2.43	4.86
9CI-PF3ONS	756426-58-1	2.43 U	E0638-FS(0)	1.000	5/19/2022	1.00	2.43	4.86
11CI-PF3OUdS	763051-92-9	2.43 U	E0638-FS(0)	1.000	5/19/2022	0.876	2.43	4.86



Project Client: Friends of Merrymeeting Bay
 Project Name: FOMB - PFAS in water
 Project No.: G31839.XX.XX.0047.FOMB01

Client ID FOMB-BS1 FB
 Battelle ID E0638-FS
 Sample Type SA
 Collection Date 05/06/2022
 Extraction Date 05/06/2022
 Analytical Instrument Sciex 5500 (AC) LC/MS/MS

Surrogate Recoveries (%)	Recovery	Extract ID	Analysis Date
13C4-PFBA	94	E0638-FS(0)	5/19/2022
13C5-PFPeA	103	E0638-FS(0)	5/19/2022
13C5-PFHxA	74	E0638-FS(0)	5/19/2022
13C4-PFHpA	77	E0638-FS(0)	5/19/2022
13C8-PFOA	79	E0638-FS(0)	5/19/2022
13C9-PFNA	77	E0638-FS(0)	5/19/2022
13C6-PFDA	77	E0638-FS(0)	5/19/2022
13C7-PFUnA	73	E0638-FS(0)	5/19/2022
13C2-PFDoA	64	E0638-FS(0)	5/19/2022
13C2-PFTeDA	60	E0638-FS(0)	5/19/2022
d3-MeFOSAA	73	E0638-FS(0)	5/19/2022
d5-EtFOSAA	76	E0638-FS(0)	5/19/2022
d3-MeFOSA	44 N	E0638-FS(0)	5/19/2022
13C8-FOSA	77	E0638-FS(0)	5/19/2022
13C3-PFBS	85	E0638-FS(0)	5/19/2022
13C3-PFHxS	83	E0638-FS(0)	5/19/2022
13C8-PFOS	79	E0638-FS(0)	5/19/2022
13C2-4:2FTS	91	E0638-FS(0)	5/19/2022
13C2-6:2FTS	114	E0638-FS(0)	5/19/2022
13C2-8:2FTS	93	E0638-FS(0)	5/19/2022
13C3-HFPO-DA	71	E0638-FS(0)	5/19/2022



It can be done

Project Client: Friends of Merrymeeting Bay

Project Name: FOMB - PFAS in water

Project No.: G31839.XX.XX.0047.FOMB01

Client ID LQ43 IB

Battelle ID LQ43 IB_05/19/2022

Sample Type IB

Collection Date NA

Extraction Date NA

Analysis Date 05/19/2022

Analytical Instrument Sciex 5500 (AC) LC/MS/MS

% Moisture NA

Matrix Water

Sample Size 0.250

Size Unit-Basis L

Analyte	CAS No.	Result (ng/L)	DL	LOD	LOQ
PFBA	375-22-4	3.50 U	1.51	3.50	5.00
PFPeA	2706-90-3	3.50 U	1.28	3.50	5.00
PFHxA	307-24-4	2.50 U	0.913	2.50	5.00
PFHpA	375-85-9	2.50 U	0.941	2.50	5.00
PFOA	335-67-1	2.50 U	1.01	2.50	5.00
PFNA	375-95-1	2.50 U	0.833	2.50	5.00
PFDA	335-76-2	2.50 U	0.784	2.50	5.00
PFUnA	2058-94-8	2.50 U	0.752	2.50	5.00
PFDoA	307-55-1	2.50 U	0.760	2.50	5.00
PFTTrDA	72629-94-8	2.50 U	0.742	2.50	5.00
PFTeDA	376-06-7	2.50 U	0.791	2.50	5.00
NMeFOSAA	2355-31-9	2.50 U	1.03	2.50	5.00
NEtFOSAA	2991-50-6	2.50 U	0.990	2.50	5.00
NMeFOSA	31506-32-8	2.50 U	1.06	2.50	5.00
PFOSA	754-91-6	3.50 U	1.58	3.50	5.00
PFBS	375-73-5	2.50 U	0.866	2.50	5.00
PFPeS	2706-91-4	2.50 U	1.02	2.50	5.00
PFHxS	355-46-4	2.50 U	0.997	2.50	5.00
PFHpS	375-92-8	2.50 U	0.841	2.50	5.00
PFOS	1763-23-1	2.50 U	1.07	2.50	5.00
PFNS	68259-12-1	2.50 U	0.701	2.50	5.00
PFDS	335-77-3	2.50 U	0.779	2.50	5.00
4:2FTS	757124-72-4	2.50 U	1.02	2.50	5.00
6:2FTS	27619-97-2	3.50 U	1.47	3.50	5.00
8:2FTS	120226-60-0	2.50 U	1.01	2.50	5.00
HFPO-DA	13252-13-6	2.50 U	0.865	2.50	5.00
Adona	919005-14-4	2.50 U	0.869	2.50	5.00
9CI-PF3ONS	756426-58-1	2.50 U	1.03	2.50	5.00
11CI-PF3OUdS	763051-92-9	2.50 U	0.901	2.50	5.00



It can be done

Project Client: Friends of Merrymeeting Bay

Project Name: FOMB - PFAS in water

Project No.: G31839.XX.XX.0047.FOMB01

Client ID	LQ43 IB
Battelle ID	LQ43 IB_05/19/2022
Sample Type	IB
Collection Date	NA
Extraction Date	NA
Analysis Date	05/19/2022
Analytical Instrument	Sciex 5500 (AC) LC/MS/MS
% Moisture	NA
Matrix	Water
Sample Size	0.250
Size Unit-Basis	L

Surrogate Recoveries (%)

13C4-PFBA	102
13C5-PFPeA	97
13C5-PFHxA	98
13C4-PFHpA	101
13C8-PFOA	97
13C9-PFNA	105
13C6-PFDA	106
13C7-PFUnA	105
13C2-PFDoA	99
13C2-PFTeDA	98
d3-MeFOSAA	102
d5-EtFOSAA	106
d3-MeFOSA	99
13C8-FOSA	102
13C3-PFBS	106
13C3-PFHxS	104
13C8-PFOS	105
13C2-4:2FTS	112
13C2-6:2FTS	108
13C2-8:2FTS	107
13C3-HFPO-DA	90



Project Client: Friends of Merrymeeting Bay
 Project Name: FOMB - PFAS in water
 Project No.: G31839.XX.XX.0047.FOMB01

Client ID		Procedural Blank						
Battelle ID		DH877PB-FS						
Sample Type		PB						
Collection Date		05/06/2022						
Extraction Date		05/06/2022						
Analytical Instrument		Sciex 5500 (AC) LC/MS/MS						
% Moisture		NA						
Matrix		WATER						
Sample Size		0.258						
Size Unit-Basis		L						
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Analysis Date	DL	LOD	LOQ
PFBA	375-22-4	3.39 U	DH877PB-FS(0)	1.000	5/19/2022	1.46	3.39	4.84
PFPeA	2706-90-3	3.39 U	DH877PB-FS(0)	1.000	5/19/2022	1.24	3.39	4.84
PFHxA	307-24-4	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.885	2.42	4.84
PFHpA	375-85-9	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.912	2.42	4.84
PFOA	335-67-1	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.979	2.42	4.84
PFNA	375-95-1	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.807	2.42	4.84
PFDA	335-76-2	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.760	2.42	4.84
PFUnA	2058-94-8	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.729	2.42	4.84
PFDoA	307-55-1	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.736	2.42	4.84
PFTTrDA	72629-94-8	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.719	2.42	4.84
PFTeDA	376-06-7	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.766	2.42	4.84
NMeFOSAA	2355-31-9	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.998	2.42	4.84
NEtFOSAA	2991-50-6	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.959	2.42	4.84
NMeFOSA	31506-32-8	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	1.03	2.42	4.84
PFOSA	754-91-6	3.39 U	DH877PB-FS(0)	1.000	5/19/2022	1.53	3.39	4.84
PFBS	375-73-5	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.839	2.42	4.84
PFPeS	2706-91-4	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.988	2.42	4.84
PFHxS	355-46-4	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.966	2.42	4.84
PFHpS	375-92-8	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.815	2.42	4.84
PFOS	1763-23-1	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	1.04	2.42	4.84
PFNS	68259-12-1	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.679	2.42	4.84
PFDS	335-77-3	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.755	2.42	4.84
4:2FTS	757124-72-4	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.988	2.42	4.84
6:2FTS	27619-97-2	3.39 U	DH877PB-FS(0)	1.000	5/19/2022	1.42	3.39	4.84
8:2FTS	39108-34-4	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.979	2.42	4.84
HFPO-DA	13252-13-6	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.838	2.42	4.84
Adona	919005-14-4	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.842	2.42	4.84
9CI-PF3ONS	756426-58-1	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.998	2.42	4.84
11CI-PF3OUdS	763051-92-9	2.42 U	DH877PB-FS(0)	1.000	5/19/2022	0.873	2.42	4.84



Project Client: Friends of Merrymeeting Bay
 Project Name: FOMB - PFAS in water
 Project No.: G31839.XX.XX.0047.FOMB01

Client ID	Procedural Blank
Battelle ID	DH877PB-FS
Sample Type	PB
Collection Date	05/06/2022
Extraction Date	05/06/2022
Analytical Instrument	Sciex 5500 (AC) LC/MS/MS

Surrogate Recoveries (%)	Recovery	Extract ID	Analysis
			Date
13C4-PFBA	60	DH877PB-FS(0)	5/19/2022
13C5-PFPeA	87	DH877PB-FS(0)	5/19/2022
13C5-PFHxA	84	DH877PB-FS(0)	5/19/2022
13C4-PFHpA	84	DH877PB-FS(0)	5/19/2022
13C8-PFOA	79	DH877PB-FS(0)	5/19/2022
13C9-PFNA	81	DH877PB-FS(0)	5/19/2022
13C6-PFDA	81	DH877PB-FS(0)	5/19/2022
13C7-PFUnA	77	DH877PB-FS(0)	5/19/2022
13C2-PFDoA	72	DH877PB-FS(0)	5/19/2022
13C2-PFTeDA	68	DH877PB-FS(0)	5/19/2022
d3-MeFOSAA	70	DH877PB-FS(0)	5/19/2022
d5-EtFOSAA	76	DH877PB-FS(0)	5/19/2022
d3-MeFOSA	57	DH877PB-FS(0)	5/19/2022
13C8-FOSA	73	DH877PB-FS(0)	5/19/2022
13C3-PFBS	84	DH877PB-FS(0)	5/19/2022
13C3-PFHxS	77	DH877PB-FS(0)	5/19/2022
13C8-PFOS	82	DH877PB-FS(0)	5/19/2022
13C2-4:2FTS	93	DH877PB-FS(0)	5/19/2022
13C2-6:2FTS	88	DH877PB-FS(0)	5/19/2022
13C2-8:2FTS	85	DH877PB-FS(0)	5/19/2022
13C3-HFPO-DA	81	DH877PB-FS(0)	5/19/2022



Project Client: Friends of Merrymeeting Bay
 Project Name: FOMB - PFAS in water
 Project No.: G31839.XX.XX.0047.FOMB01

Client ID		Laboratory Control Sample								
Battelle ID		DH878LCS-FS								
Sample Type		LCS								
Collection Date		05/06/2022								
Extraction Date		05/06/2022								
Analytical Instrument		Sciex 5500 (AC) LC/MS/MS								
% Moisture		NA								
Matrix		WATER								
Sample Size		0.254								
Size Unit-Basis		L								
Analyte	CAS No.	Result (ng/L)	Extract ID	DF	Analysis			Control Limits		
					Date	Target	Recovery	Qual	Lower	Upper
PFBA	375-22-4	36.7	DH878LCS-FS(0)	1.000	5/19/2022	39.4	93	73	129	
PFPeA	2706-90-3	32.9	DH878LCS-FS(0)	1.000	5/19/2022	39.8	83	72	129	
PFHxA	307-24-4	35.2	DH878LCS-FS(0)	1.000	5/19/2022	39.4	89	72	129	
PFHpA	375-85-9	37.3	DH878LCS-FS(0)	1.000	5/19/2022	39.4	95	72	130	
PFOA	335-67-1	39.9	DH878LCS-FS(0)	1.000	5/19/2022	39.8	100	71	133	
PFNA	375-95-1	36.9	DH878LCS-FS(0)	1.000	5/19/2022	39.4	94	69	130	
PFDA	335-76-2	38.3	DH878LCS-FS(0)	1.000	5/19/2022	39.4	97	71	129	
PFUnA	2058-94-8	38.5	DH878LCS-FS(0)	1.000	5/19/2022	39.4	98	69	133	
PFDoA	307-55-1	37.7	DH878LCS-FS(0)	1.000	5/19/2022	39.4	96	72	134	
PFTriDA	72629-94-8	42.6	DH878LCS-FS(0)	1.000	5/19/2022	39.4	108	65	144	
PFTeDA	376-06-7	39.7	DH878LCS-FS(0)	1.000	5/19/2022	39.4	101	71	132	
NMeFOSAA	2355-31-9	34.0	DH878LCS-FS(0)	1.000	5/19/2022	39.4	86	65	136	
NEtFOSAA	2991-50-6	34.3	DH878LCS-FS(0)	1.000	5/19/2022	39.4	87	61	135	
NMeFOSA	31506-32-8	33.4	DH878LCS-FS(0)	1.000	5/19/2022	39.4	85	68	141	
PFOSA	754-91-6	33.2	DH878LCS-FS(0)	1.000	5/19/2022	39.4	84	67	137	
PFBS	375-73-5	35.6	DH878LCS-FS(0)	1.000	5/19/2022	39.4	90	72	130	
PFPeS	2706-91-4	36.1	DH878LCS-FS(0)	1.000	5/19/2022	39.4	92	71	127	
PFHxS	355-46-4	35.5	DH878LCS-FS(0)	1.000	5/19/2022	39.4	90	68	131	
PFHpS	375-92-8	36.8	DH878LCS-FS(0)	1.000	5/19/2022	39.4	93	69	134	
PFOS	1763-23-1	34.4	DH878LCS-FS(0)	1.000	5/19/2022	39.4	87	65	140	
PFNS	68259-12-1	38.2	DH878LCS-FS(0)	1.000	5/19/2022	39.8	96	69	127	
PFDS	335-77-3	31.2	DH878LCS-FS(0)	1.000	5/19/2022	39.8	78	53	142	
4:2FTS	757124-72-4	28.2	DH878LCS-FS(0)	1.000	5/19/2022	39.4	72	63	143	
6:2FTS	27619-97-2	35.4	DH878LCS-FS(0)	1.000	5/19/2022	39.4	90	64	140	
8:2FTS	39108-34-4	33.6	DH878LCS-FS(0)	1.000	5/19/2022	39.8	84	67	138	
HFPO-DA	13252-13-6	39.8	DH878LCS-FS(0)	1.000	5/19/2022	39.4	101	60	126	
Adona	919005-14-4	38.0	DH878LCS-FS(0)	1.000	5/19/2022	39.4	96	61	130	
9Cl-PF3ONS	756426-58-1	38.1	DH878LCS-FS(0)	1.000	5/19/2022	39.4	97	60	126	
11Cl-PF3OUdS	763051-92-9	33.8	DH878LCS-FS(0)	1.000	5/19/2022	39.4	86	56	125	



Project Client: Friends of Merrymeeting Bay
 Project Name: FOMB - PFAS in water
 Project No.: G31839.XX.XX.0047.FOMB01

Client ID	Laboratory Control Sample
Battelle ID	DH878LCS-FS
Sample Type	LCS
Collection Date	05/06/2022
Extraction Date	05/06/2022
Analytical Instrument	Sciex 5500 (AC) LC/MS/MS

<i>Surrogate Recoveries (%)</i>	Recovery	Extract ID	Analysis Date
13C4-PFBA	62	DH878LCS-FS(0)	5/19/2022
13C5-PFPeA	90	DH878LCS-FS(0)	5/19/2022
13C5-PFHxA	79	DH878LCS-FS(0)	5/19/2022
13C4-PFHpA	76	DH878LCS-FS(0)	5/19/2022
13C8-PFOA	75	DH878LCS-FS(0)	5/19/2022
13C9-PFNA	78	DH878LCS-FS(0)	5/19/2022
13C6-PFDA	77	DH878LCS-FS(0)	5/19/2022
13C7-PFUnA	72	DH878LCS-FS(0)	5/19/2022
13C2-PFDoA	69	DH878LCS-FS(0)	5/19/2022
13C2-PFTeDA	63	DH878LCS-FS(0)	5/19/2022
d3-MeFOSAA	78	DH878LCS-FS(0)	5/19/2022
d5-EtFOSAA	75	DH878LCS-FS(0)	5/19/2022
d3-MeFOSA	51	DH878LCS-FS(0)	5/19/2022
13C8-FOSA	73	DH878LCS-FS(0)	5/19/2022
13C3-PFBS	81	DH878LCS-FS(0)	5/19/2022
13C3-PFHxS	81	DH878LCS-FS(0)	5/19/2022
13C8-PFOS	81	DH878LCS-FS(0)	5/19/2022
13C2-4:2FTS	98	DH878LCS-FS(0)	5/19/2022
13C2-6:2FTS	100	DH878LCS-FS(0)	5/19/2022
13C2-8:2FTS	94	DH878LCS-FS(0)	5/19/2022
13C3-HFPO-DA	69	DH878LCS-FS(0)	5/19/2022



Glossary of Data Qualifiers

Flag: Application:

B	Analyte found in the sample at a concentration <10x the level found in the procedural blank
D	Dilution Run. Initial run outside the initial calibration range of the instrument
E	Estimate, result is greater than the highest concentration level in the calibration
J	Analyte detected below the Limit of Quantitation (LOQ)
MI	Significant Matrix Interference - value could not be determined.
N	Quality Control (QC) value is outside the accuracy or precision Data Quality Objective (DQO)
NA	Not Applicable
T	Holding Time (HT) exceeded
U	Analyte not detected or detected below the Detection Limit (DL) value, Limit of Detection (LOD) reported
Q	Ion ratio outside of criteria (50% difference from calibration expected ratio)

Miscellaneous Documentation

QA/QC Summary
Batch 22-0634

Project:	FOMB – PFAS in Water
Client Project Manager:	Ed Friedman
Parameters:	PFAS
Laboratory:	Battelle, Norwell, MA
Matrix:	Water
Data Set:	DP-22-0651
Analytical SOP:	5-369
Method Reference:	PFAS to QSM 5.3 Table B-15

Sample Custody		
Collection Date	Receipt Date	Temp (°C)
NA	4/21/2022	2.1
Corrective Actions	Chain of Custody forms arrived incomplete, collection information was missing. Client was notified.	
Sample Storage	The samples were stored refrigerated until extraction.	
Related samples	None.	

METHOD SUMMARIES	
Sample Preparation	Water samples were fortified with surrogates in the original sample container from the field. The water was extracted using a Weak-anion exchange (WAX) solid phase extraction (SPE) cartridge. Target analytes are eluted from the WAX SPE using 1% NH ₃ OH in methanol. Extracts were acidified with acetic acid and further refined using dispersive Envi-carb to remove co-extracted interferences. Extracts were fortified with internal standards and transferred to LC-MS/MS for analysis.
Prep comments	pH of all samples prior to SPE extraction was verified between 6 and 8. Sample E0637-FS (FOMB-BS1) contained particulates.
Analysis	PFAS were measured by liquid chromatography tandem mass spectrometry (LC-MS/MS) in the multiple reaction monitoring (MRM). An initial calibration consisting of representative target analytes, labelled analogs, and internal standards was analyzed prior to analysis to demonstrate the linear range of analysis. Calibration verification was performed at the beginning and end of 10 injections and at the end of each sequence. Target PFAS were quantified using the isotope dilution method. Samples are reported in ng/L concentrations to three (3) significant figures.
Analysis Comments	Samples analyzed on Sciex 5500 (AC) LC-MS/MS. MeFOSAA, EtFOSAA, PFHxS, and PFOS in the LCS were found and reported as a combination of the branched and linear isomers. The following calibration points were not used in the primary or secondary transitions, when applicable: <ul style="list-style-type: none"> • PFPeS in the L8 As these points are below the LOQ concentration equivalent, the reported concentrations are not above the high point of the calibrations, and these analytes use a minimum of five points for linear and six points for quadratic,

QA/QC Summary
Batch 22-0634

	<p>there is no impact on the reported data excluding these points. Points in the middle of calibration points are not excluded from use.</p> <p>The following secondary transitions were not used in the calibration:</p> <ul style="list-style-type: none"> • PFHpA, HFPO-DA, 11Cl-PF3OUdS in the L1 • PFHxA, 8:2FTS and EtFOSAA in the L1 and L2 • 9Cl-PF3ONS, PFOSA in the L1, L2 and L3 <p>The secondary transition is monitored solely for peak identification, not quantification. There is no impact on the reported data.</p>
--	--

Holding Times	Extraction Date(s)	Analysis Date(s)
	5/6/2022	5/19/2022

Procedural Blank (PB)	A PB was prepared with this analytical batch to ensure the sample extraction and analysis methods are free of contamination.
≤ ½ the LOQ Samples >10x PB	No exceedances noted.
	No comments.

Laboratory Control Spike (LCS)	A LCS was prepared with this analytical batch. The percent recoveries of target analytes were calculated to measure accuracy.
Laboratory derived control limits for recovery	No exceedances noted.
	No comments.

Matrix Spike and Matrix Spike Duplicate (MS/MSD)	A MS/MSD was prepared with this analytical batch. The percent recoveries of target analytes were calculated to measure accuracy.
Laboratory derived control limits for recovery and <30% RPD	Project specific MS/MSD not included in this data set.
	No comments.

Extracted Internal Standard Analytes	Labelled analog compounds were added prior to extraction. The recoveries are calculated to measure extraction efficiency.																							
50-150% of true value	Eight (8) exceedances noted.																							
	Two samples had suppressed or enhanced recoveries for select extracted internal standards. The table below indicates if the extracted internal standard was within +/- 50% of the area of the L5 calibration point ("P") or if the area showed suppression ("↓") or enhancement ("↑") for these extracted internal standards.																							
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>13C2-PFDoA</th> <th>13C2-PFTeDA</th> <th>d3-MeFOSAA</th> <th>d5-EtFOSAA</th> <th>d3-MeFOSA</th> <th>13C2-6:2FTS</th> <th>13C2-8:2FTS</th> </tr> </thead> <tbody> <tr> <td>E0637-FS (FOMB-BS1)</td> <td style="text-align: center;">↓</td> <td style="text-align: center;">↓</td> <td style="text-align: center;">↓</td> <td style="text-align: center;">↓</td> <td style="text-align: center;">↓</td> <td style="text-align: center;">P</td> <td style="text-align: center;">P</td> </tr> <tr> <td>E0638-FS (FOMB-BS1 FB)</td> <td></td> <td></td> <td></td> <td></td> <td style="text-align: center;">↓</td> <td></td> <td></td> </tr> </tbody> </table>		13C2-PFDoA	13C2-PFTeDA	d3-MeFOSAA	d5-EtFOSAA	d3-MeFOSA	13C2-6:2FTS	13C2-8:2FTS	E0637-FS (FOMB-BS1)	↓	↓	↓	↓	↓	P	P	E0638-FS (FOMB-BS1 FB)					↓	
	13C2-PFDoA	13C2-PFTeDA	d3-MeFOSAA	d5-EtFOSAA	d3-MeFOSA	13C2-6:2FTS	13C2-8:2FTS																	
E0637-FS (FOMB-BS1)	↓	↓	↓	↓	↓	P	P																	
E0638-FS (FOMB-BS1 FB)					↓																			
	The remaining extracted internal standards in each impacted sample, fortified from the same solution, pass all criteria, suggesting that the suppression is																							

QA/QC Summary
Batch 22-0634

	<p>matrix related to these analytes only. The sample extracts were re-analyzed for confirmation.</p> <p>Samples with passing area are not re-extracted as the exceedance is likely due to the quantification using an internal standard that behaves differently in the presence of the sample matrix. Samples with recoveries at or above 20% are not re-extracted.</p>
Internal Standard Analytes	Labelled analog compounds were added prior to analysis.
+/- 50% of the area of the L5 calibration point.	<p>No exceedances noted.</p> <p>No comments.</p>
Initial Calibration (ICAL)	The LC-MS/MS was calibrated with multi-level calibration curve for all compounds using linear or quadratic curve fitting.
+/- 30% of true value, $R^2 \geq 0.99$	<p>No exceedances noted.</p> <p>The following secondary transitions are outside of criteria:</p> <ul style="list-style-type: none"> • EtFOSAA $R^2 < 0.99$ <p>The secondary transition is monitored solely for peak identification, not quantification. There is no impact on the reported data.</p>
Independent Calibration Check (ICC)	The independent check was run after each initial calibration to verify the calibration. This standard is from a different source than the ICAL.
+/- 30% of true value	<p>No exceedances noted.</p> <p>No comments.</p>
Continuing Calibration Verification (CCV)	Continuing calibration standards were run at the beginning and end of 10 injections and at the end of the sequence to ensure that initial calibration is still valid.
+/- 30% of true value	<p>No exceedances noted.</p> <p>The following secondary transitions are outside of criteria:</p> <ul style="list-style-type: none"> • 9CI-PF3ONS in LQ38 CCV (5/19/2022 21:19:49) <p>The secondary transition is monitored solely for peak identification, not quantification. There is no impact on the reported data.</p>
Instrument Blank (IB)	Immediately following the highest standard analyzed and daily prior to sample analysis.
$\leq \frac{1}{2}$ the LOQ	<p>No exceedances noted.</p> <p>No comments.</p>



It can be done

Project Client: Friends of Merrymeeting Bay
 Project Name: FOMB - PFAS in water
 Project Number: G31839.XX.XX.0047.FOMB01
 Preparation Batch: 22-0634
 Data Set: DP-22-0651
 Test Code: Master_369D

QC Parameter:	Exceed:	Justification:
Procedural Blank	0	None
PB Measurement Quality Objective	0	None
Laboratory Control Sample	0	None
Matrix Spike / Matrix Spike Duplicate Recovery	NA	None
Matrix Spike / Matrix Spike Duplicate Precision	NA	None
Extracted Internal Standard Analytes (Surrogates)	8	There are eight extracted internal standard analytes that do not meet passing criteria and were confirmed by analyzing a fresh aliquot. DMS 6/3/2022
Instrument Calibration	0	None
Instrument Blank	0	None
Independent Calibration Check	0	None
Continuing Calibration Verification	0	None



It can be done

BATTELLE - NORWELL OPERATIONS MISCELLANEOUS DOCUMENTATION FORM

Project Title:	FOMB - PFAS in water	Data Set Number:	DP-22-0651
Project Number:	G31839.XX.XX.0047.FOMB01	Prep Batch Number:	22-0634
Entered By:	Denise Schumitz	Entered On:	06/08/2022
Test Code (Matrix Type):	Master_369D(L)		

Samples that were manually integrated are noted on the quant reports with the comment (TRUE).

The following calibration points were not used in the primary or secondary transitions, when applicable:

- PFPeS in the L8

As these points are below the LOQ concentration equivalent, the reported concentrations are not above the high point of the calibrations, and these analytes use a minimum of five points for linear and six points for quadratic, there is no impact on the reported data excluding these points. Points in the middle of calibration points are not excluded from use.

The following secondary transitions were not used in the calibration:

- PFHpA, HFPO-DA, 11Cl-PF3OUdS in the L1
- PFHxA, 8:2FTS and EtFOSAA in the L1 and L2
- 9Cl-PF3ONS, PFOSA in the L1, L2 and L3

The secondary transition is monitored solely for peak identification, not quantification. There is no impact on the reported data.

The following secondary transitions are outside of criteria:

- NEtFOSAA $r^2 < .99$
- 9Cl-PF3ONS in LQ38 CCV (5/19/2022)

The secondary transition is monitored solely for peak identification, not quantification. There is no impact on the reported data.

Task Leader Approval:

Supervisor Approval:

PM Approval:

Digitally signed by Jonathan Thorn

Date: 2022.06.08 17:51:42 -04'00'



Project Client: Friends of Merrymeeting Bay
 Project Name: FOMB - PFAS in water
 Project No.: G31839.XX.XX.0047.FOMB01
 Preparation Batch: 22-0634
 Data Set: DP-22-0651

		DH877PB-FS (Procedural Blank)	DH878LCS-FS (Laboratory Control Sample)	E0637-FS (FOMB-BS1)	E0638-FS (FOMB-BS1 FB)
PFBA	375-22-4	-	L	-	-
PFPeA	2706-90-3	-	L	-	-
PFHxA	307-24-4	-	L	-	-
PFHpA	375-85-9	-	L	-	-
PFOA	335-67-1	-	L	L	-
PFNA	375-95-1	-	L	-	-
PFDA	335-76-2	-	L	-	-
PFUnA	2058-94-8	-	L	-	-
PFDoA	307-55-1	-	L	-	-
PFTrDA	72629-94-8	-	L	-	-
PFTeDA	376-06-7	-	L	-	-
NMeFOSAA	2355-31-9	-	L/Br	-	-
NEtFOSAA	2991-50-6	-	L/Br	-	-
NMeFOSA	31506-32-8	-	L	-	-
PFOSA	754-91-6	-	L	-	-
PFBS	375-73-5	-	L	-	-
PFPeS	2706-91-4	-	L	-	-
PFHxS	355-46-4	-	L/Br	-	-
PFHpS	375-92-8	-	L	-	-
PFOS	1763-23-1	-	L/Br	-	-
PFNS	68259-12-1	-	L	-	-
PFDS	335-77-3	-	L	-	-
4:2FTS	757124-72-4	-	L	-	-
6:2FTS	27619-97-2	-	L	-	-
8:2FTS	39108-34-4	-	L	-	-
HFPO-DA	13252-13-6	-	L	-	-
Adona	919005-14-4	-	L	-	-
9Cl-PF3ONS	756426-58-1	-	L	-	-
11Cl-PF3OUds	763051-92-9	-	L	-	-

"L": Linear
 "Br": branched
 "L/Br": Linear/Branched
 "-": Not detected



ACCREDITATIONS

Accrediting Authority	Laboratory ID
U.S. Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP)	91667
State of Florida Department of Health	E87856
State of New York Department of Health	12105
State of Washington Department of Ecology	C1050
State of Maine	MA00056
State of Vermont	VT 87856
State of New Hampshire	2137
Commonwealth of Pennsylvania Department of Environmental Protection	68-05687
State of Alaska Department of Environmental Conservation	19-005
State of Rhode Island	E87856
State of California	3045

Current certificates and lists of accredited parameters are available upon request.



Appendix 9

Alpha Analytical FOMB Results Report



ANALYTICAL REPORT

Lab Number:	L2220432
Client:	Friends of Merrymeeting Bay 42 Stevens Rd. Bowdoinham, ME 04008
ATTN:	Ed Friedman
Phone:	(207) 666-3372
Project Name:	BWWTP
Project Number:	Not Specified
Report Date:	05/09/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com



Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2220432-01	FOMB AS-1	WATER	BRUNSWICK, ME	04/20/22 10:30	04/20/22
L2220432-02	FOMB AS-1 FB	WATER	BRUNSWICK, ME	04/20/22 10:30	04/20/22

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Case Narrative (continued)

Perfluorinated Alkyl Acids by Isotope Dilution

L2220432-01: The sample was centrifuged and decanted prior to extraction due to sample matrix.

L2220432-01: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

L2220432-01 and -02: The MeOH fraction of the extraction is reported for the following compounds:

Perfluorooctanesulfonamide (FOSA), N-Methyl Perfluorooctane Sulfonamide (NMeFOSA), N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA), N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE), and N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE) due to better extraction efficiency of the Surrogates (Extracted Internal Standards).

L2220432-01R and -02R: The sample was re-analyzed due to QC failures in the original analysis. The results of the re-analysis are reported for br-NEtFOSAA and L-NEtFOSAA only.

WG1633640-1 and WG1633640-2: The MeOH fraction of the extraction is reported for the following compounds: Perfluorooctanesulfonamide (FOSA), N-Methyl Perfluorooctane Sulfonamide (NMeFOSA), N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA), N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE), and N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE) due to better extraction efficiency of the Surrogates (Extracted Internal Standards).

WG1633640-1R and WG1633640-2R: The sample was re-analyzed due to QC failures in the original analysis. The results of the re-analysis are reported for br-NEtFOSAA and L-NEtFOSAA only.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Susan O'Neil

Title: Technical Director/Representative

Date: 05/09/22

ORGANICS

SEMIVOLATILES

Project Name: BWWT
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

SAMPLE RESULTS

Lab ID: L2220432-01
Client ID: FOMB AS-1
Sample Location: BRUNSWICK, ME

Date Collected: 04/20/22 10:30
Date Received: 04/20/22
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/04/22 04:45
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 05/03/22 04:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	5.84		ng/l	1.80	--	1
Perfluoropentanoic Acid (PFPeA)	5.43		ng/l	1.80	--	1
Perfluorobutanesulfonic Acid (PFBS)	3.51		ng/l	1.80	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.80	--	1
Perfluorohexanoic Acid (PFHxA)	7.19		ng/l	1.80	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.80	--	1
Perfluoroheptanoic Acid (PFHpA)	3.24		ng/l	1.80	--	1
Perfluorohexanesulfonic Acid-Branched (br-PFHxS)	ND		ng/l	1.80	--	1
Perfluorohexanesulfonic Acid-Linear (L-PFHxS)	6.94		ng/l	1.80	--	1
Perfluorooctanoic Acid-Branched (br-PFOA)	ND		ng/l	1.80	--	1
Perfluorooctanoic Acid-Linear (L-PFOA)	7.04		ng/l	1.80	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	2.44		ng/l	1.80	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.80	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.80	--	1
Perfluorooctanesulfonic Acid-Branched (br-PFOS)	8.35	F	ng/l	1.80	--	1
Perfluorooctanesulfonic Acid-Linear (L-PFOS)	10.9		ng/l	1.80	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.80	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.80	--	1
Perfluoronanesulfonic Acid (PFNS)	ND		ng/l	1.80	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid-Branched (br-NMeFOSAA)	ND		ng/l	1.80	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid-Linear (L-NMeFOSAA)	ND		ng/l	1.80	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.80	--	1
Perfluorodecanesulfonic Acid (PFDS)	23.6	F	ng/l	1.80	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.80	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.80	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.80	--	1
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	45.0	--	1

Project Name: BWWT
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

SAMPLE RESULTS

Lab ID: L2220432-01
Client ID: FOMB AS-1
Sample Location: BRUNSWICK, ME

Date Collected: 04/20/22 10:30
Date Received: 04/20/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	1.80	--	1
Perfluorohexadecanoic Acid (PFHxDA)	ND		ng/l	3.60	--	1
Perfluorooctadecanoic Acid (PFODA)	ND		ng/l	3.60	--	1
Perfluorododecane Sulfonic Acid (PFDoDS)	10.1	F	ng/l	1.80	--	1
1H,1H,2H,2H-Perfluorododecanesulfonic Acid (10:2FTS)	ND		ng/l	4.50	--	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	1.80	--	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	1.80	--	1
Perfluoropropane Sulfonic Acid (PFPrS)	ND		ng/l	1.80	--	1
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	1.80	--	1
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	1.80	--	1
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEEESA)	ND		ng/l	1.80	--	1
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	1.80	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	96		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	105		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	108		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	271	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	79		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	84		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	116		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	103		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	351	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	100		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	98		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	212	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	51		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	51	Q	55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	70		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	103		22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	99		10-165
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	133		10-206
1H,1H,2H,2H-Perfluorododecane Sulfonate (M2D4-10:2FTS)	208	Q	50-150

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

SAMPLE RESULTS

Lab ID: L2220432-01
 Client ID: FOMB AS-1
 Sample Location: BRUNSWICK, ME

Date Collected: 04/20/22 10:30
 Date Received: 04/20/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 134,LCMSMS-ID
 Analytical Date: 05/04/22 12:08
 Analyst: RS

Extraction Method: ALPHA 23528
 Extraction Date: 05/03/22 04:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.80	--	1
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	ND		ng/l	18.0	--	1
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	ND		ng/l	18.0	--	1
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	ND		ng/l	45.0	--	1
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	ND		ng/l	45.0	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	75		10-112
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (d3-NMeFOSA)	59		10-161
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (d5-NEtFOSA)	78		10-160
2-(N-Methyl-d3-Perfluoro-1-Octanesulfonamido)ethan-d4-ol (d7-NMeFOSE)	40		10-189
2-(N-Ethyl-d5-Perfluoro-1-Octanesulfonamido)ethan-d4-ol (d9-NEtFOSE)	62		10-187

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

SAMPLE RESULTS

Lab ID: L2220432-01 R
 Client ID: FOMB AS-1
 Sample Location: BRUNSWICK, ME

Date Collected: 04/20/22 10:30
 Date Received: 04/20/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 134,LCMSMS-ID
 Analytical Date: 05/05/22 10:30
 Analyst: RS

Extraction Method: ALPHA 23528
 Extraction Date: 05/03/22 04:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid-Branched (br-NEtFOSAA)	ND		ng/l	1.80	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid-Linear (L-NEtFOSAA)	ND		ng/l	1.80	--	1
Surrogate (Extracted Internal Standard)			% Recovery	Qualifier	Acceptance Criteria	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)			58		27-126	

Project Name: BWWT
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

SAMPLE RESULTS

Lab ID: L2220432-02
Client ID: FOMB AS-1 FB
Sample Location: BRUNSWICK, ME

Date Collected: 04/20/22 10:30
Date Received: 04/20/22
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/04/22 05:02
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 05/03/22 04:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.78	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	1.78	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.78	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.78	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.78	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.78	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.78	--	1
Perfluorohexanesulfonic Acid-Branched (br-PFHxS)	ND		ng/l	1.78	--	1
Perfluorohexanesulfonic Acid-Linear (L-PFHxS)	ND		ng/l	1.78	--	1
Perfluorooctanoic Acid-Branched (br-PFOA)	ND		ng/l	1.78	--	1
Perfluorooctanoic Acid-Linear (L-PFOA)	ND		ng/l	1.78	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.78	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.78	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.78	--	1
Perfluorooctanesulfonic Acid-Branched (br-PFOS)	ND		ng/l	1.78	--	1
Perfluorooctanesulfonic Acid-Linear (L-PFOS)	ND		ng/l	1.78	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.78	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.78	--	1
Perfluoronanesulfonic Acid (PFNS)	ND		ng/l	1.78	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid-Branched (br-NMeFOSAA)	ND		ng/l	1.78	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid-Linear (L-NMeFOSAA)	ND		ng/l	1.78	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.78	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.78	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.78	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.78	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.78	--	1
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	44.6	--	1

Project Name: BWWT
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

SAMPLE RESULTS

Lab ID: L2220432-02
Client ID: FOMB AS-1 FB
Sample Location: BRUNSWICK, ME

Date Collected: 04/20/22 10:30
Date Received: 04/20/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	1.78	--	1
Perfluorohexadecanoic Acid (PFHxDA)	ND		ng/l	3.57	--	1
Perfluorooctadecanoic Acid (PFODA)	ND		ng/l	3.57	--	1
Perfluorododecane Sulfonic Acid (PFDoDS)	ND		ng/l	1.78	--	1
1H,1H,2H,2H-Perfluorododecanesulfonic Acid (10:2FTS)	ND		ng/l	4.46	--	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	1.78	--	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	1.78	--	1
Perfluoropropane Sulfonic Acid (PFPrS)	ND		ng/l	1.78	--	1
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	1.78	--	1
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	1.78	--	1
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEEESA)	ND		ng/l	1.78	--	1
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	1.78	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	102		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	125		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	102		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	56		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	101		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	98		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	105		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	105		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	59		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	97		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	101		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	66		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	75		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	99		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	58		10-112
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	100		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	97		22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	136		10-165
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	122		10-206
1H,1H,2H,2H-Perfluorododecane Sulfonate (M2D4-10:2FTS)	78		50-150

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

SAMPLE RESULTS

Lab ID: L2220432-02
 Client ID: FOMB AS-1 FB
 Sample Location: BRUNSWICK, ME

Date Collected: 04/20/22 10:30
 Date Received: 04/20/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 134,LCMSMS-ID
 Analytical Date: 05/04/22 12:15
 Analyst: RS

Extraction Method: ALPHA 23528
 Extraction Date: 05/03/22 04:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.78	--	1
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	ND		ng/l	17.8	--	1
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	ND		ng/l	17.8	--	1
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	ND		ng/l	44.6	--	1
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	ND		ng/l	44.6	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	74		10-112
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (d3-NMeFOSA)	74		10-161
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (d5-NEtFOSA)	71		10-160
2-(N-Methyl-d3-Perfluoro-1-Octanesulfonamido)ethan-d4-ol (d7-NMeFOSE)	82		10-189
2-(N-Ethyl-d5-Perfluoro-1-Octanesulfonamido)ethan-d4-ol (d9-NEtFOSE)	78		10-187

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

SAMPLE RESULTS

Lab ID: L2220432-02 R
 Client ID: FOMB AS-1 FB
 Sample Location: BRUNSWICK, ME

Date Collected: 04/20/22 10:30
 Date Received: 04/20/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 134,LCMSMS-ID
 Analytical Date: 05/05/22 10:47
 Analyst: RS

Extraction Method: ALPHA 23528
 Extraction Date: 05/03/22 04:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid-Branched (br-NEtFOSAA)	ND		ng/l	1.78	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid-Linear (L-NEtFOSAA)	ND		ng/l	1.78	--	1
Surrogate (Extracted Internal Standard)			% Recovery	Qualifier	Acceptance Criteria	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)			75		27-126	

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/04/22 02:49
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 05/03/22 04:15

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02 Batch: WG1633640-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	--
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	--
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	--
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	--
Perfluorohexanesulfonic Acid-Branched (br-PFHxS)	ND		ng/l	2.00	--
Perfluorohexanesulfonic Acid-Linear (L-PFHxS)	ND		ng/l	2.00	--
Perfluorooctanoic Acid-Branched (br-PFOA)	ND		ng/l	2.00	--
Perfluorooctanoic Acid-Linear (L-PFOA)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	--
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	--
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--
Perfluorooctanesulfonic Acid-Branched (br-PFOS)	ND		ng/l	2.00	--
Perfluorooctanesulfonic Acid-Linear (L-PFOS)	ND		ng/l	2.00	--
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	--
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	--
N-Methyl Perfluorooctanesulfonamidoacetic Acid-Branched (br-NMeFOSAA)	ND		ng/l	2.00	--
N-Methyl Perfluorooctanesulfonamidoacetic Acid-Linear (L-NMeFOSAA)	ND		ng/l	2.00	--
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	--
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	--
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	--

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/04/22 02:49
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 05/03/22 04:15

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02 Batch: WG1633640-1					
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	--
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	50.0	--
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	--
Perfluorohexadecanoic Acid (PFHxDA)	ND		ng/l	4.00	--
Perfluorooctadecanoic Acid (PFODA)	ND		ng/l	4.00	--
Perfluorododecane Sulfonic Acid (PFDoDS)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorododecanesulfonic Acid (10:2FTS)	ND		ng/l	5.00	--
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	--
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	--
Perfluoropropane Sulfonic Acid (PFPrS)	ND		ng/l	2.00	--
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	2.00	--
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	2.00	--
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND		ng/l	2.00	--
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	2.00	--

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/04/22 02:49
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 05/03/22 04:15

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02 Batch: WG1633640-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	101		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	118		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	93		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	53		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	96		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	95		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	99		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	102		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	58		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	100		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	100		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	67		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	80		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	95		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	56		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	67		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	96		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	95		22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	145		10-165
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	128		10-206
1H,1H,2H,2H-Perfluorododecane Sulfonate (M2D4-10:2FTS)	73		50-150

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/04/22 11:54
Analyst: RS

Extraction Method: ALPHA 23528
Extraction Date: 05/03/22 04:15

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02 Batch: WG1633640-1					
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	--
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	ND		ng/l	20.0	--
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	ND		ng/l	20.0	--
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	ND		ng/l	50.0	--
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	ND		ng/l	50.0	--

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	74		10-112
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (d3-NMeFOSA)	65		10-161
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (d5-NEtFOSA)	64		10-160
2-(N-Methyl-d3-Perfluoro-1-Octanesulfonamido)ethan-d4-ol (d7-NMeFOSE)	76		10-189
2-(N-Ethyl-d5-Perfluoro-1-Octanesulfonamido)ethan-d4-ol (d9-NEtFOSE)	72		10-187

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

**Method Blank Analysis
Batch Quality Control**

Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/06/22 10:00
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/03/22 04:15

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02 Batch: WG1633640-1 R					
N-Ethyl Perfluorooctanesulfonamidoacetic Acid-Branched (br-NEtFOSAA)	ND		ng/l	2.00	--
N-Ethyl Perfluorooctanesulfonamidoacetic Acid-Linear (L-NEtFOSAA)	ND		ng/l	2.00	--

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	89		27-126

Lab Control Sample Analysis

Batch Quality Control

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Parameter	LCS	Qual	LCS	Qual	%Recovery	RPD	Qual	RPD
	%Recovery		%Recovery		Limits			Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1633640-2								
Perfluorobutanoic Acid (PFBA)	100		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	99		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	106		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	101		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	100		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	96		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	101		-		58-159	-		30
Perfluorohexanesulfonic Acid-Branched (br-PFHxS)	102		-		69-177	-		30
Perfluorohexanesulfonic Acid-Linear (L-PFHxS)	98		-		69-177	-		30
Perfluorooctanoic Acid-Linear (L-PFOA)	101		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	107		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	109		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	106		-		68-171	-		30
Perfluorooctanesulfonic Acid-Branched (br-PFOS)	101		-		52-151	-		30
Perfluorooctanesulfonic Acid-Linear (L-PFOS)	98		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	105		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	107		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	109		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid-Branched (br-NMeFOSAA)	133		-		60-166	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid-Linear (L-NMeFOSAA)	101		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	103		-		60-153	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1633640-2								
Perfluorodecanesulfonic Acid (PFDS)	115		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	112		-		46-170	-		30
Perfluorododecanoic Acid (PFDoA)	108		-		67-153	-		30
Perfluorotridecanoic Acid (PFTTrDA)	118		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	116		-		59-182	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	98		-		57-162	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	95		-		69-143	-		30
Perfluorohexadecanoic Acid (PFHxDA)	88		-		40-167	-		30
Perfluorooctadecanoic Acid (PFODA)	30		-		10-119	-		30
Perfluorododecane Sulfonic Acid (PFDoDS)	121		-		69-141	-		30
1H,1H,2H,2H-Perfluorododecanesulfonic Acid (10:2FTS)	128		-		81-188	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	100		-		55-158	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	94		-		52-156	-		30
Perfluoropropane Sulfonic Acid (PFPrS)	108		-		50-150	-		30
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	122		-		50-150	-		30
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	93		-		50-150	-		30
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEEESA)	95		-		50-150	-		30
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	118		-		50-150	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: BWWT
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Parameter	LCS		LCSD		%Recovery		RPD	RPD	
	%Recovery	Qual	%Recovery	Qual	Limits	Qual		Limits	
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1633640-2									

Surrogate (Extracted Internal Standard)	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
Perfluoro[13C4]Butanoic Acid (MPFBA)	102				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	116				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	97				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	57				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	99				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	96				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	103				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	103				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	65				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	98				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	101				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	73				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	76				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	104				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	62				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	78				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	99				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	98				22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	115				10-165
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	133				10-206
1H,1H,2H,2H-Perfluorododecane Sulfonate (M2D4-10:2FTS)	73				50-150

Lab Control Sample Analysis

Batch Quality Control

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1633640-2								
Perfluorooctanesulfonamide (FOSA)	122		-		46-170	-		30
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	136		-		10-185	-		30
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	142		-		10-202	-		30
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	138		-		10-209	-		30
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	144		-		66-176	-		30

Surrogate (Extracted Internal Standard)	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	78				10-112
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (d3-NMeFOSA)	69				10-161
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (d5-NEtFOSA)	69				10-160
2-(N-Methyl-d3-Perfluoro-1-Octanesulfonamido)ethan-d4-ol (d7-NMeFOSE)	83				10-189
2-(N-Ethyl-d5-Perfluoro-1-Octanesulfonamido)ethan-d4-ol (d9-NEtFOSE)	78				10-187

Lab Control Sample Analysis

Batch Quality Control

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1633640-2								
N-Ethyl Perfluorooctanesulfonamidoacetic Acid-Branched (br-NEtFOSAA)	102		-		45-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid-Linear (L-NEtFOSAA)	96		-		45-170	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	100				27-126

Matrix Spike Analysis

Batch Quality Control

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

<i>Parameter</i>	<i>Native Sample</i>	<i>MS Added</i>	<i>MS Found</i>	<i>MS %Recovery</i>	<i>Qual</i>	<i>MSD Found</i>	<i>MSD %Recovery</i>	<i>Qual</i>	<i>Recovery Limits</i>	<i>RPD</i>	<i>Qual</i>	<i>RPD Limits</i>
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1633640-3 QC Sample: L2220653-03 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	34.1	39.5	75.1	104		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	70.6	39.5	110	100		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	7.98	35.1	46.5	110		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	37.1	37.9	102		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	66.3	39.5	112	116		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	37.2	39.2	105		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	6.98	39.5	48.2	104		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	36.1	42.5	115		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	9.32	39.5	50.3	104		-	-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	37.6	37.7	100		-	-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	37.7	45.5	121		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	ND	39.5	43.7	109		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	7.08F	36.7	47.8F	111		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	ND	39.5	39.4	100		-	-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	37.9	37.4	99		-	-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	38	41.6	109		-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	39.5	37.2	94		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	39.5	39.4	100		-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	38.2	43.1	113		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	ND	39.5	42.6	108		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	39.5	40.1	101		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	39.5	41.3	104		-	-		67-153	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

<i>Parameter</i>	<i>Native Sample</i>	<i>MS Added</i>	<i>MS Found</i>	<i>MS %Recovery</i>	<i>Qual</i>	<i>MSD Found</i>	<i>MSD %Recovery</i>	<i>Qual</i>	<i>Recovery Limits</i>	<i>RPD</i>	<i>Qual</i>	<i>RPD Limits</i>
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1633640-3 QC Sample: L2220653-03 Client ID: MS Sample												
Perfluorotridecanoic Acid (PFTTrDA)	ND	39.5	45.6	115		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTTA)	ND	39.5	46.6	118		-	-		59-182	-		30

<i>Surrogate (Extracted Internal Standard)</i>	<i>MS % Recovery</i>	<i>Qualifier</i>	<i>MSD % Recovery</i>	<i>Qualifier</i>	<i>Acceptance Criteria</i>
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	68				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	124				12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	79				14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	52				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	54				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	85				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	84				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	79				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	83				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	102				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	83				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	84				22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	82				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	86				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	17				10-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	93				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	84				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	80				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	97				70-131

Matrix Spike Analysis

Batch Quality Control

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

<i>Parameter</i>	<i>Native Sample</i>	<i>MS Added</i>	<i>MS Found</i>	<i>MS %Recovery</i>	<i>Qual</i>	<i>MSD Found</i>	<i>MSD %Recovery</i>	<i>Qual</i>	<i>Recovery Limits</i>	<i>RPD</i>	<i>Qual</i>	<i>RPD Limits</i>
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1633640-3 QC Sample: L2220653-03 Client ID: MS Sample												
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	ND	198	239	121		-	-		10-185	-		30

<i>Surrogate (Extracted Internal Standard)</i>	<i>MS % Recovery</i>	<i>Qualifier</i>	<i>MSD % Recovery</i>	<i>Qualifier</i>	<i>Acceptance Criteria</i>
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (d3-NMeFOSA)	76				10-161

Lab Duplicate Analysis

Batch Quality Control

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1633640-4 QC Sample: L2220653-04 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	10.3	10.5	ng/l	2		30
Perfluoropentanoic Acid (PFPeA)	21.4	21.0	ng/l	2		30
Perfluorobutanesulfonic Acid (PFBS)	7.41	7.03	ng/l	5		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	26.7	26.9	ng/l	1		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	8.65	8.99	ng/l	4		30
Perfluorohexanesulfonic Acid (PFHxS)	5.82	5.70	ng/l	2		30
Perfluorooctanoic Acid (PFOA)	12.0	11.8	ng/l	2		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	ND	ng/l	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	2.94	2.80	ng/l	5		30
Perfluorooctanesulfonic Acid (PFOS)	54.3F	55.6F	ng/l	2		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis

Batch Quality Control

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1633640-4 QC Sample: L2220653-04 Client ID: DUP Sample						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	84		83		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	84		85		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	92		94		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	149	Q	167	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	71		70		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	79		78		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	102		106		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	84		83		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	108		103		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	76		74		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	97		96		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	78		73		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	75		70		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	49		44		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	82		77		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	15		21		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	42		42		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	82		69		48-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1633640-4 QC Sample: L2220653-04 Client ID: DUP Sample						

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	76		60		22-136

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1633640-4 QC Sample: L2220653-04 Client ID: DUP Sample						
--	--	--	--	--	--	--

N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	ND		ND		ng/l	NC	30
--	----	--	----	--	------	----	----

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (d3-NMeFOSA)	91		91		10-161

Project Name: BWWTP
Project Number: Not Specified

Sample Receipt and Container Information

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2220432-01A	Plastic 250ml unpreserved	A	NA		3.5	Y	Absent		A2-537-ISOTOPE-FULL+(14)
L2220432-01B	Plastic 250ml unpreserved	A	NA		3.5	Y	Absent		A2-537-ISOTOPE-FULL+(14)
L2220432-02A	Plastic 250ml unpreserved	A	NA		3.5	Y	Absent		A2-537-ISOTOPE-FULL+(14)

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report



Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the reporting limit (RL) for the sample.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: Data Usability Report



Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

Data Qualifiers

the identification is based on a mass spectral library search.

- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: BWWTP
Project Number: Not Specified

Lab Number: L2220432
Report Date: 05/09/22

REFERENCES

- 134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpineol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



CHAIN OF CUSTODY

WESTBORO, MA
TEL: 508-898-9220
FAX: 508-898-9193

MANSFIELD, MA
TEL: 508-822-9300
FAX: 508-822-3288

Date Rec'd in Lab: *4/21/22*

ALPHA Job #: *L2220432*

Client Information

Client: *Friends of Merrymeeting Bay*
Address: *P.O. Box 233*
Richmond, ME 04357
Phone: *207-666-3372*
Fax:
Email: *edfombw@comcast.net*

Project Information

Project Name: *BWWTTP*
Project Location: *Brunswick, ME*
Project #:
Project Manager: *E. Friedman*
ALPHA Quote #:

Turn-Around Time

Standard RUSH (only confirmed if pre-approved)
Date Due: Time:

Report Information - Data Deliverables

FAX EMAIL
 ADEX Add'l Deliverables

Billing Information

Same as Client Info PO #:

Regulatory Requirements/Report Limits

State /Fed Program	Criteria

These samples have been previously analyzed by Alpha
Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS		SAMPLE HANDLING
		Filtration _____ <input type="checkbox"/> Done <input type="checkbox"/> Not needed <input type="checkbox"/> Lab to do
		Preservation <input type="checkbox"/> Lab to do (Please specify below)
Sample Specific Comments		TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
<i>20432-01</i>	<i>FOMTB AS-1 142</i>	<i>4/20/22</i>	<i>1030</i>	<i>Mun. influ</i>	<i>ES</i>
	<i>FOMTB AS-1 202</i>			'	
<i>-02</i>	<i>FOMTB AS-1 FB</i>				

anal - anal 4/21/22 0620

Container Type	
Preservative	

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

Relinquished By:	Date/Time	Received By:	Date/Time
<i>E. Friedman</i>	<i>4/20/22 12:30</i>	<i>Anal</i>	<i>4/20/22 12:30</i>
<i>Anal</i>	<i>4/20/22</i>	<i>Anal</i>	<i>4/20/22 1800</i>
<i>Anal</i>	<i>4/21/22 9:45</i>	<i>Anal</i>	<i>4/21/22 0620</i>

R. Mando 4/21/22 0620

Appendix 10

Alpha Analytical BSD Results Report

Maine Environmental Laboratory

One Main Street, Yarmouth, ME 04096 Tel.: 207-846-6569 FAX: 207-846-9066 Email: melab@mel-lab.com

Report of Analyses

Report Prepared for:

Jason Prout
Brunswick Sewer District
10 Pine Tree Road
Brunswick, ME 04011

Report Information:

Batch ID: BSD 11942
Report ID: 11942-220516-1540
Date of Issue: May 16, 2022

The complete report consists of the following parts:

Maine Environmental Laboratory Chain of Custody form
Alpha Analytical report

REPORT NARRATIVE:

Enclosed are results of the analyses for your samples as received by the laboratory. Results are for the exclusive use of the client named on the report and will not be released to a third party without written consent. This report shall not be reproduced except in full without the written consent of the laboratory.

Maine Environmental Laboratory is accredited by the States of Maine (Cert. #ME00028) and New Hampshire (NH ELAP) (Cert. #2031) and is TNI/NELAP accredited. Please refer to our website www.maineenvironmentallaboratory.com for a copy of our Maine and NH ELAP certificates and accredited parameters. When a subcontracted laboratory is listed above, the data produced is by a Maine accredited laboratory accredited for the fields of testing performed.

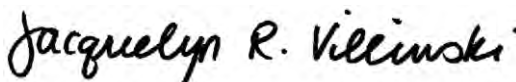
Unless otherwise noted:

- Samples were received in acceptable condition and analyzed within method hold times.
- Soils, sediment, solids and tissues are reported on dry weight basis. Wipes are reported on an "as received" basis.
- All quality control data demonstrated acceptable limits.
- The results reported herein conform to the 2009 TNI standards where applicable.
- Analysis of solids for pH, flash point, ignitability, paint filter, corrosivity, alkalinity, conductivity and specific gravity are reported on an "as received" basis.
- **Results for "immediate" field parameters tested at the lab such as pH were run outside of the EPA recommended hold time.**
- %RPD is not calculated when the native sample concentration is below 5 x LOQ.

DEFINITIONS:

- LOQ / RL - The Limit of Quantitation / Reporting Limit is the minimum level for reporting quantitative data.
- LOD / MDL - The Limit of Detection / Method Detection Limit is the minimum level for reporting estimated data.
- J - Data reported between the Limit of Quantitation and Limit of Detection is J-flagged as "estimated."
- ND or U - Not detected below the LOD / MDL
- B - Detected in QC blank
- S - Detection Limits increased due to sample matrix
- 4X - Native sample concentration was greater than 4 times the spike concentration so the spike added could not be distinguished from the native concentration.
- % Rec - Percent Recovery; RPD - Relative Percent Difference
- D - Duplicate sample
- R - Reanalysis

This report has been reviewed and authorized by
Jacquelyn R. Villinski, Laboratory Director:



Maine Environmental Laboratory - Chain of Custody

One Main Street Yarmouth, Maine 04096 (207) 846-6569 Fax: (207) 846-9066

Email: melab@mel-lab.com

Telephone _____ Email _____

Project Manager Sasen Prout Telephone 207 751 5837 Email SProut@BSEWER.org

Company Brunswick Sewer District Purchase Order #/Bill To _____

Address 10 Pine Tree Road Brunswick Me 04011

Project Name INF PFAS Sampler Name Sasen Prout

Sample Identification	# Containers	Container Type	Field Filtration (Yes or No)	Sample Matrix	Grab	Composite	Method Preserved	Sampling Date/Time
<u>X BSD INF</u>	<u>2</u>	<u>P</u>	<u>NO</u>	<u>WW</u>	<u>X</u>		<u>≤6°C</u>	<u>4/20/22 10:40</u>
<u>Blank</u>	<u>2</u>	<u>P</u>	<u>NO</u>	<u>PFAS-free H2O</u>	<u>X</u>		<u>≤6°C</u>	<u>4/20/22 10:40</u>

PFAS- Full List-28 Compounds

Laboratory Report # BSD 11942

Delivered by: SR

Turnaround Request: _____

Standard _____

Priority _____

Quote # _____

Laboratory Identification/ Subcontractor 220420101 Alpha

002

Received in hold time	Received in good condition	Temp. Blank °C	Frozen ice packs	Samples received preserved	Relinquished by Sampler	Relinquished by:	Date	Time	Received by Laboratory	Comments
<u>yes</u>	<u>yes</u>	<u>1.9</u>	<u>yes</u>	<u>yes</u>	<u>Sasen Prout</u>	<u>Sasen Prout</u>	<u>4/20/22</u>	<u>11:21</u>	<u>SR</u>	<u>Please cc nicholson@BSEWER.org</u>
<u>no</u>	<u>no</u>	<u>N/A</u>	<u>no</u>	<u>N/A</u>	<u>Sasen Prout</u>	<u>Sasen Prout</u>	<u>4/20/22</u>	<u>13:21</u>	<u>Sasen Prout</u>	<u>Method EPA 537.1 modified with Isotope Dilution</u>

Method EPA 537.1 modified with Isotope Dilution

Received in hold time

Received in good condition

Temp. Blank °C

Frozen ice packs

Samples received preserved

Relinquished by Sampler:

Relinquished by:

Date

Time

It is the client's responsibility to check the chain for accuracy prior to relinquishing samples. By executing this COC, the client has read and agrees to be bound by MEL's Terms and Conditions. WW-COC 28 compounds



ANALYTICAL REPORT

Lab Number:	L2220729
Client:	Maine Environmental Labs One Main Street Yarmouth, ME 04096
ATTN:	Jackie Villinski
Phone:	(207) 846-6569
Project Name:	BSD 11942
Project Number:	Not Specified
Report Date:	05/16/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com



Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2220729-01	BSD WF	WATER	Not Specified	04/20/22 10:40	04/21/22
L2220729-02	BLANK	WATER	Not Specified	04/20/22 10:40	04/21/22

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Case Narrative (continued)

Perfluorinated Alkyl Acids by Isotope Dilution

L2220729-01: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

L2220729-01: The sample was centrifuged and decanted prior to extraction due to sample matrix.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Susan O'Neil

Title: Technical Director/Representative

Date: 05/16/22

ORGANICS

SEMIVOLATILES

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

SAMPLE RESULTS

Lab ID: L2220729-01
 Client ID: BSD WF
 Sample Location: Not Specified

Date Collected: 04/20/22 10:40
 Date Received: 04/21/22
 Field Prep: Not Specified

Sample Depth:

Matrix: Water
 Analytical Method: 134,LCMSMS-ID
 Analytical Date: 05/01/22 17:26
 Analyst: SG

Extraction Method: ALPHA 23528
 Extraction Date: 04/30/22 02:42

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	6.14		ng/l	1.77	--	1
Perfluoropentanoic Acid (PFPeA)	6.12		ng/l	1.77	--	1
Perfluorobutanesulfonic Acid (PFBS)	3.61		ng/l	1.77	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.77	--	1
Perfluorohexanoic Acid (PFHxA)	7.21		ng/l	1.77	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.77	--	1
Perfluoroheptanoic Acid (PFHpA)	3.44		ng/l	1.77	--	1
Perfluorohexanesulfonic Acid (PFHxS)	8.18	F	ng/l	1.77	--	1
Perfluorooctanoic Acid (PFOA)	7.36		ng/l	1.77	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	2.42		ng/l	1.77	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.77	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.77	--	1
Perfluorooctanesulfonic Acid (PFOS)	19.8		ng/l	1.77	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.77	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.77	--	1
Perfluoronanesulfonic Acid (PFNS)	ND		ng/l	1.77	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.77	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.77	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.77	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.77	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.77	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.77	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.77	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.77	--	1
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	44.2	--	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	1.77	--	1
Perfluorohexadecanoic Acid (PFHxDA)	ND		ng/l	3.53	--	1

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

SAMPLE RESULTS

Lab ID: L2220729-01
 Client ID: BSD WF
 Sample Location: Not Specified

Date Collected: 04/20/22 10:40
 Date Received: 04/21/22
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorooctadecanoic Acid (PFODA)	ND		ng/l	3.53	--	1
PFAS, Total (6)	38.8		ng/l	1.77	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	91		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	99		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	94		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	234	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	76		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	79		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	100		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	98		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	303	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	103		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	94		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	180	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	49		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	43	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	19		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	59		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	56		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	90		22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	106		10-165
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	105		10-206

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

SAMPLE RESULTS

Lab ID: L2220729-02
Client ID: BLANK
Sample Location: Not Specified

Date Collected: 04/20/22 10:40
Date Received: 04/21/22
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/01/22 17:59
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 04/30/22 02:42

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.80	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	1.80	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.80	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.80	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.80	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.80	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.80	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.80	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.80	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.80	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.80	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.80	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.80	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.80	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.80	--	1
Perfluoronanesulfonic Acid (PFNS)	ND		ng/l	1.80	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.80	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.80	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.80	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.80	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.80	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.80	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.80	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.80	--	1
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	45.1	--	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	1.80	--	1
Perfluorohexadecanoic Acid (PFHxDA)	ND		ng/l	3.61	--	1

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

SAMPLE RESULTS

Lab ID: L2220729-02
Client ID: BLANK
Sample Location: Not Specified

Date Collected: 04/20/22 10:40
Date Received: 04/21/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorooctadecanoic Acid (PFODA)	ND		ng/l	3.61	--	1
PFAS, Total (6)	ND		ng/l	1.80	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	92		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	110		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	89		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	52		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	92		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	86		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	99		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	51		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	93		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	93		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	91		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	50		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	65		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	81		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	61		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	62		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	73		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	78		22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	127		10-165
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	105		10-206

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/01/22 13:50
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 04/30/22 02:42

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02 Batch: WG1637883-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	--
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	--
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	--
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	--
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	--
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	--
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	--
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	--
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	--
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	--
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	--
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	--
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	--
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	50.0	--
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	--

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/01/22 13:50
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 04/30/22 02:42

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02 Batch: WG1637883-1					
Perfluorohexadecanoic Acid (PFHxDA)	ND		ng/l	4.00	--
Perfluorooctadecanoic Acid (PFODA)	ND		ng/l	4.00	--
PFAS, Total (6)	ND		ng/l	2.00	--

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	94		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	95		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	90		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	85		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	99		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	93		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	85		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	102		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	86		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	96		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	99		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	80		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	66		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	85		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	62		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	58		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	75		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	77		22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	101		10-165
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	83		10-206



Lab Control Sample Analysis Batch Quality Control

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1637883-2								
Perfluorobutanoic Acid (PFBA)	102		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	99		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	104		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	106		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	100		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	105		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	102		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	107		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	96		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	101		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	98		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	97		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	103		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	97		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	134		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	93		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	92		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	123		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	99		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	105		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	97		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	107		-		67-153	-		30



Lab Control Sample Analysis Batch Quality Control

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Parameter	<i>LCS</i> %Recovery	<i>Qual</i>	<i>LCSD</i> %Recovery	<i>Qual</i>	<i>%Recovery</i> Limits	<i>RPD</i>	<i>Qual</i>	<i>RPD</i> Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1637883-2								
Perfluorotridecanoic Acid (PFTrDA)	104		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	100		-		59-182	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	92		-		57-162	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	92		-		69-143	-		30
Perfluorohexadecanoic Acid (PFHxDA)	78		-		40-167	-		30
Perfluorooctadecanoic Acid (PFODA)	52		-		10-119	-		30



Lab Control Sample Analysis Batch Quality Control

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1637883-2								

<i>Surrogate (Extracted Internal Standard)</i>	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	91				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	96				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	90				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	90				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	93				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	88				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	87				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	85				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	94				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	94				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	90				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	67				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	74				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	66				5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	63				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	74				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	73				22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	114				10-165
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	76				10-206



Matrix Spike Analysis Batch Quality Control

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1637883-3 QC Sample: L2200061-53 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	ND	38.1	38.0	100		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	ND	38.1	37.4	98		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	ND	33.8	34.6	102		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	35.7	36.4	102		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	ND	38.1	38.1	100		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	35.9	36.0	100		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	ND	38.1	38.8	102		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	34.8	36.0	103		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	ND	38.1	37.1	97		-	-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	36.3	36.6	101		-	-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	36.3	34.4	95		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	ND	38.1	35.4	93		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	ND	35.4	36.0	102		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	ND	38.1	37.4	98		-	-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	36.6	47.7	130		-	-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	36.6	34.8	95		-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	38.1	38.6	101		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	38.1	46.7	123		-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	36.8	36.9	100		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	ND	38.1	38.0	100		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	38.1	34.7	91		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	38.1	40.2	106		-	-		67-153	-		30



Matrix Spike Analysis Batch Quality Control

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1637883-3 QC Sample: L2200061-53 Client ID: MS Sample												
Perfluorotridecanoic Acid (PFTTrDA)	ND	38.1	41.7	109		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTTA)	ND	38.1	37.7	99		-	-		59-182	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	371	393F	106		-	-		57-162	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	36	29.0	80		-	-		69-143	-		30
Perfluorohexadecanoic Acid (PFHxDA)	ND	38.1	30.4	80		-	-		40-167	-		30
Perfluorooctadecanoic Acid (PFODA)	ND	38.1	15.4	40		-	-		10-119	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	65				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	53				12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	60				14-147
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	88				10-165
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	47				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	47				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	74				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	86				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	72				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	71				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	87				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	71				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	73				22-136
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	87				10-206



Matrix Spike Analysis Batch Quality Control

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1637883-3 QC Sample: L2200061-53 Client ID: MS Sample												

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	74				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	86				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	39				5-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	82				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	88				70-131



Lab Duplicate Analysis Batch Quality Control

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1637883-4 QC Sample: L2200061-54 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	ND	ND	ng/l	NC		30
Perfluoropentanoic Acid (PFPeA)	ND	ND	ng/l	NC		30
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	ND	ND	ng/l	NC		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	ND	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	ND	ng/l	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	ND	ND	ng/l	NC		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30



Lab Duplicate Analysis Batch Quality Control

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1637883-4 QC Sample: L2200061-54 Client ID: DUP Sample						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	ND	ng/l	NC		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	ND	ng/l	NC		30
Perfluorohexadecanoic Acid (PFHxDA)	ND	ND	ng/l	NC		30
Perfluorooctadecanoic Acid (PFODA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	89		82		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	101		95		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	91		87		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	106		106		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	88		82		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	81		76		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	86		85		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97		89		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	73		66		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87		80		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	91		83		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	88		82		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	60		62		10-162



Lab Duplicate Analysis
Batch Quality Control

Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1637883-4 QC Sample: L2200061-54 Client ID: DUP Sample						

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	52		46		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	73		64		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	24		25		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	57		42		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	70		67		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	74		63		22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	123		98		10-165
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	86		70		10-206



Project Name: BSD 11942
Project Number: Not Specified

Serial_No: 05162211:20
Lab Number: L2220729
Report Date: 05/16/22

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler **Custody Seal**
 A Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2220729-01A	Plastic 250ml unpreserved	A	NA		3.3	Y	Absent		A2-ME-537ISOTOPE-28+(14)
L2220729-01B	Plastic 250ml unpreserved	A	NA		3.3	Y	Absent		A2-ME-537ISOTOPE-28+(14)
L2220729-02A	Plastic 250ml unpreserved	A	NA		3.3	Y	Absent		-

*Values in parentheses indicate holding time in days



Project Number:

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6



Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report



Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the reporting limit (RL) for the sample.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: Data Usability Report



Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

Data Qualifiers

the identification is based on a mass spectral library search.

- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: Data Usability Report



Project Name: BSD 11942
Project Number: Not Specified

Lab Number: L2220729
Report Date: 05/16/22

REFERENCES

- 134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625/625.1: alpha-Terpeneol

EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpeneol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B

EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B


For a complete listing of analytes and methods, please contact your Alpha Project Manager.

4/21/22

L2220729

Serial_No:05162211:20

ALP

 MAINE ENVIRONMENTAL LABORATORY- Chain of Custody One Main Street Yarmouth, ME 04096-6716 Tel: (207) 846-6569 Fax: (207) 846-9066 Email: melab@mel-lab.com Web: MaineEnvironmentalLaboratory.com				ANALYSES Specify Required Method								FOR LAB USE ONLY LABORATORY REPORT #	
				SAMPLE RECEIVING Within Hold Time? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Good Condition? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Preserved? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Custody Seal? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Del. by: _____ Temp. °C _____									
REPORT TO <i>J. Villinski</i>			EMAIL			TELEPHONE						LAB ID/SUBCONTRACTOR	
COMPANY			BILL TO / PURCHASE ORDER #										
ADDRESS													
PROJECT NAME <i>BSD 11942</i>			SAMPLER NAME			QUOTE #							
SAMPLE IDENTIFICATION	# CONTAINERS	TYPE OF CONTAINERS	FIELD FILTRATION		SAMPLE TYPE	GRAB	COMP	METHOD PRESERVED	SAMPLING				
			YES	NO					DATE	TIME			
<i>BSD INF</i>	<i>2</i>	<i>P</i>	<i>X</i>		<i>WW</i>	<i>X</i>		<i>4°C</i>	<i>4-20-22</i>	<i>1040</i>	<i>X</i>		
<i>Blank</i>	<i>2</i>	<i>P</i>	<i>X</i>		<i>FB</i>	<i>X</i>		<i>4°C</i>	<i>↓</i>	<i>↓</i>	<i>X</i>		
<p><i>Wth Wan 4/21/22 1930</i> <i>Ryane Sull 4/21/22 1930</i></p> <p><i>Ryane Sull 4/21/22 2100</i> <i>AK 4/21/22 2100</i></p>													
TURNAROUND REQUEST <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Priority (SURCHARGE)			REPORTING REQUIREMENTS? <input type="checkbox"/> Standard Report <input checked="" type="checkbox"/> ME DEP EDD <input type="checkbox"/> STUTOX <input type="checkbox"/> DW Compliance (sent to State) <input type="checkbox"/> CC Results to _____				COMMENTS <i>EPA 537.1 modified w/ Isotope Dilution</i>						
RELINQUISHED BY SAMPLER:				DATE		TIME		RECEIVED BY:					
RELINQUISHED BY: <i>Jacquelyn Villinski</i>				<i>4/21/22</i>		<i>12:45</i>		RECEIVED BY: <i>[Signature] AAL</i>					
RELINQUISHED BY: <i>JLL AAL</i>				<i>4/21/22</i>		<i>1910</i>		RECEIVED BY LABORATORY: <i>[Signature]</i>					

Appendix 11

PFAS Lab Evaluations

Alpha Analytical-based in MA

Number of analytes tested for: 51 [41 standard plus 10 branched & linear isomers]

Test Kit Delivery: Arrives on requested date by Alpha Courier. Pick up the same.

Contents and Packing: In appropriately sized small cooler

2-250 ml sample bottles

2-250 ml field blank [FB] bottles

2-250 ml bottles of field blank water

1- Small temperature water bottle [monitors return shipment temperature]

1-Chain of Custody [COC] form w/carbon. Good for 10 samples

Test Requirements: 2-250 ml samples, 1-250 ml FB

Instructions: Clear and include phone number for scheduling pick-up.

Note: I had requested an extra FB water and bottle because I wasn't sure Cyclopure could supply these. AA supplied with no problem.

Cost: \$450 each for sample and FB = \$900

Results Delivery: 19 days

Overall Customer Service Experience: Excellent. Prompt & responsive email communications, excellent materials and service.

Eurofins-used lab based in PA but they are nation-wide.

Number of analytes tested for: 70

Test Kit Delivery: Via FEDEX. Return: Need to bring to FEDEX Center.

Contents and Packing: Large cooler

4-250 ml Green Tag bottles "PFAS Batch QC-Please fill this bottle in addition to samples."????

4-250 ml bottles unmarked

1-550 ml PFAS-Free FB water

1- Large temperature water bottle

Bubble wrap

1-Chain of Custody [COC] form w/carbon.

Test Requirements: 2- Clear 250 ml samples + 4- Green Tag 250 ml bottles, 2-Clear 250 ml FB bottles

Instructions: Very extensive, for more than H2O samples. Packing instruction sheet with graphics. Unclear how many bottles for sample or what Green Tag bottles were for. COC instructions to

photograph and email back to start pre-processing for expected samples. Instructions reference “RUSH” or “Short Hold” shipping but no indication what requires these. Questions over instructions were asked and answered via email.

Cost: \$727 each for sample and FB = \$1454, FB deionized water = \$20, Waste Fee- \$5 = \$1479
Overnight return express FEDEX- \$232 [big and heavy (water and ice)]

Results Delivery: 14 days

Overall Customer Service Experience: Good, once initial contact with correct lab was made, which was difficult. Instructions were very extensive but not as clear as could be. Extra water means more shipping weight.

Battelle-based in MA

Number of analytes tested for: 43

Test Kit Delivery: Via FEDEX. Return: Need to bring to FEDEX Center.

Contents and Packing: Large cooler

6-250 ml bottles

1- Temperature water bottle

1- Sheet adhesive “plain address labels.”

5-Chain of Custody [COC] forms, each good for 12 samples, no carbon.

Test Requirements: 2- 250 ml sample bottles [1 for extraction, 1 for contingency] 2- 250 ml FB bottles

Instructions: **None**, No packing materials, No FB water.

Cost: \$500 each for sample and FB = \$1000 Overnight return express FEDEX- \$86 [big and heavy (water and ice)]

Results Delivery: Promised in 28 days. Actual: 51 days

Note: Only one analyte was detected in sharp contrast to all other labs. Questionable whether repairs were made correctly or whether they mistreated sample water ? One analyte result detected was in line with others.

Overall Customer Service Experience: Once established, communication was good. FB water was promptly sent once notified. Instructions given by email [or phone?]-basically how many of each bottle to fill for sample and FB. Results Report Delivery held up rest of our project. Supposedly they had instrumentation problems. We were repeatedly told samples would be shipped in a few days but they repeatedly were not. Comparing results with those of other labs we notified them including sending comparative spreadsheet and received no response. Later after receiving invoice requested \$500 adjustment given delays and clearly problematic results. Received no response.

Cyclopure-Based in IL

Number of analytes tested for: 55

Test Kit Delivery: Via USPS Priority Mail, Return: Same-Postpaid

Contents and Packing:

3 - Water Test Kits [WTK] in individual boxes [1 test, 1 FB, 1 replicate]

1- Bottle FB water [supplied by special request]

Test Requirements: 1- WTK. We requested an additional kit as a replicate and 1 for a FB

Instructions: Very clear for sampling and return. No protocols for whether it's okay to set containers down while draining or how to do so. This is important with multiple WTK's since under clear water situations it takes about 15 minutes to drain. Discussed via email and phone.

Cost: \$80 each for samples and FB = \$160 Note: These are normal WTK prices but for trial, WTK's were supplied at no charge. Field Blanks by special request Cyclopure ships in USPS Priority boxes with postage paid for return post sampling.

Results Delivery: 8 days.

Note: Only non-certified lab although they follow EPA methodologies and use top of line instrumentation. See Appendix 4. Lack of certification means results can't be used for regulatory purposes but comparable results are excellent for screening or other non-regulatory purposes at a fraction of cost. Advantages-light weight and shipping type mean low cost, quick turn-around. Disadvantages-not certified, each sample requires about 15 minutes to gather or more if sample water contains a lot of particulates. Cyclopure's main business is producing their PFAS filtering media [DEXSORB®] which is widely used in PFAS remediation and is a corn-based product. See Appendix 5. The WTK's are more of a sideline or spin-off. They now are also making water filters for home use at the tap. According to the company their corn product is non GMO but this is [only the case for about 10%](#) of the US acreage planted to corn, soybeans, canola and sugar beets.

Overall Customer Service Experience: Excellent personal and prompt service. Tough getting some detailed questions answered.