

Trevor Moulton
Environmental Scientist
Rhode Island Department of Environmental Management
Office of Land Revitalization & Sustainable Materials Management
235 Promenade Street
Providence, Rhode Island 02908

April 5, 2024
Project 06100

RE: FM Global PFAS Groundwater Sampling Results
FM Global Test Center
743 Reynolds Road
Chepachet, Rhode Island

Dear Mr. Moulton,

The following report documents the results of PFAS sampling conducted at the former landfill at FM Global Test Center in Chepachet, RI. Sampling was conducted by Geosphere Environmental Management, Inc. (GEOSPHERE) in accordance with the proposed PFAS Monitoring Plan presented in letters submitted to RI DEM, dated November 8, 2023 and November 27, 2023. The only alterations to the proposed sampling plan, were the exact dates on which the samples were taken, for reasons discussed below.

First Round of PFAS Sampling

Groundwater samples were collected from the four monitoring wells, MW-1, MW-3, MW-6, and RW-4, on January 12, 2024 (see **Figure 1** for the location of the monitoring wells). This was the second time samples were collected from the wells, as the original samples collected on December 19, 2023 did not produce reportable results due to laboratory error. The samples were analyzed by Alpha Analytical using the method Perfluorinated Alkyl Acids by Isotope Dilution (134, LCMSMS-ID) for 24 Per- and Polyfluorinated Substances (PFAS) compounds.

The results of the laboratory analysis indicated the presence of PFAS compounds in all four monitoring wells. The laboratory report is included in **Attachment A** and sampling results are summarized in **Table 1**. In total, 14 different PFAS compounds were identified at various concentrations within the wells, listed below:

- Perfluorobutanoic Acid (PFBA);
- Perfluoropentanoic Acid (PFPeA);
- Perfluorobutanesulfonic Acid (PFBS);
- Perfluorohexanoic Acid (PFHxA);
- Perfluoropentanesulfonic Acid (PFPeS);
- PFHpA;
- PFHxS;
- PFOA; and
- 1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS);
- Perfluoroheptanesulfonic Acid (PFHpS);
- PFNA;
- PFOS;
- N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA);
- Perfluorooctanesulfonamide (FOSA).

In summary, five of the six regulated PFAS were detected in the groundwater from these monitoring wells. Of the five PFAS regulated compounds that were detected, only two compounds, PFHpA and PFNA, were detected below the GAA standard for drinking water of 20 parts per trillion (ppt) in each

monitoring well. Groundwater from each of the four monitoring wells contained over 20 ppt of the regulated compounds when combined.

The compounds detected in the highest concentrations were PFOS (183 ppt in MW-3, 32.1 ppt in MW-6, and 847 ppt in RW-4) and PFHxS (420 ppt, 410 ppt, 37.8 ppt, and 348 ppt in MW-1, MW-3, MW-6, and RW-4, respectively). Concentrations of all other detected PFAS compounds are located in **Table 1**.

The highest concentration PFAS compounds was detected in monitoring well RW-4. RW-4 was used as a recovery well in the cutoff trench that was constructed along the downgradient side of the former landfill. This well collected groundwater from the upgradient landfill for treatment of volatile organic compounds, principally toluene. The lowest concentration of PFAS compounds was detected in MW-6 which is located slightly outside of the limit of the landfill's impermeable cap to the north of the former landfill.

Additionally, depth to groundwater measurements were recorded before sampling on January 12, 2024, and are presented in **Table 1**. Depth to groundwater measurements in the first sampling event were 28.10 feet below top of casing (ft btoc) in MW-1, 26.41 ft btoc in MW-3, 8.53 ft btoc in MW-6, and 15.74 ft btoc in RW-4.

Second Round of PFAS Sampling

Groundwater samples were collected from the four monitoring wells, MW-1, MW-3, MW-6, and RW-4, on February 22, 2024. This was earlier than the originally planned sampling date of March 14, 2024, in case there was another laboratory error requiring resampling. The samples were analyzed by Alpha Analytical using the same method previously used for the first round of sampling.

The results of the laboratory analysis indicated the presence of PFAS compounds in all four monitoring wells. The laboratory report for the second round of sampling is located in **Attachment B**. In total, 17 different PFAS compounds were identified at various concentrations within the wells. All 14 compounds observed in the first round of sampling were detected again, along with 3 additional compounds, listed below:

- Perfluorodecanoic acid (PFDA);
- Perfluorononanesulfonic Acid (PFNS); and
- Perfluorotridecanoic Acid (PFTrDA).

All of the six regulated PFAS were detected in the groundwater from these monitoring wells (see **Table 1**). Of the six PFAS regulated compounds that were detected only two compounds, PFNA and PFDA, were detected below the GAA standard for drinking water of 20 parts per trillion (ppt) in each monitoring well. PFHpA was below 20 ppt in well MW-1, MW-3, and RW-4, but was over the GAA standard in MW-6. Groundwater from each of the four monitoring wells contained over 20 ppt of the regulated compounds when combined.

The compounds detected in the highest concentrations were PFOS (6.02 ppt in MW-1, 210 ppt in MW-3, 8260 ppt in MW-6, and 1310 ppt in RW-4) and PFHxS (294 ppt, 324 ppt, 2270 ppt, and 20 ppt in MW-1, MW-3, MW-6, and RW-4, respectively). Concentrations of all detected PFAS compounds are located in **Table 1**.

The highest concentrations of PFAS compounds were detected in monitoring well MW-6. This differs from the previous sampling event, where MW-6 contained the lowest concentrations of PFAS compounds. The lowest concentrations of PFAS compounds were detected in MW-1 which is located upgradient of the landfill outside of the limit of the landfill's impermeable cap to the north of the former landfill (see **Figure 1**).

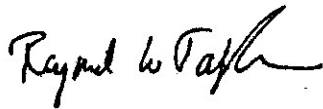
Depth to groundwater measurements were recorded before sampling on February 22, 2024, and are presented in **Table 1**. Depth to groundwater measurements in the second sampling event were 26.59 feet below top of casing (ft btoc) in MW-1, 26.18 ft btoc in MW-3, 7.24 ft btoc in MW-6, and 14.63 ft btoc in RW-4. Groundwater levels were higher during the second sampling event compared to the first.

Future PFAS Sampling

GEOSPHERE is recommending an additional round of sampling to be scheduled for mid-summer 2024. This sampling event will provide additional monitoring data and help determine if changes in groundwater levels in the landfill impact concentrations of PFAS compounds.

If you have any questions, please don't hesitate to reach us at 603-773-0075 x 11 or rtalkington@geospherenh.com.

Sincerely,
GEOSPHERE ENVIRONMENTAL MANAGEMENT, INC.



Raymond W. Talkington, Ph.D., P.G.
Principal Hydrogeologist

cc: Janine Pitocco, FM Global

Figures

Figure 1 – Site Plan

Tables

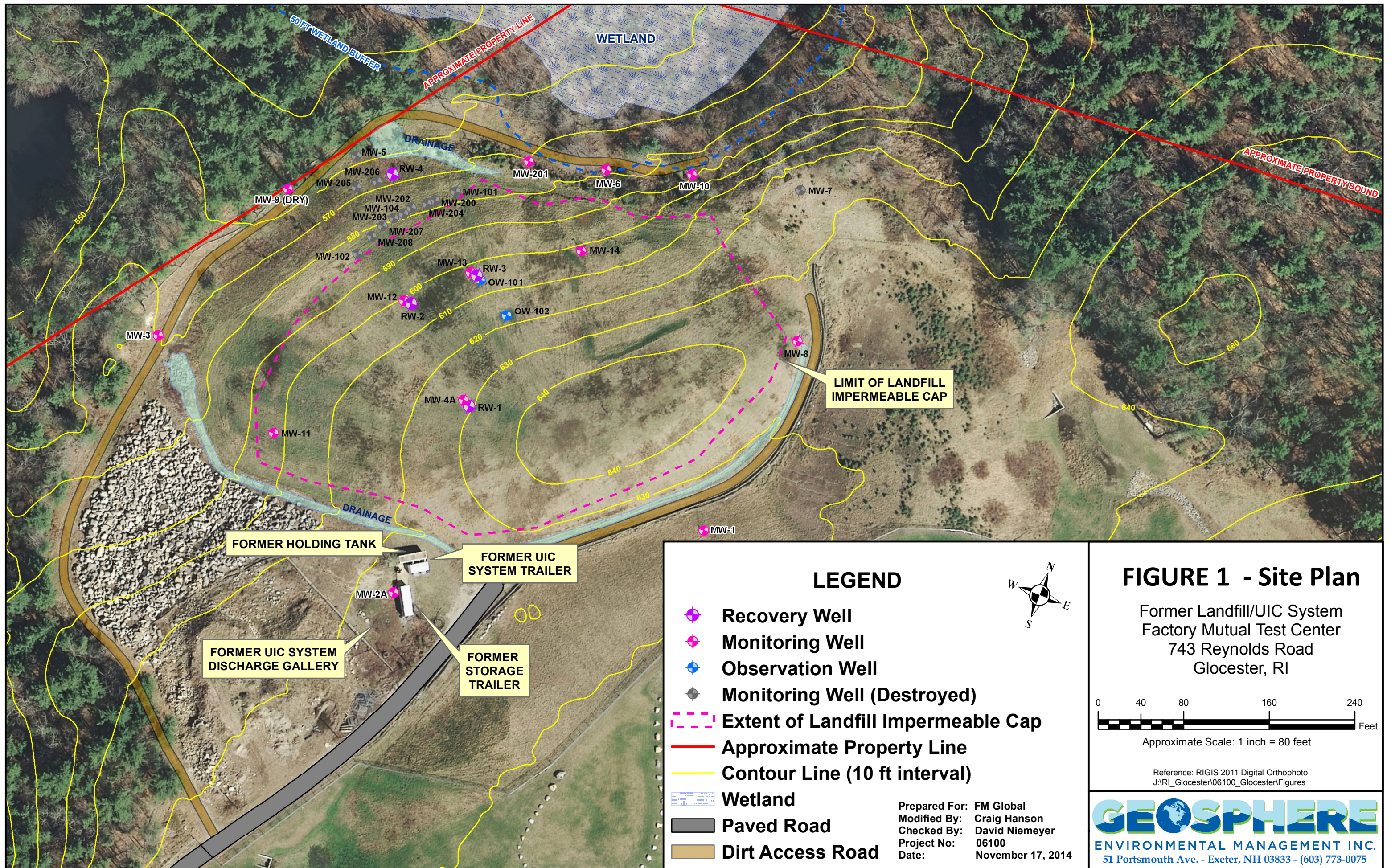
Table 1 – Summary of PFAS Sampling Results

Attachments

Attachment A – Laboratory Report dated January 17, 2024

Attachment B – Laboratory Report dated March 6, 2024

Figures



Tables

Table 1

Summary of PFAS Sampling Results

FM Global's Former Landfill

April 5, 2024

Parameter	MW-1	MW-1	MW-3	MW-3	MW-6	MW-6	RW-4	RW-4	GAA STD*
	1/12/2024	2/22/2024	1/12/2024	2/22/2024	1/12/2024	2/22/2024	1/12/2024	2/22/2024	
Perfluorinated Alkyl Acids by Isotope Dilution in parts per trillion (ng/l)									
Perfluorobutanoic Acid (PFBA)	ND	3.57	4.64	4.83	ND	65.50	ND	2.96	-
Perfluoropentanoic Acid (PFPeA)	2.01	6.94	8.91	9.60	ND	172.00	3.34	6.95	-
Perfluorobutanesulfonic Acid (PFBS)	3.18	4.42	4.46	5.41	ND	65.80	3.16	3.78	-
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ND	ND	ND	ND	ND	ND	-
Perfluorohexanoic Acid (PFHxA)	10.40	30.50	37.90	45.00	1.85	1200.00	24.40	37.80	-
Perfluoropentanesulfonic Acid (PFPeS)	3.98	3.72	6.26	5.94	ND	92.60	4.46	4.55	-
Perfluoroheptanoic Acid (PFHpA)	3.52	6.13	10.30	10.50	ND	168.00	5.94	7.46	20**
Perfluorohexanesulfonic Acid (PFHxS)	420.00	294.00	410.00	324.00	37.80	2270.00	348.00	420.00	20**
Perfluorooctanoic Acid (PFOA)	32.80	27.20	48.70	44.20	3.74	989.00	36.30	48.10	20**
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	ND	2.80	3.32	ND	ND	ND	ND	-
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	5.29	4.01	ND	302.00	7.93	11.60	-
Perfluorononanoic Acid (PFNA)	ND	ND	2.61	2.32	2.68	11.20	3.24	ND	20**
Perfluorooctanesulfonic Acid (PFOS)	ND	6.02	183.00	210.00	32.10	8260.00	847.00	1310.00	20**
Perfluorodecanoic Acid (PFDA)	ND	ND	ND	2.18	ND	ND	ND	ND	20**
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ND	ND	ND	ND	ND	ND	-
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ND	ND	ND	1.87	ND	ND	-
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	9.02	47.80	ND	6.24	ND	ND	-
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ND	ND	ND	ND	ND	ND	-
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ND	ND	ND	ND	ND	ND	-
Perfluorooctanesulfonamide (FOSA)	ND	ND	ND	2.82	ND	158.00	21.10	22.20	-
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ND	ND	ND	ND	ND	ND	-
Perfluorododecanoic Acid (PFDoA)	ND	ND	ND	ND	ND	ND	ND	ND	-
Perfluorotridecanoic Acid (PFTTrDA)	ND	ND	ND	ND	ND	ND	ND	3.18	-
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ND	ND	ND	ND	ND	ND	-
Totals	475.89	382.50	733.89	721.93	78.17	13762.21	1304.87	1878.58	-

Note:

Detected concentrations shown in bold

Increasing concentrations shown in red

* GAA STD. = Rhode Island Groundwater Quality Standard for Class GAA Ground Water

** Current RI standards for PFAS compounds are in place for 6 compounds (shown above) with a limit of 20 parts per trillion individually or in aggregate

Attachment A

Laboratory Report dated January 17, 2024



ANALYTICAL REPORT

Lab Number:	L2402269
Client:	Geosphere Environmental Mgmt, Inc 51 Portsmouth Avenue Exeter, NH 03833
ATTN:	Lauren Kaehler
Phone:	(603) 773-0075
Project Name:	FM GLOBAL
Project Number:	06100
Report Date:	01/17/24

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-0825), DoD (L2474), FL (E87814), IL (200081), IN (C-MA-04), KY (KY98046), LA (85084), ME (MA00030), MD (350), MI (99110), NJ (MA015), NY (11627), NC (685), OH (CL106), OR (MA-0262), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #525-23-107-88708), 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: FM GLOBAL
Project Number: 06100

Lab Number: L2402269
Report Date: 01/17/24

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2402269-01	MW-1	WATER	RI	01/12/24 10:30	01/12/24
L2402269-02	MW-3	WATER	RI	01/12/24 10:40	01/12/24
L2402269-03	MW-6	WATER	RI	01/12/24 10:50	01/12/24
L2402269-04	RW-4	WATER	RI	01/12/24 11:00	01/12/24
L2402269-05	TRIP BLANK	WATER	RI	01/08/24 08:00	01/12/24

Project Name: FM GLOBAL
Project Number: 06100

Lab Number: L2402269
Report Date: 01/17/24

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: FM GLOBAL
Project Number: 06100

Lab Number: L2402269
Report Date: 01/17/24

Case Narrative (continued)

Sample Receipt

The samples were received at the laboratory above the required temperature range. The samples were delivered directly from the sampling site but were not on ice.

Perfluorinated Alkyl Acids by Isotope Dilution

L2402269-01, -02 and -04: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

L2402269-04: The sample was re-extracted on dilution in order to quantitate the results within the calibration range. The result(s) should be considered estimated, and are qualified with an E flag, for any compound(s) that exceeded the calibration range in the initial analysis. The re-extraction was performed only for the compound(s) that exceeded the calibration range.

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:



Alycia Mogayzel

Title: Technical Director/Representative

Date: 01/17/24

ORGANICS

SEMIVOLATILES

Project Name: FM GLOBAL

Lab Number: L2402269

Project Number: 06100

Report Date: 01/17/24

SAMPLE RESULTS

Lab ID: L2402269-01

Date Collected: 01/12/24 10:30

Client ID: MW-1

Date Received: 01/12/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Extraction Method: ALPHA 23528

Analytical Method: 134,LCMSMS-ID

Extraction Date: 01/13/24 06:25

Analytical Date: 01/15/24 09:50

Analyst: SG

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.83	--	1
Perfluoropentanoic Acid (PFPeA)	2.01		ng/l	1.83	--	1
Perfluorobutanesulfonic Acid (PFBS)	3.18		ng/l	1.83	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.83	--	1
Perfluorohexanoic Acid (PFHxA)	10.4		ng/l	1.83	--	1
Perfluoropentanesulfonic Acid (PFPeS)	3.98		ng/l	1.83	--	1
Perfluoroheptanoic Acid (PFHpA)	3.52		ng/l	1.83	--	1
Perfluorohexanesulfonic Acid (PFHxS)	420		ng/l	1.83	--	1
Perfluorooctanoic Acid (PFOA)	32.8		ng/l	1.83	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.83	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.83	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.83	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.83	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.83	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.83	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.83	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.83	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.83	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.83	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.83	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.83	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.83	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.83	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.83	--	1

Project Name: FM GLOBAL

Lab Number: L2402269

Project Number: 06100

Report Date: 01/17/24

SAMPLE RESULTS

Lab ID: L2402269-01

Date Collected: 01/12/24 10:30

Client ID: MW-1

Date Received: 01/12/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Surrogate (Extracted Internal Standard)	% Recovery		Qualifier	Acceptance Criteria		
Perfluoro[13C4]Butanoic Acid (MPFBA)	71			58-132		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	68			62-163		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	77			70-131		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	107			12-142		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	69			57-129		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	72			60-129		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	66		Q	71-134		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	70			62-129		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	74			14-147		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	69			59-139		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	73			69-131		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	65			62-124		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	60			10-162		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	45			24-116		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	71			55-137		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	12			5-112		
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	52			27-126		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	60			48-131		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	67			22-136		

Project Name: FM GLOBAL

Lab Number: L2402269

Project Number: 06100

Report Date: 01/17/24

SAMPLE RESULTS

Lab ID: L2402269-02

Date Collected: 01/12/24 10:40

Client ID: MW-3

Date Received: 01/12/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Extraction Method: ALPHA 23528

Analytical Method: 134,LCMSMS-ID

Extraction Date: 01/13/24 06:25

Analytical Date: 01/15/24 10:06

Analyst: SG

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	4.64		ng/l	2.06	--	1
Perfluoropentanoic Acid (PFPeA)	8.91		ng/l	2.06	--	1
Perfluorobutanesulfonic Acid (PFBS)	4.46		ng/l	2.06	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.06	--	1
Perfluorohexanoic Acid (PFHxA)	37.9		ng/l	2.06	--	1
Perfluoropentanesulfonic Acid (PFPeS)	6.26		ng/l	2.06	--	1
Perfluoroheptanoic Acid (PFHpA)	10.3		ng/l	2.06	--	1
Perfluorohexanesulfonic Acid (PFHxS)	410		ng/l	2.06	--	1
Perfluorooctanoic Acid (PFOA)	48.7		ng/l	2.06	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	2.80		ng/l	2.06	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	5.29		ng/l	2.06	--	1
Perfluorononanoic Acid (PFNA)	2.61		ng/l	2.06	--	1
Perfluorooctanesulfonic Acid (PFOS)	183		ng/l	2.06	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.06	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.06	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.06	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	9.02		ng/l	2.06	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.06	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.06	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.06	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.06	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.06	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.06	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.06	--	1

Project Name: FM GLOBAL

Lab Number: L2402269

Project Number: 06100

Report Date: 01/17/24

SAMPLE RESULTS

Lab ID: L2402269-02

Date Collected: 01/12/24 10:40

Client ID: MW-3

Date Received: 01/12/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Surrogate (Extracted Internal Standard)	% Recovery		Qualifier	Acceptance Criteria		
Perfluoro[13C4]Butanoic Acid (MPFBA)	72			58-132		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	68			62-163		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	92			70-131		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	143		Q	12-142		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	67			57-129		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	70			60-129		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	86			71-134		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	72			62-129		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	101			14-147		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	71			59-139		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	72			69-131		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	65			62-124		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	96			10-162		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	43			24-116		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	68			55-137		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	15			5-112		
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	40			27-126		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	54			48-131		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	60			22-136		

Project Name: FM GLOBAL

Lab Number: L2402269

Project Number: 06100

Report Date: 01/17/24

SAMPLE RESULTS

Lab ID: L2402269-03

Date Collected: 01/12/24 10:50

Client ID: MW-6

Date Received: 01/12/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Extraction Method: ALPHA 23528

Analytical Method: 134,LCMSMS-ID

Extraction Date: 01/13/24 06:25

Analytical Date: 01/15/24 10:23

Analyst: SG

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)	1.85		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)	37.8		ng/l	1.80	--	1
Perfluorooctanoic Acid (PFOA)	3.74		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)	2.68		ng/l	1.80	--	1
Perfluorooctanesulfonic Acid (PFOS)	32.1		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
Perfluorononanesulfonic 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

Project Name: FM GLOBAL

Lab Number: L2402269

Project Number: 06100

Report Date: 01/17/24

SAMPLE RESULTS

Lab ID: L2402269-03

Date Collected: 01/12/24 10:50

Client ID: MW-6

Date Received: 01/12/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Surrogate (Extracted Internal Standard)	% Recovery			Qualifier	Acceptance Criteria	
Perfluoro[13C4]Butanoic Acid (MPFBA)	90				58-132	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	83				62-163	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	86				70-131	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	124				12-142	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	80				57-129	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	86				60-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	91				71-134	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	86				62-129	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	95				14-147	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	82				59-139	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	87				69-131	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	85				62-124	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	89				10-162	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	73				24-116	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	90				55-137	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	34				5-112	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	81				27-126	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	79				48-131	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	91				22-136	

Project Name: FM GLOBAL

Lab Number: L2402269

Project Number: 06100

Report Date: 01/17/24

SAMPLE RESULTS

Lab ID: L2402269-04

Date Collected: 01/12/24 11:00

Client ID: RW-4

Date Received: 01/12/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Extraction Method: ALPHA 23528

Analytical Method: 134,LCMSMS-ID

Extraction Date: 01/13/24 06:25

Analytical Date: 01/15/24 10:40

Analyst: SG

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.90	--	1
Perfluoropentanoic Acid (PFPeA)	3.34		ng/l	1.90	--	1
Perfluorobutanesulfonic Acid (PFBS)	3.16		ng/l	1.90	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.90	--	1
Perfluorohexanoic Acid (PFHxA)	24.4		ng/l	1.90	--	1
Perfluoropentanesulfonic Acid (PFPeS)	4.46		ng/l	1.90	--	1
Perfluoroheptanoic Acid (PFHpA)	5.94		ng/l	1.90	--	1
Perfluorohexanesulfonic Acid (PFHxS)	348		ng/l	1.90	--	1
Perfluorooctanoic Acid (PFOA)	36.3		ng/l	1.90	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.90	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	7.93		ng/l	1.90	--	1
Perfluorononanoic Acid (PFNA)	3.24		ng/l	1.90	--	1
Perfluorooctanesulfonic Acid (PFOS)	847	E	ng/l	1.90	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.90	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.90	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.90	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.90	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.90	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.90	--	1
Perfluorooctanesulfonamide (FOSA)	21.1	F	ng/l	1.90	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.90	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.90	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.90	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.90	--	1

Project Name: FM GLOBAL

Lab Number: L2402269

Project Number: 06100

Report Date: 01/17/24

SAMPLE RESULTS

Lab ID: L2402269-04

Date Collected: 01/12/24 11:00

Client ID: RW-4

Date Received: 01/12/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Surrogate (Extracted Internal Standard)	% Recovery		Qualifier	Acceptance Criteria		
Perfluoro[13C4]Butanoic Acid (MPFBA)	90			58-132		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	85			62-163		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	130			70-131		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	187		Q	12-142		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	84			57-129		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89			60-129		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	114			71-134		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	88			62-129		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	132			14-147		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	85			59-139		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94			69-131		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	85			62-124		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	119			10-162		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	72			24-116		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	92			55-137		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	21			5-112		
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	65			27-126		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	69			48-131		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	50			22-136		

Project Name: FM GLOBAL**Lab Number:** L2402269**Project Number:** 06100**Report Date:** 01/17/24**SAMPLE RESULTS**

Lab ID: L2402269-04 RE

Date Collected: 01/12/24 11:00

Client ID: RW-4

Date Received: 01/12/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Extraction Method: ALPHA 23528

Analytical Method: 134,LCMSMS-ID

Extraction Date: 01/16/24 06:48

Analytical Date: 01/16/24 18:37

Analyst: AC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorooctanesulfonic Acid (PFOS)	917		ng/l	10.0	--	1
Surrogate (Extracted Internal Standard)	% Recovery		Qualifier	Acceptance Criteria		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96			69-131		

Project Name: FM GLOBAL

Lab Number: L2402269

Project Number: 06100

Report Date: 01/17/24

SAMPLE RESULTS

Lab ID: L2402269-05

Date Collected: 01/08/24 08:00

Client ID: TRIP BLANK

Date Received: 01/12/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Extraction Method: ALPHA 23528

Analytical Method: 134,LCMSMS-ID

Extraction Date: 01/13/24 06:25

Analytical Date: 01/15/24 10:56

Analyst: SG

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.70	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	1.70	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.70	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.70	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.70	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.70	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.70	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.70	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.70	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.70	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.70	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.70	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.70	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.70	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.70	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.70	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.70	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.70	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.70	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.70	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.70	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.70	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.70	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.70	--	1

Project Name: FM GLOBAL

Lab Number: L2402269

Project Number: 06100

Report Date: 01/17/24

SAMPLE RESULTS

Lab ID: L2402269-05

Date Collected: 01/08/24 08:00

Client ID: TRIP BLANK

Date Received: 01/12/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	91		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	97		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)	92		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	90		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	91		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	97		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	90		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	86		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	87		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	86		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	86		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)	87		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	38		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	81		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	74		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	61		22-136

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID

Analytical Date: 01/14/24 18:16

Analyst: SG

Extraction Method: ALPHA 23528

Extraction Date: 01/13/24 06:25

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-05 Batch: WG1873854-1					
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	--

Project Name: FM GLOBAL
Project Number: 06100

Lab Number: L2402269
Report Date: 01/17/24

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 01/14/24 18:16
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 01/13/24 06:25

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-05 Batch: WG1873854-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	93		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	100		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	95		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	89		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	90		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	100		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	94		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	79		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	85		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	91		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	89		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	91		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)	90		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	36		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	88		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	81		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	70		22-136

Project Name: FM GLOBAL
Project Number: 06100

Lab Number: L2402269
Report Date: 01/17/24

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 01/16/24 13:05
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 01/16/24 06:48

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 04 Batch: WG1874701-1					
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	--

Project Name: FM GLOBAL
Project Number: 06100

Lab Number: L2402269
Report Date: 01/17/24

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 01/16/24 13:05
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 01/16/24 06:48

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 04 Batch: WG1874701-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	99		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	112		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	87		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	99		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	95		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	100		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	99		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	99		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	97		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	99		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)	116		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	96		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	103		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	59		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	86		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	96		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	91		22-136

Lab Control Sample Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-05 Batch: WG1873854-2								
Perfluorobutanoic Acid (PFBA)	95		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	94		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	96		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	92		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	97		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	81		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	99		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	85		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	98		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	98		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	92		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	96		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	82		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	88		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	104		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	89		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	90		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	91		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	90		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	90		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	90		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	91		-		67-153	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: FM GLOBAL

Lab Number: L2402269

Project Number: 06100

Report Date: 01/17/24

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-05 Batch: WG1873854-2								
Perfluorotridecanoic Acid (PFTTrDA)	100		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	97		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	94				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	100				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	96				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	94				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	88				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	100				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	93				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	87				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	89				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	99				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	92				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	74				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	84				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	89				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	40				5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	86				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	84				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	106				22-136

Lab Control Sample Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 04 Batch: WG1874701-2								
Perfluorobutanoic Acid (PFBA)	104		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	100		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	101		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	116		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	107		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	97		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	106		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	103		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	105		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	116		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	102		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	105		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	105		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	99		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	116		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	104		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	102		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	107		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	119		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	101		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	105		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	109		-		67-153	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 04 Batch: WG1874701-2								
Perfluorotridecanoic Acid (PFTrDA)	101		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	100		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	98				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	112				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	94				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	99				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	95				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	99				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	103				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	100				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	102				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	120				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	98				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	105				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	62				5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	96				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	99				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	100				22-136

Matrix Spike Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

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): 01-05 QC Batch ID: WG1873854-3 QC Sample: L2401487-01 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	5.01	37	40.2	95	-	-	-	-	67-148	-	-	30
Perfluoropentanoic Acid (PFPeA)	ND	37	36.5	95	-	-	-	-	63-161	-	-	30
Perfluorobutanesulfonic Acid (PFBS)	ND	32.9	31.7	96	-	-	-	-	65-157	-	-	30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	34.8	32.7	94	-	-	-	-	37-219	-	-	30
Perfluorohexanoic Acid (PFHxA)	ND	37	37.0	96	-	-	-	-	69-168	-	-	30
Perfluoropentanesulfonic Acid (PFPeS)	ND	34.9	29.7	85	-	-	-	-	52-156	-	-	30
Perfluoroheptanoic Acid (PFHpA)	ND	37	37.3	97	-	-	-	-	58-159	-	-	30
Perfluorohexanesulfonic Acid (PFHxS)	ND	33.9	29.4	87	-	-	-	-	69-177	-	-	30
Perfluorooctanoic Acid (PFOA)	6.20	37	41.6	96	-	-	-	-	63-159	-	-	30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	35.3	33.9	96	-	-	-	-	49-187	-	-	30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	35.3	35.6	101	-	-	-	-	61-179	-	-	30
Perfluorononanoic Acid (PFNA)	2.61	37	38.6	97	-	-	-	-	68-171	-	-	30
Perfluorooctanesulfonic Acid (PFOS)	ND	34.4	29.0	84	-	-	-	-	52-151	-	-	30
Perfluorodecanoic Acid (PFDA)	3.33	37	35.4	87	-	-	-	-	63-171	-	-	30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	35.6	32.4	91	-	-	-	-	56-173	-	-	30
Perfluorononanesulfonic Acid (PFNS)	ND	35.6	30.0	84	-	-	-	-	48-150	-	-	30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	37	34.6	93	-	-	-	-	60-166	-	-	30
Perfluoroundecanoic Acid (PFUnA)	ND	37	36.2	93	-	-	-	-	60-153	-	-	30
Perfluorodecanesulfonic Acid (PFDS)	ND	35.8	32.0	89	-	-	-	-	38-156	-	-	30
Perfluorooctanesulfonamide (FOSA)	ND	37	35.7	96	-	-	-	-	46-170	-	-	30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	37	33.4	90	-	-	-	-	45-170	-	-	30
Perfluorododecanoic Acid (PFDoA)	ND	37	35.3	91	-	-	-	-	67-153	-	-	30

Matrix Spike Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

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): 01-05 QC Batch ID: WG1873854-3 QC Sample: L2401487-01 Client ID: MS Sample												
Perfluorotridecanoic Acid (PFTrDA)	ND	37	36.7	96		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	37	35.5	92		-	-		59-182	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	Qualifier	MSD % Recovery	Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	84				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	92				12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	85				14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	83				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	75				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)	87				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	90				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	93				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	80				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	98				22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	91				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	96				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	35				5-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	85				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	92				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	90				70-131

Matrix Spike Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

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): 04 QC Batch ID: WG1874701-3 QC Sample: L2401961-01 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	ND	39.1	38.5	98		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	ND	39.1	36.9	94		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	ND	34.7	32.0	92		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	36.7	36.2	99		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	ND	39.1	39.2	100		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	36.8	33.2	90		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	ND	39.1	38.2	98		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	35.7	34.5	97		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	ND	39.1	38.0	97		-	-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	37.2	41.4	111		-	-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	37.3	38.5	103		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	ND	39.1	39.4	101		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	ND	36.3	35.8	99		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	ND	39.1	38.1	98		-	-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	37.5	38.7	103		-	-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	37.6	38.1	101		-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	39.1	37.0	95		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	39.1	38.8	99		-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	37.8	39.6	105		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	ND	39.1	36.4	93		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	39.1	41.5	106		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	39.1	41.4	106		-	-		67-153	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

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): 04 QC Batch ID: WG1874701-3 QC Sample: L2401961-01 Client ID: MS Sample												
Perfluorotridecanoic Acid (PFTrDA)	ND	39.1	38.8	99		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	39.1	39.9	102		-	-		59-182	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	381	412	108		-	-		57-162	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	37	36.8	100		-	-		69-143	-		30
Perfluorohexadecanoic Acid (PFHxDA)	ND	39.1	39.7	102		-	-		40-167	-		30
Perfluorooctadecanoic Acid (PFODA)	ND	39.1	16.9	43		-	-		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)	103				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	80				12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	89				14-147
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	134				10-165
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	93				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	107				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	95				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	92				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	89				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	88				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	96				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	88				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	86				22-136
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	85				10-206

Matrix Spike Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

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): 04 QC Batch ID: WG1874701-3 QC Sample: L2401961-01 Client ID: MS Sample												

Surrogate (Extracted Internal Standard)	MS		MSD		Acceptance Criteria
	% Recovery	Qualifier	% Recovery	Qualifier	
Perfluoro[13C4]Butanoic Acid (MPFBA)	91				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	117				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	36				5-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	93				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	91				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	96				70-131

Lab Duplicate Analysis Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-05 QC Batch ID: WG1873854-4 QC Sample: L2401487-02 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	5.30	5.30	ng/l	0		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)	1.98	ND	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	6.10	6.06	ng/l	1		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)	2.44	2.14	ng/l	13		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: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-05 QC Batch ID: WG1873854-4 QC Sample: L2401487-02 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 (PFTrDA)	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)	93		95		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	98		101		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	81		99		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	80		96		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	89		94		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	87		95		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	89		105		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	91		96		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	72		88		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	89		90		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	79		91		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	87		88		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	86		83		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	80		76		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	87		94		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	35		40		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	84		86		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	83		86		48-131

Lab Duplicate Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-05 QC Batch ID: WG1873854-4 QC Sample: L2401487-02 Client ID: DUP Sample						

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	105		104		22-136

Lab Duplicate Analysis Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 04 QC Batch ID: WG1874701-4 QC Sample: L2401961-02 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: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 04 QC Batch ID: WG1874701-4 QC Sample: L2401961-02 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 (PFTrDA)	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)	92		94		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	115		126		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	99		96		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	79		74		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	86		94		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	90		94		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101		98		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	94		98		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	87		93		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	95		96		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98		98		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	97		95		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	102		102		10-162

Lab Duplicate Analysis Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2402269

Report Date: 01/17/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 04 QC Batch ID: WG1874701-4 QC Sample: L2401961-02 Client ID: DUP Sample						

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	105		110		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	104		97		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	39		33		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	98		97		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	95		84		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	96		58		22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	157		170	Q	10-165
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	89		59		10-206

Project Name: FM GLOBAL
Project Number: 06100

Serial_No:01172412:33
Lab Number: L2402269
Report Date: 01/17/24

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(*)
L2402269-01A	Plastic 250ml unpreserved	A	NA		12.1	Y	Absent		A2-537-ISOTOPE(28)
L2402269-01B	Plastic 250ml unpreserved	A	NA		12.1	Y	Absent		A2-537-ISOTOPE(28)
L2402269-02A	Plastic 250ml unpreserved	A	NA		12.1	Y	Absent		A2-537-ISOTOPE(28)
L2402269-02B	Plastic 250ml unpreserved	A	NA		12.1	Y	Absent		A2-537-ISOTOPE(28)
L2402269-03A	Plastic 250ml unpreserved	A	NA		12.1	Y	Absent		A2-537-ISOTOPE(28)
L2402269-03B	Plastic 250ml unpreserved	A	NA		12.1	Y	Absent		A2-537-ISOTOPE(28)
L2402269-04A	Plastic 250ml unpreserved	A	NA		12.1	Y	Absent		A2-537-ISOTOPE(28)
L2402269-04B	Plastic 250ml unpreserved	A	NA		12.1	Y	Absent		A2-537-ISOTOPE(28)
L2402269-05A	Plastic 250ml unpreserved	A	NA		12.1	Y	Absent		A2-537-ISOTOPE(28)

Project Name: FM GLOBAL

Project Number: 06100

Serial_No:01172412:33
Lab Number: L2402269

Report Date: 01/17/24

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/PFTeDA	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/PFDoS	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
Perfluoropropanesulfonic Acid	PFPrS	423-41-6
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/PFOSA	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-Chloroeicosafluoro-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	PFEEA	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: FM GLOBAL
Project Number: 06100

Serial_No:01172412:33
Lab Number: L2402269
Report Date: 01/17/24

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
FLUOROTELOMER CARBOXYLIC ACIDS (FTCAs)		
3-Perfluoroheptyl Propanoic Acid	7:3FTCA	812-70-4
2H,2H,3H,3H-Perfluorooctanoic Acid	5:3FTCA	914637-49-3
3-Perfluoropropyl Propanoic Acid	3:3FTCA	356-02-5

Project Name: FM GLOBAL**Lab Number:** L2402269**Project Number:** 06100**Report Date:** 01/17/24

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: FM GLOBAL
Project Number: 06100

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Report Date: 01/17/24

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.

Chlordane: 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.)

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'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

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.

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.

Report Format: Data Usability Report



Project Name: FM GLOBAL
Project Number: 06100

Lab Number: L2402269
Report Date: 01/17/24

Data Qualifiers

- 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 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: FM GLOBAL
Project Number: 06100

Lab Number: L2402269
Report Date: 01/17/24

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.



Alpha Analytical, Inc.Facility: **Company-wide**Department: **Quality Assurance**Title: **Certificate/Approval Program Summary**ID No.: **17873**

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Published Date: 6/16/2023 4:52:28 PM

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Certification Information**The following analytes are not included in our Primary NELAP Scope of Accreditation:****Westborough Facility****EPA 624.1:** m/p-xylene, o-xylene, Naphthalene**EPA 625.1:** alpha-Terpineol**EPA 8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 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 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, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B****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, **LACHAT 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).**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.

Attachment B

Laboratory Report dated March 6, 2024



ANALYTICAL REPORT

Lab Number:	L2409745
Client:	Geosphere Environmental Mgmt, Inc 51 Portsmouth Avenue Exeter, NH 03833
ATTN:	Lauren Kaehler
Phone:	(603) 773-0075
Project Name:	FM GLOBAL
Project Number:	06100
Report Date:	03/06/24

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-0825), DoD (L2474), FL (E87814), IL (200081), IN (C-MA-04), KY (KY98046), LA (85084), ME (MA00030), MD (350), MI (99110), NJ (MA015), NY (11627), NC (685), OH (CL106), OR (MA-0262), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #525-23-107-88708), 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: FM GLOBAL
Project Number: 06100

Lab Number: L2409745
Report Date: 03/06/24

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2409745-01	MW-6	WATER	RI	02/22/24 12:20	02/22/24
L2409745-02	RW-4	WATER	RI	02/22/24 12:30	02/22/24
L2409745-03	MW-3	WATER	RI	02/22/24 12:40	02/22/24
L2409745-04	MW-1	WATER	RI	02/22/24 13:00	02/22/24
L2409745-05	TRIP BLANK	WATER	RI	02/22/24 00:00	02/22/24

Project Name: FM GLOBAL
Project Number: 06100

Lab Number: L2409745
Report Date: 03/06/24

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: FM GLOBAL
Project Number: 06100

Lab Number: L2409745
Report Date: 03/06/24

Case Narrative (continued)

Sample Receipt

The samples were received via Alpha Courier in a cooler with ice; however, the ice was melted and the samples were above the required temperature range. Per client authorization of the exceedance, all requested analyses were performed.

Perfluorinated Alkyl Acids by Isotope Dilution

L2409745-01: The sample was re-extracted on dilution in order to quantitate the results within the calibration range. The result(s) should be considered estimated, and are qualified with an E flag, for any compound(s) that exceeded the calibration range in the initial analysis. The re-extraction was performed only for the compound(s) that exceeded the calibration range.

L2409745-02: The sample was re-extracted on dilution in order to quantitate the results within the calibration range. The result(s) should be considered estimated, and are qualified with an E flag, for any compound(s) that exceeded the calibration range in the initial analysis. The re-extraction was performed only for the compound(s) that exceeded the calibration range.

L2409745-01: The PFHXS and PFOS result is not reported because the quadratic fit of the curve does not allow for an estimated "E" flagged value. The sample was re-extracted on dilution and the result within the calibration curve is reported for this compound.

L2409745-02R: The sample was re-analyzed due to QC failures in the original analysis. The results of the re-analysis are reported.

L2409745-01, -03, -04, WG1889966-3, and WG1889966-4: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

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:



Ashley Boucher

Title: Technical Director/Representative

Date: 03/06/24

ORGANICS

SEMIVOLATILES

Project Name: FM GLOBAL**Lab Number:** L2409745**Project Number:** 06100**Report Date:** 03/06/24**SAMPLE RESULTS**

Lab ID: L2409745-01

Date Collected: 02/22/24 12:20

Client ID: MW-6

Date Received: 02/22/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Extraction Method: ALPHA 23528

Analytical Method: 134,LCMSMS-ID

Extraction Date: 02/27/24 23:50

Analytical Date: 02/28/24 17:34

Analyst: PS

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	65.6		ng/l	1.75	--	1
Perfluoropentanoic Acid (PFPeA)	172		ng/l	1.75	--	1
Perfluorobutanesulfonic Acid (PFBS)	65.8		ng/l	1.75	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.75	--	1
Perfluorohexanoic Acid (PFHxA)	1090	E	ng/l	1.75	--	1
Perfluoropentanesulfonic Acid (PFPeS)	92.6		ng/l	1.75	--	1
Perfluoroheptanoic Acid (PFHpA)	168		ng/l	1.75	--	1
Perfluorooctanoic Acid (PFOA)	940	E	ng/l	1.75	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.75	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	302		ng/l	1.75	--	1
Perfluorononanoic Acid (PFNA)	11.2		ng/l	1.75	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.75	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.75	--	1
Perfluorononanesulfonic Acid (PFNS)	1.87		ng/l	1.75	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	6.24	F	ng/l	1.75	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.75	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.75	--	1
Perfluorooctanesulfonamide (FOSA)	158		ng/l	1.75	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.75	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.75	--	1
Perfluorotridecanoic Acid (PFTriDA)	ND		ng/l	1.75	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.75	--	1

Project Name: FM GLOBAL

Lab Number: L2409745

Project Number: 06100

Report Date: 03/06/24

SAMPLE RESULTS

Lab ID: L2409745-01

Date Collected: 02/22/24 12:20

Client ID: MW-6

Date Received: 02/22/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Surrogate (Extracted Internal Standard)	% Recovery			Qualifier	Acceptance Criteria	
Perfluoro[13C4]Butanoic Acid (MPFBA)	77				58-132	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	75				62-163	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	201			Q	70-131	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	198			Q	12-142	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	70				57-129	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89				60-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	140			Q	71-134	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	82				62-129	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	178			Q	14-147	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	102				59-139	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	89				69-131	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	83				62-124	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	256			Q	10-162	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	97				24-116	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	95				55-137	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	43				5-112	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	107				27-126	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	95				48-131	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	91				22-136	

Project Name: FM GLOBAL**Lab Number:** L2409745**Project Number:** 06100**Report Date:** 03/06/24**SAMPLE RESULTS**

Lab ID: L2409745-01 RE2

Date Collected: 02/22/24 12:20

Client ID: MW-6

Date Received: 02/22/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Extraction Method: ALPHA 23528

Analytical Method: 134,LCMSMS-ID

Extraction Date: 03/02/24 09:08

Analytical Date: 03/02/24 17:48

Analyst: SG

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorohexanoic Acid (PFHxA)	1200		ng/l	50.0	--	1
Perfluorohexanesulfonic Acid (PFHxS)	2270		ng/l	50.0	--	1
Perfluorooctanoic Acid (PFOA)	989		ng/l	50.0	--	1
Perfluorooctanesulfonic Acid (PFOS)	8260		ng/l	50.0	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	101		57-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	107		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	93		62-129
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	87		69-131

Project Name: FM GLOBAL**Lab Number:** L2409745**Project Number:** 06100**Report Date:** 03/06/24**SAMPLE RESULTS**

Lab ID: L2409745-02 RE

Date Collected: 02/22/24 12:30

Client ID: RW-4

Date Received: 02/22/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Extraction Method: ALPHA 23528

Analytical Method: 134,LCMSMS-ID

Extraction Date: 02/29/24 05:50

Analytical Date: 02/29/24 18:05

Analyst: PS

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorooctanesulfonic Acid (PFOS)	926		ng/l	20.0	--	1
Surrogate (Extracted Internal Standard)	% Recovery		Qualifier	Acceptance Criteria		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	104			69-131		

Project Name: FM GLOBAL**Lab Number:** L2409745**Project Number:** 06100**Report Date:** 03/06/24**SAMPLE RESULTS**

Lab ID: L2409745-02 R

Date Collected: 02/22/24 12:30

Client ID: RW-4

Date Received: 02/22/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Extraction Method: ALPHA 23528

Analytical Method: 134,LCMSMS-ID

Extraction Date: 02/27/24 23:50

Analytical Date: 02/28/24 20:57

Analyst: PS

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	2.96		ng/l	1.90	--	1
Perfluoropentanoic Acid (PFPeA)	6.95		ng/l	1.90	--	1
Perfluorobutanesulfonic Acid (PFBS)	3.78		ng/l	1.90	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.90	--	1
Perfluorohexanoic Acid (PFHxA)	37.8		ng/l	1.90	--	1
Perfluoropentanesulfonic Acid (PFPeS)	4.55		ng/l	1.90	--	1
Perfluoroheptanoic Acid (PFHpA)	7.46		ng/l	1.90	--	1
Perfluorohexanesulfonic Acid (PFHxS)	420		ng/l	1.90	--	1
Perfluorooctanoic Acid (PFOA)	48.1		ng/l	1.90	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.90	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	11.6		ng/l	1.90	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.90	--	1
Perfluorooctanesulfonic Acid (PFOS)	1310	E	ng/l	1.90	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.90	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.90	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.90	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.90	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.90	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.90	--	1
Perfluorooctanesulfonamide (FOSA)	22.2		ng/l	1.90	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.90	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.90	--	1
Perfluorotridecanoic Acid (PFTrDA)	3.18	F	ng/l	1.90	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.90	--	1

Project Name: FM GLOBAL

Lab Number: L2409745

Project Number: 06100

Report Date: 03/06/24

SAMPLE RESULTS

Lab ID: L2409745-02 R

Date Collected: 02/22/24 12:30

Client ID: RW-4

Date Received: 02/22/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	81		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	79		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	92		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	100		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	69		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	68		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	95		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	96		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	84		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	80		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	77		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	103		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	91		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	85		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	33		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	94		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	71		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	53		22-136

Project Name: FM GLOBAL

Lab Number: L2409745

Project Number: 06100

Report Date: 03/06/24

SAMPLE RESULTS

Lab ID: L2409745-03

Date Collected: 02/22/24 12:40

Client ID: MW-3

Date Received: 02/22/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Extraction Method: ALPHA 23528

Analytical Method: 134,LCMSMS-ID

Extraction Date: 02/27/24 23:50

Analytical Date: 02/28/24 18:07

Analyst: PS

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	4.83		ng/l	1.91	--	1
Perfluoropentanoic Acid (PFPeA)	9.60		ng/l	1.91	--	1
Perfluorobutanesulfonic Acid (PFBS)	5.41		ng/l	1.91	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.91	--	1
Perfluorohexanoic Acid (PFHxA)	45.0		ng/l	1.91	--	1
Perfluoropentanesulfonic Acid (PFPeS)	5.94		ng/l	1.91	--	1
Perfluoroheptanoic Acid (PFHpA)	10.5		ng/l	1.91	--	1
Perfluorohexanesulfonic Acid (PFHxS)	324		ng/l	1.91	--	1
Perfluorooctanoic Acid (PFOA)	44.2		ng/l	1.91	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	3.32		ng/l	1.91	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	4.01		ng/l	1.91	--	1
Perfluorononanoic Acid (PFNA)	2.32		ng/l	1.91	--	1
Perfluorooctanesulfonic Acid (PFOS)	210		ng/l	1.91	--	1
Perfluorodecanoic Acid (PFDA)	2.18	F	ng/l	1.91	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.91	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.91	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	47.8		ng/l	1.91	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.91	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.91	--	1
Perfluorooctanesulfonamide (FOSA)	2.82	F	ng/l	1.91	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.91	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.91	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.91	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.91	--	1

Project Name: FM GLOBAL

Lab Number: L2409745

Project Number: 06100

Report Date: 03/06/24

SAMPLE RESULTS

Lab ID: L2409745-03

Date Collected: 02/22/24 12:40

Client ID: MW-3

Date Received: 02/22/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Surrogate (Extracted Internal Standard)	% Recovery		Qualifier	Acceptance Criteria		
Perfluoro[13C4]Butanoic Acid (MPFBA)	90			58-132		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	69			62-163		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	65		Q	70-131		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	78			12-142		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	71			57-129		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	74			60-129		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	83			71-134		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	88			62-129		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	75			14-147		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	94			59-139		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	79			69-131		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	81			62-124		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	85			10-162		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	96			24-116		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	91			55-137		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	35			5-112		
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	100			27-126		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	88			48-131		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	82			22-136		

Project Name: FM GLOBAL

Lab Number: L2409745

Project Number: 06100

Report Date: 03/06/24

SAMPLE RESULTS

Lab ID: L2409745-04

Date Collected: 02/22/24 13:00

Client ID: MW-1

Date Received: 02/22/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Extraction Method: ALPHA 23528

Analytical Method: 134,LCMSMS-ID

Extraction Date: 02/27/24 23:50

Analytical Date: 02/28/24 18:40

Analyst: PS

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	3.57		ng/l	1.87	--	1
Perfluoropentanoic Acid (PFPeA)	6.94		ng/l	1.87	--	1
Perfluorobutanesulfonic Acid (PFBS)	4.42		ng/l	1.87	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.87	--	1
Perfluorohexanoic Acid (PFHxA)	30.5		ng/l	1.87	--	1
Perfluoropentanesulfonic Acid (PFPeS)	3.72		ng/l	1.87	--	1
Perfluoroheptanoic Acid (PFHpA)	6.13		ng/l	1.87	--	1
Perfluorohexanesulfonic Acid (PFHxS)	294		ng/l	1.87	--	1
Perfluorooctanoic Acid (PFOA)	27.2		ng/l	1.87	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.87	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.87	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.87	--	1
Perfluorooctanesulfonic Acid (PFOS)	6.02		ng/l	1.87	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.87	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.87	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.87	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.87	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.87	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.87	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.87	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.87	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.87	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.87	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.87	--	1

Project Name: FM GLOBAL

Lab Number: L2409745

Project Number: 06100

Report Date: 03/06/24

SAMPLE RESULTS

Lab ID: L2409745-04

Date Collected: 02/22/24 13:00

Client ID: MW-1

Date Received: 02/22/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Surrogate (Extracted Internal Standard)	% Recovery		Qualifier	Acceptance Criteria		
Perfluoro[13C4]Butanoic Acid (MPFBA)	86			58-132		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	75			62-163		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	59		Q	70-131		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	69			12-142		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	64			57-129		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	70			60-129		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	71			71-134		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	85			62-129		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	79			14-147		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	94			59-139		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	86			69-131		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	80			62-124		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	84			10-162		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	84			24-116		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	85			55-137		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	9			5-112		
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	84			27-126		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	82			48-131		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	85			22-136		

Project Name: FM GLOBAL**Lab Number:** L2409745**Project Number:** 06100**Report Date:** 03/06/24**SAMPLE RESULTS**

Lab ID: L2409745-05

Date Collected: 02/22/24 00:00

Client ID: TRIP BLANK

Date Received: 02/22/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Extraction Method: ALPHA 23528

Analytical Method: 134,LCMSMS-ID

Extraction Date: 02/27/24 23:50

Analytical Date: 02/28/24 19:13

Analyst: PS

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.87	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	1.87	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.87	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.87	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.87	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.87	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.87	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.87	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.87	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.87	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.87	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.87	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.87	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.87	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.87	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.87	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.87	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.87	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.87	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.87	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.87	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.87	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.87	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.87	--	1

Project Name: FM GLOBAL

Lab Number: L2409745

Project Number: 06100

Report Date: 03/06/24

SAMPLE RESULTS

Lab ID: L2409745-05

Date Collected: 02/22/24 00:00

Client ID: TRIP BLANK

Date Received: 02/22/24

Sample Location: RI

Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Surrogate (Extracted Internal Standard)	% Recovery		Qualifier	Acceptance Criteria		
Perfluoro[13C4]Butanoic Acid (MPFBA)	76			58-132		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	89			62-163		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	76			70-131		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	54			12-142		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	73			57-129		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	69			60-129		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	81			71-134		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	73			62-129		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	60			14-147		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	75			59-139		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	77			69-131		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	70			62-124		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	72			10-162		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	83			24-116		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	79			55-137		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	56			5-112		
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	92			27-126		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	70			48-131		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	57			22-136		

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID

Analytical Date: 02/28/24 16:26

Analyst: PS

Extraction Method: ALPHA 23528

Extraction Date: 02/27/24 23:50

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-05 Batch: WG1889966-1					
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	--

Project Name: FM GLOBAL
Project Number: 06100

Lab Number: L2409745
Report Date: 03/06/24

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 02/28/24 16:26
Analyst: PS

Extraction Method: ALPHA 23528
Extraction Date: 02/27/24 23:50

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-05 Batch: WG1889966-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	109		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	117		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	109		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	82		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	108		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	101		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	117		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	107		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	90		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	106		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	111		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	103		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	116		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	88		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	111		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	74		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	124		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	103		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	95		22-136

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID

Analytical Date: 02/29/24 12:52

Analyst: PS

Extraction Method: ALPHA 23528

Extraction Date: 02/29/24 05:50

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 02 Batch: WG1890516-1					
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	--

Project Name: FM GLOBAL
Project Number: 06100

Lab Number: L2409745
Report Date: 03/06/24

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 02/29/24 12:52
Analyst: PS

Extraction Method: ALPHA 23528
Extraction Date: 02/29/24 05:50

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 02 Batch: WG1890516-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	109		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	121		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	89		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	111		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	103		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	113		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	112		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	83		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	118		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	105		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	110		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	108		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	103		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	122		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	74		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	114		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	116		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	102		22-136

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID

Analytical Date: 03/02/24 17:15

Analyst: SG

Extraction Method: ALPHA 23528

Extraction Date: 03/02/24 09:08

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01 Batch: WG1891426-1					
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	--

Project Name: FM GLOBAL
Project Number: 06100

Lab Number: L2409745
Report Date: 03/06/24

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 03/02/24 17:15
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 03/02/24 09:08

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01 Batch: WG1891426-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	97		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	98		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	67		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	106		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	97		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	102		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	99		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	63		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)	92		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	64		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	86		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	103		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	52		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	95		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	101		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	89		22-136

Lab Control Sample Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-05 Batch: WG1889966-2								
Perfluorobutanoic Acid (PFBA)	104		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	101		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	108		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	98		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	106		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	94		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	104		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	96		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	106		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	105		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	112		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	109		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	96		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	105		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	112		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	92		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	106		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	101		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	92		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	93		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	85		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	98		-		67-153	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-05 Batch: WG1889966-2								
Perfluorotridecanoic Acid (PFTTrDA)	130		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	94		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	92				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	95				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	92				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	79				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	85				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	102				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	89				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	85				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	89				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	88				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	95				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	96				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	95				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	66				5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	117				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	103				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	85				22-136

Lab Control Sample Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 Batch: WG1890516-2								
Perfluorobutanoic Acid (PFBA)	98		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	96		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	99		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	95		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	98		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	93		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	97		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	90		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	94		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	98		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	101		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	102		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	87		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	94		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	102		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	82		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	99		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	93		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	91		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	89		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	85		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	88		-		67-153	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 Batch: WG1890516-2								
Perfluorotridecanoic Acid (PFTrDA)	111		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	94		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	105				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	118				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	96				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	109				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)	106				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	92				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	108				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	107				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	105				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	100				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	114				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	63				5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	123				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	112				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	105				22-136

Lab Control Sample Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

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 Batch: WG1891426-2								
Perfluorobutanoic Acid (PFBA)	104		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	100		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	105		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	102		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	106		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	101		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	104		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	98		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	102		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	107		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	111		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	110		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	100		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	102		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	120		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	91		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	104		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	98		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	93		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	96		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	93		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	96		-		67-153	-		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01 Batch: WG1891426-2								
Perfluorotridecanoic Acid (PFTrDA)	119		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	100		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	94				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	92				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	99				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	70				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	99				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	91				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	98				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	94				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	71				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	91				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	92				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	65				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	83				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	95				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	50				5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	87				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	108				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	92				22-136

Matrix Spike Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

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): 01-05 QC Batch ID: WG1889966-3 QC Sample: L2409745-03 Client ID: MW-3												
Perfluorobutanoic Acid (PFBA)	4.83	40.8	48.0	106	-	-	-	-	67-148	-	-	30
Perfluoropentanoic Acid (PFPeA)	9.60	40.8	50.0	99	-	-	-	-	63-161	-	-	30
Perfluorobutanesulfonic Acid (PFBS)	5.41	36.3	44.2	107	-	-	-	-	65-157	-	-	30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	38.3	35.8	94	-	-	-	-	37-219	-	-	30
Perfluorohexanoic Acid (PFHxA)	45.0	40.8	85.9	100	-	-	-	-	69-168	-	-	30
Perfluoropentanesulfonic Acid (PFPeS)	5.94	38.5	41.6	93	-	-	-	-	52-156	-	-	30
Perfluoroheptanoic Acid (PFHpA)	10.5	40.8	51.5	100	-	-	-	-	58-159	-	-	30
Perfluorohexanesulfonic Acid (PFHxS)	324	37.3	381	153	-	-	-	-	69-177	-	-	30
Perfluorooctanoic Acid (PFOA)	44.2	40.8	87.6	106	-	-	-	-	63-159	-	-	30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	3.32	38.9	45.7	109	-	-	-	-	49-187	-	-	30
Perfluoroheptanesulfonic Acid (PFHpS)	4.01	39	52.1	123	-	-	-	-	61-179	-	-	30
Perfluorononanoic Acid (PFNA)	2.32	40.8	48.1	112	-	-	-	-	68-171	-	-	30
Perfluorooctanesulfonic Acid (PFOS)	210	37.9	243	87	-	-	-	-	52-151	-	-	30
Perfluorodecanoic Acid (PFDA)	2.18F	40.8	44.2	103	-	-	-	-	63-171	-	-	30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	39.2	39.9	102	-	-	-	-	56-173	-	-	30
Perfluorononanesulfonic Acid (PFNS)	ND	39.3	40.8	104	-	-	-	-	48-150	-	-	30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	47.8	40.8	99.4	126	-	-	-	-	60-166	-	-	30
Perfluoroundecanoic Acid (PFUnA)	ND	40.8	43.0	105	-	-	-	-	60-153	-	-	30
Perfluorodecanesulfonic Acid (PFDS)	ND	39.4	44.1	112	-	-	-	-	38-156	-	-	30
Perfluorooctanesulfonamide (FOSA)	2.82F	40.8	39.9	91	-	-	-	-	46-170	-	-	30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	40.8	40.2	98	-	-	-	-	45-170	-	-	30
Perfluorododecanoic Acid (PFDoA)	ND	40.8	40.3	99	-	-	-	-	67-153	-	-	30

Matrix Spike Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

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): 01-05 QC Batch ID: WG1889966-3 QC Sample: L2409745-03 Client ID: MW-3												
Perfluorotridecanoic Acid (PFTrDA)	ND	40.8	51.8	127		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	40.8	40.0	98		-	-		59-182	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	Qualifier	MSD % Recovery	Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	82				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	81				12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	73				14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	82				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	80				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	78				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	70				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	64				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	69				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	76				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	79				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	81				22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	78				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	64				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	51				5-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	75				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	76				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	80				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	68	Q			70-131

Matrix Spike Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

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): 02 QC Batch ID: WG1890516-3 QC Sample: L2410685-02 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	ND	38.5	36.9	94	-	-	-	-	67-148	-	-	30
Perfluoropentanoic Acid (PFPeA)	2.23	38.5	38.4	94	-	-	-	-	63-161	-	-	30
Perfluorobutanesulfonic Acid (PFBS)	ND	34.2	35.0	101	-	-	-	-	65-157	-	-	30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	36.1	33.8	94	-	-	-	-	37-219	-	-	30
Perfluorohexanoic Acid (PFHxA)	ND	38.5	39.5	100	-	-	-	-	69-168	-	-	30
Perfluoropentanesulfonic Acid (PFPeS)	ND	36.3	31.3	86	-	-	-	-	52-156	-	-	30
Perfluoroheptanoic Acid (PFHpA)	ND	38.5	38.9	100	-	-	-	-	58-159	-	-	30
Perfluorohexanesulfonic Acid (PFHxS)	ND	35.2	31.5	90	-	-	-	-	69-177	-	-	30
Perfluorooctanoic Acid (PFOA)	ND	38.5	38.2	98	-	-	-	-	63-159	-	-	30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	36.7	38.2	104	-	-	-	-	49-187	-	-	30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	36.7	43.9	119	-	-	-	-	61-179	-	-	30
Perfluorononanoic Acid (PFNA)	ND	38.5	40.0	104	-	-	-	-	68-171	-	-	30
Perfluorooctanesulfonic Acid (PFOS)	ND	35.7	34.5	96	-	-	-	-	52-151	-	-	30
Perfluorodecanoic Acid (PFDA)	ND	38.5	41.8	109	-	-	-	-	63-171	-	-	30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	37	42.3	114	-	-	-	-	56-173	-	-	30
Perfluorononanesulfonic Acid (PFNS)	ND	37	31.7	86	-	-	-	-	48-150	-	-	30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	38.5	43.2	112	-	-	-	-	60-166	-	-	30
Perfluoroundecanoic Acid (PFUnA)	ND	38.5	39.8	103	-	-	-	-	60-153	-	-	30
Perfluorodecanesulfonic Acid (PFDS)	ND	37.2	34.1	92	-	-	-	-	38-156	-	-	30
Perfluorooctanesulfonamide (FOSA)	ND	38.5	37.1	96	-	-	-	-	46-170	-	-	30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	38.5	35.9	93	-	-	-	-	45-170	-	-	30
Perfluorododecanoic Acid (PFDoA)	ND	38.5	37.8	98	-	-	-	-	67-153	-	-	30

Matrix Spike Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

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): 02 QC Batch ID: WG1890516-3 QC Sample: L2410685-02 Client ID: MS Sample												
Perfluorotridecanoic Acid (PFTrDA)	ND	38.5	47.0	122		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	38.5	39.1	102		-	-		59-182	-		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)	73				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	77				12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	80				14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	83				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	77				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	78				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	78				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	87				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	83				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	109				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	83				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	86				22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	86				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	91				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	36				5-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	86				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	94				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	98				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	95				70-131

Matrix Spike Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

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 QC Batch ID: WG1891426-3 QC Sample: L2410762-01 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	ND	37.2	38.7	104	-	-	-	-	67-148	-	-	30
Perfluoropentanoic Acid (PFPeA)	ND	37.2	37.5	101	-	-	-	-	63-161	-	-	30
Perfluorobutanesulfonic Acid (PFBS)	ND	33	35.2	107	-	-	-	-	65-157	-	-	30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	34.9	35.1	101	-	-	-	-	37-219	-	-	30
Perfluorohexanoic Acid (PFHxA)	ND	37.2	39.9	107	-	-	-	-	69-168	-	-	30
Perfluoropentanesulfonic Acid (PFPeS)	ND	35	33.4	95	-	-	-	-	52-156	-	-	30
Perfluoroheptanoic Acid (PFHpA)	ND	37.2	39.8	107	-	-	-	-	58-159	-	-	30
Perfluorohexanesulfonic Acid (PFHxS)	ND	34	32.0	94	-	-	-	-	69-177	-	-	30
Perfluorooctanoic Acid (PFOA)	ND	37.2	37.8	102	-	-	-	-	63-159	-	-	30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	35.4	39.7	112	-	-	-	-	49-187	-	-	30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	35.5	41.2	116	-	-	-	-	61-179	-	-	30
Perfluorononanoic Acid (PFNA)	ND	37.2	41.7	112	-	-	-	-	68-171	-	-	30
Perfluorooctanesulfonic Acid (PFOS)	ND	34.5	36.2	105	-	-	-	-	52-151	-	-	30
Perfluorodecanoic Acid (PFDA)	ND	37.2	39.2	105	-	-	-	-	63-171	-	-	30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	35.7	38.3	107	-	-	-	-	56-173	-	-	30
Perfluorononanesulfonic Acid (PFNS)	ND	35.8	33.8	94	-	-	-	-	48-150	-	-	30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	37.2	38.8	104	-	-	-	-	60-166	-	-	30
Perfluoroundecanoic Acid (PFUnA)	ND	37.2	38.6	104	-	-	-	-	60-153	-	-	30
Perfluorodecanesulfonic Acid (PFDS)	ND	35.9	35.0	97	-	-	-	-	38-156	-	-	30
Perfluorooctanesulfonamide (FOSA)	ND	37.2	36.6F	98	-	-	-	-	46-170	-	-	30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	37.2	35.4	95	-	-	-	-	45-170	-	-	30
Perfluorododecanoic Acid (PFDoA)	ND	37.2	36.9	99	-	-	-	-	67-153	-	-	30

Matrix Spike Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

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 QC Batch ID: WG1891426-3 QC Sample: L2410762-01 Client ID: MS Sample												
Perfluorotridecanoic Acid (PFTrDA)	ND	37.2	46.5	125		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	37.2	38.3	103		-	-		59-182	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	362	328	90		-	-		57-162	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	35.2	36.2	103		-	-		69-143	-		30
Perfluorohexadecanoic Acid (PFHxDA)	ND	37.2	37.1	100		-	-		40-167	-		30
Perfluorooctadecanoic Acid (PFODA)	ND	37.2	17.3	46		-	-		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)	67				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	62				12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	63				14-147
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	146				10-165
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	88				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	85				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	89				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	91				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	93				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	87				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	97				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	102				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	84				22-136
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	90				10-206

Matrix Spike Analysis

Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

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 QC Batch ID: WG1891426-3 QC Sample: L2410762-01 Client ID: MS Sample												

Surrogate (Extracted Internal Standard)	MS		MSD		Acceptance Criteria
	% Recovery	Qualifier	% Recovery	Qualifier	
Perfluoro[13C4]Butanoic Acid (MPFBA)	87				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	92				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	15				5-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	85				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	91				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	84				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	94				70-131

Lab Duplicate Analysis Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-05 QC Batch ID: WG1889966-4 QC Sample: L2409745-04 Client ID: MW-1						
Perfluorobutanoic Acid (PFBA)	3.57	3.01	ng/l	17		30
Perfluoropentanoic Acid (PFPeA)	6.94	6.38	ng/l	8		30
Perfluorobutanesulfonic Acid (PFBS)	4.42	4.10	ng/l	8		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	30.5	28.9	ng/l	5		30
Perfluoropentanesulfonic Acid (PFPeS)	3.72	4.08	ng/l	9		30
Perfluoroheptanoic Acid (PFHpA)	6.13	5.91	ng/l	4		30
Perfluorohexanesulfonic Acid (PFHxS)	294	273	ng/l	7		30
Perfluorooctanoic Acid (PFOA)	27.2	25.9	ng/l	5		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)	6.02	6.45	ng/l	7		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: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-05 QC Batch ID: WG1889966-4 QC Sample: L2409745-04 Client ID: MW-1						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	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)	86		77		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	75		75		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	59	Q	61	Q	70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	69		76		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	64		56	Q	57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	70		60		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	71		75		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	85		73		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	79		79		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	94		80		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	86		75		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	80		69		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	84		72		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	84		84		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	85		81		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	9		2	Q	5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	84		91		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	82		82		48-131

Project Name: FM GLOBAL

Project Number: 06100

Lab Duplicate Analysis

Batch Quality Control

Lab Number: L2409745

Report Date: 03/06/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-05 QC Batch ID: WG1889966-4 QC Sample: L2409745-04 Client ID: MW-1						

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	85		84		22-136

Lab Duplicate Analysis Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 QC Batch ID: WG1890516-4 QC Sample: L2410828-02 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	4.80	4.80	ng/l	0		30
Perfluoropentanoic Acid (PFPeA)	7.65	7.63	ng/l	0		30
Perfluorobutanesulfonic Acid (PFBS)	24.1	23.4	ng/l	3		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	6.46	6.70	ng/l	4		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	6.22	5.96	ng/l	4		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	15.6	15.1	ng/l	3		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)	2.13	2.33	ng/l	9		30
Perfluorooctanesulfonic Acid (PFOS)	2.53	2.77	ng/l	9		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: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 QC Batch ID: WG1890516-4 QC Sample: L2410828-02 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 (PFTrDA)	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)	78		74		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	77		71		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	71		68	Q	70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	83		92		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	64		57		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	67		64		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	89		88		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81		77		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	88		97		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88		85		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	93		91		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	84		79		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	108		121		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	82		75		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	92		86		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	22		28		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	73		79		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	92		89		48-131

Project Name: FM GLOBAL

Project Number: 06100

Lab Duplicate Analysis

Batch Quality Control

Lab Number: L2409745

Report Date: 03/06/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 QC Batch ID: WG1890516-4 QC Sample: L2410828-02 Client ID: DUP Sample						

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	86		81		22-136

Lab Duplicate Analysis Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1891426-4 QC Sample: L2411010-01 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	6.12	5.71	ng/l	7		30
Perfluoropentanoic Acid (PFPeA)	2.29	2.03	ng/l	12		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: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1891426-4 QC Sample: L2411010-01 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 (PFTrDA)	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)	95		93		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	48	Q	49	Q	62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	59	Q	59	Q	70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	77		78		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	63		62		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	75		72		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	77		75		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	96		95		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	83		82		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	101		96		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	90		83		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	89		80		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	88		75		10-162

Lab Duplicate Analysis Batch Quality Control

Project Name: FM GLOBAL

Project Number: 06100

Lab Number: L2409745

Report Date: 03/06/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1891426-4 QC Sample: L2411010-01 Client ID: DUP Sample						

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	96		85		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	96		88		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	37		25		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	98		89		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	90		96		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	100		86		22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	112		115		10-165
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	112		98		10-206

Project Name: FM GLOBAL
Project Number: 06100

Serial_No:03062410:50
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Report Date: 03/06/24

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(*)
L2409745-01A	Plastic 250ml unpreserved	A	NA		9.9	Y	Absent		A2-537-ISOTOPE(28)
L2409745-01B	Plastic 250ml unpreserved	A	NA		9.9	Y	Absent		A2-537-ISOTOPE(28)
L2409745-02A	Plastic 250ml unpreserved	A	NA		9.9	Y	Absent		A2-537-ISOTOPE(28)
L2409745-02B	Plastic 250ml unpreserved	A	NA		9.9	Y	Absent		A2-537-ISOTOPE(28)
L2409745-03A	Plastic 250ml unpreserved	A	NA		9.9	Y	Absent		A2-537-ISOTOPE(28)
L2409745-03B	Plastic 250ml unpreserved	A	NA		9.9	Y	Absent		A2-537-ISOTOPE(28)
L2409745-04A	Plastic 250ml unpreserved	A	NA		9.9	Y	Absent		A2-537-ISOTOPE(28)
L2409745-04B	Plastic 250ml unpreserved	A	NA		9.9	Y	Absent		A2-537-ISOTOPE(28)
L2409745-05A	Plastic 250ml unpreserved/H2O fill	A	NA		9.9	Y	Absent		A2-537-ISOTOPE(28)

Project Name: FM GLOBAL

Project Number: 06100

Serial_No:03062410:50
Lab Number: L2409745

Report Date: 03/06/24

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/PFTeDA	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/PFDoS	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
Perfluoropropanesulfonic Acid	PFPrS	423-41-6
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/PFOSA	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-Chloroeicosafluoro-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	PFEEA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonfluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name: FM GLOBAL
Project Number: 06100

Serial_No:03062410:50
Lab Number: L2409745
Report Date: 03/06/24

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
FLUOROTELOMER CARBOXYLIC ACIDS (FTCAs)		
3-Perfluoroheptyl Propanoic Acid	7:3FTCA	812-70-4
2H,2H,3H,3H-Perfluorooctanoic Acid	5:3FTCA	914637-49-3
3-Perfluoropropyl Propanoic Acid	3:3FTCA	356-02-5

Project Name: FM GLOBAL**Lab Number:** L2409745**Project Number:** 06100**Report Date:** 03/06/24

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: FM GLOBAL
Project Number: 06100

Lab Number: L2409745
Report Date: 03/06/24

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.

Chlordane: 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.)

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'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

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.

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.

Report Format: Data Usability Report



Project Name: FM GLOBAL
Project Number: 06100

Lab Number: L2409745
Report Date: 03/06/24

Data Qualifiers

- 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 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: FM GLOBAL
Project Number: 06100

Lab Number: L2409745
Report Date: 03/06/24

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.



Alpha Analytical, Inc.

ID No.:17873

Facility: **Company-wide**

Revision 20

Department: **Quality Assurance**

Published Date: 6/16/2023 4:52:28 PM

Title: **Certificate/Approval Program Summary**

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Certification Information

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

Westborough Facility**EPA 624.1:** m/p-xylene, o-xylene, Naphthalene**EPA 625.1:** alpha-Terpineol**EPA 8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 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 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, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B****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, **LACHAT 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).**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

PAGE _____ OF _____

Date Rec'd in Lab: 2/22/24

ALPHA Job #: L2409745

8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

Project Information

Project Name: FM Global

Project Location: RI

Project #: 06100

Project Manager: Lauren Kaehler

ALPHA Quote #: 24985

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

Client Information

Client: Geosphere Environmental Management
Address: 572

Address: 57 Portsmouth Ave.
Exeter, NH 03833

Phone: (518) 612-9898

Email: l.kahler@giosphere.nh.com

Additional Project Information:

Bill to:
FM Global
Attn: Accounts Payable Dept.
Po Box 91660
Johnston, RI 02919

[illegible]

Container Type

P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative

A = None
B = HCl
C = HNO₃
D = H₂SO₄
E = NaOH
F = MeOH
G = NaHSO₄
H = Na₂S₂O₃
I = Ascorbic Acid
J = NH₄Cl
K = Zn Acetate
O = Other

Container Type

Preservative

Relinquished By:

Date/Time

Received By:

Date/Time

Wm. W. H. R. R.

21221241457

Received By: Julia Com

2122145

H. Puri

1640

H. levi

1500

7500
2/22/04 11:11

All samples submitted are subject to Alpha's Terms and Conditions.
See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)