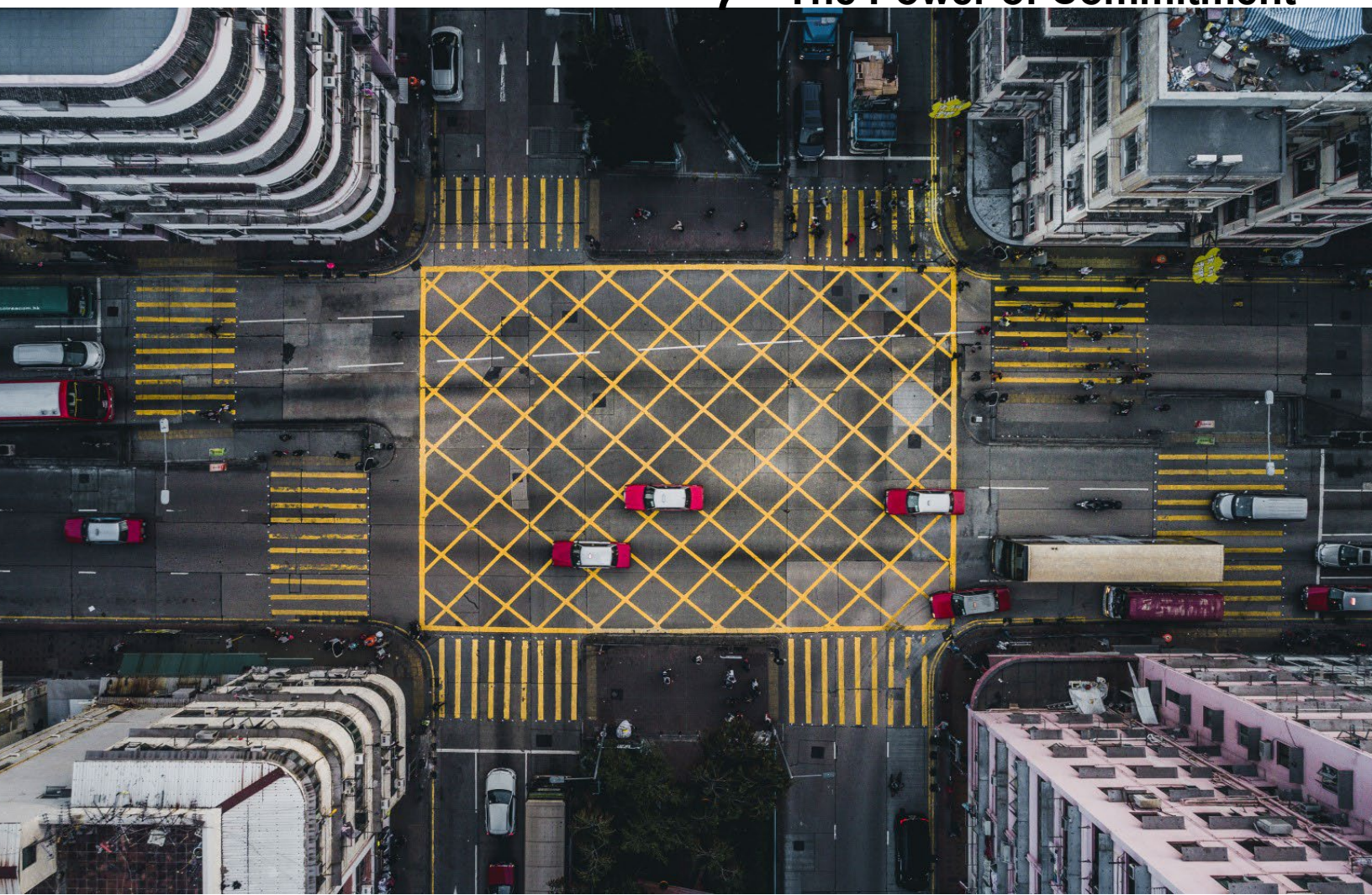
2024 PFAS Results Summary

RACER Nodular Facility – Saginaw, Michigan

RACER Trust, MID 041 793 340

10 April 2025

→ The Power of Commitment



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Contents

Table index

Figure index

Appendices

1. Introduction

This Report was prepared by GHD Services, Inc. (GHD) for Revitalizing Auto Communities Environmental Response Trust (RACER) to summarize the results of the 2024 Per- and Polyfluoroalkyl Substances (PFAS) sampling at the Former Nodular Industrial Land (Site) in Saginaw, Michigan (Figure 1.1).

Resource Conservation and Recovery Act (RCRA) Corrective Action at the Site has been performed consistent with the Administrative Order on Consent (RCRA 05 2011 0023) (AOC) between RACER and the United States Environmental Protection Agency (U.S. EPA). The AOC was executed by RACER and U.S. EPA on September 29, 2011. Approximate limits of RACER property and land subject to the requirements of RCRA Corrective Action are provided on Figure 1.2.

This sampling was conducted in response to U.S. EPA's request for additional sampling of PFAS at the Site and in accordance with the approved 2024 PFAS Sampling and Analysis Plan (SAP).

1.1 Request for PFAS Sampling

In an email dated February 4, 2021, U.S. EPA requested RACER sample and analyze groundwater for PFAS and 1,4-dioxane. In response to the request, GHD, on behalf of RACER submitted a response to comments document on March 18, 2021 identifying that data for 1,1,1-trichloroethane (1,1,1-TCA) can be used to determine whether future investigation of 1,4-dioxane may be necessary. The evaluation concluded that available data for the Site did not identify a significant source of 1,1,1-TCA or other chlorinated constituents that can co-occur with 1,4-dioxane, and as such additional evaluation and investigation of 1,4-dioxane is unnecessary. In the same response to comments document, RACER committed to evaluating known or potential uses/sources of PFAS at the Site.

On April 28, 2021, GHD, on behalf of RACER, prepared and submitted a memorandum that presented "Potential Uses of Per- and Polyfluoroalkyl Substances (PFAS)" at the Site. The memorandum concluded that there is no known or suspected release of PFAS containing material to the environment that warrants investigation as part of RCRA Corrective Action. At that time (2021), RACER's position was that PFAS was not regulated by U.S. EPA as a hazardous waste, constituent, or substance, and therefore did not believe it was appropriate to expend funds to sample and analyze for PFAS at the Site.

On February 8, 2022, U.S. EPA presented RACER's proposed remedy for the Site to the Michigan Department of Environment, Great Lakes, and Energy's (EGLE's) Remediation Advisory Team. Out of the review, one of EGLE's requests was for RACER to evaluate groundwater for PFAS. In their November 14, 2022 letter, U.S. EPA also asked that RACER sample for PFAS at this Site.

After several communications with U.S. EPA in 2021 and 2022, and pursuant to U.S. EPA's November 14, 2022 letter, RACER agreed to sample groundwater for PFAS in order to allow for developing a path forward for U.S. EPA's remedy selection process. In addition, in the spirit of cooperation and to advance the RCRA Corrective action process, RACER agreed to sample for 1,4-dioxane.

1.2 2023 PFAS and 1,4-Dioxane Initial Site Screening

In 2023, RACER conducted sampling of 7 on-Site monitoring wells in accordance with the Scope of Work to Complete PFAS and 1,4 Dioxane Sampling dated June 13, 2023 (GHD, 2023A). The select on-Site monitoring wells included: MW-04438R, MW-04336, MW-05038, MW-05443, and MW-05452 which are on the downgradient property boundary; and MW-05036R and MW-8R which are in an area of former Plant operations. Results were presented in the PFAS Initial Site Screening Report dated November 6, 2023 (GHD, 2023B). No PFAS were detected above EGLE Residential Drinking Water criteria at the Site. PFOS was detected at and just above EGLE GSI Criteria in MW-05038, located over 1,350 feet from the Saginaw River. 1,4-dioxane was not detected above EGLE Residential Drinking Water or GSI Criteria at the Site.

1.3 2024 PFAS Sampling

On July 31, 2024, U.S. EPA provided comments on the Draft CMP, which included general comments requesting additional sampling for PFAS at the Site. On October 20, 2024, RACER provided a response to these general comments, and these responses were discussed in a meeting between RACER and U.S. EPA on November 13, 2024 in which the U.S. EPA agreed that sampling for 1,4-dioxane was not required. As requested by U.S. EPA, a 2024 PFAS SAP was submitted on December 3, 2024 and approved by U.S. EPA on December 6, 2024 (Appendix A).

2. Sampling Events

2.1 Sampling Activities

In accordance with the 2024 PFAS SAP dated December 3, 2024, work was conducted between December 18 and 19, 2024 and included the collection of groundwater samples from 7 existing well locations (MW-04336, MW-04438R, MW-05036R, MW-05038, MW-05452, MW-8R, and MW-06445). The wells were previously sampled as part of the initial PFAS Site screening and/or CMP monitoring and did not require redevelopment, with the exception of MW-06445, which had not been sampled in recent years and therefore was redeveloped prior to sampling. MW-06445 was included in the 2024 PFAS SAP as an upgradient location to identify potential upgradient off-Site sources of PFAS. MW-05443 was not included in the 2024 PFAS SAP as no exceedances were noted at this location during the initial PFAS Site Screening.

New high-density polyethylene (HDPE) tubing was used in each well for sampling. Groundwater samples were collected using standard low-flow procedures. Pumps utilized for the sampling did not contain Teflon, low-density polyethylene (LDPE), or Viton components. PFAS-specific sampling procedures presented in the 2024 PFAS SAP were followed. The sampling procedures are intended to prevent cross-contamination of samples by PFAS. The sampling approach is consistent with U.S. EPA's Region 5 Analytical Services Branch PFAS Sampling Fact Sheet.

The Quality Assurance/Quality Control (QA/QC) samples collected included one field blank, one field duplicate sample, one matrix spike/matrix spike duplicate (MS/MSD), one rinsate sample (equipment blank), and one trip blank.

2.2 Analysis

The groundwater samples were analyzed for PFAS by Eurofins Cleveland located in Barberton, Ohio. However, just prior to field activities, it was identified that the laboratory had discontinued EPA 537 modified, which was identified in the 2024 PFAS SAP, so the 2024 samples were analyzed using EPA Method 1633, which is appropriate for non-potable groundwater.

The analytical report is presented in Appendix B.

2.3 Validation

Laboratory QA/QC included method blanks, isotope dilution analyte recoveries, laboratory control samples, and MS/MSD analyses. The analytical results for the 2024 PFAS event were validated and determined to be acceptable with qualifications, which are described in the final Data Validation Memorandum, provided in Appendix C.

3. Results

3.1 Screening Levels

In accordance with the 2024 PFAS SAP, the groundwater results were compared to the August 2020 Michigan EGLE Drinking Water Maximum Contaminant Levels (MCLs), the October 2023 Michigan EGLE Part 201 Groundwater-Surface Water Interface (GSI) Criteria, and the April 2024 final National Primary Drinking Water Regulation (NPDWR) MCLs. Quantities are listed in nanograms per litre (ng/L) which is equivalent to parts per trillion (ppt).

3.2 Results and Discussion

The 2024 analytical results are presented in Table 3.1 and Figure 3.1.

The 2024 PFAS results are generally consistent with the 2023 results presented in the November 2023 PFAS Initial Site Screening Report. The 2024 samples reported concentrations of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) slightly above EGLE and NPDWR MCLs. Specifically:

– Two locations (MW-04336 and MW-04438R) had PFOA detections above EGLE's MCL of 8 ng/L with concentrations of 8.5/8.4 ng/L (field duplicate) and 8.5 ng/L, respectively.
– Five locations (MW-04336, MW-04438R, MW-05036R, MW-05038, and MW-05452) had PFOA detections above the NPDWR MCL of 4 ng/L with concentrations ranging from and 5.9 to 8.4 ng/L.
– Four locations (MW-8R, MW-05036R, MW-05038, and MW-05452) had PFOS detections above the NPDWR MCL of 4 ng/L with concentrations ranging from and 4.7 to 11 ng/L.

No samples exceeded EGLE Part 201 GSI Criteria.

No samples exceeded the NPDWR hazard index of 1.

4. Conclusions and Recommendations

The PFAS concentrations at the Site have remained consistent with no noticeable upward trend, and the 2024 samples did not detect concentrations of PFAS above GSI criteria. Several 2024 samples contained concentrations of PFOA and PFOS above drinking water MCLs.

It is recommended that these minor detections be managed by the existing Declaration of Restrictive Covenant (DRC), which includes provisions prohibiting installation of water wells and use of groundwater. In addition, the Corrective Measures Proposal (CMP) is being updated and will propose revising the existing DRC; this revision will still include a provision prohibiting installation of groundwater wells and use of groundwater. No further sampling for PFAS is recommended.

Tables

Table 3.1

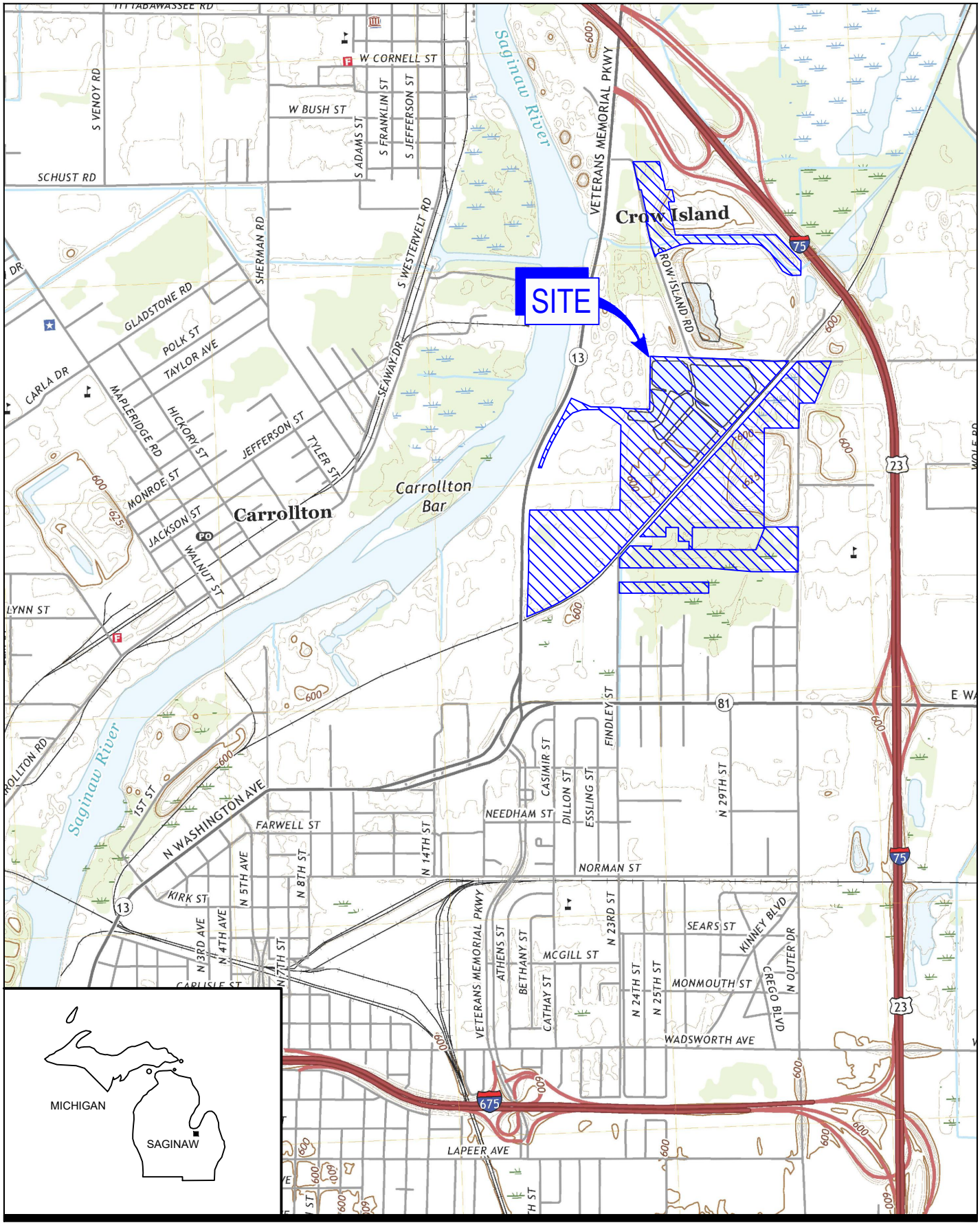
2024 PFAS Analytical Results
RACER Nodular Industrial Land
Saginaw, MI

Sample Location:					MW-8R	MW-04336	MW-04336	MW-04438R	MW-05036R	MW-05038	MW-05452	MW-06445
Sample ID:					GW-11208041-121824-BW-005	GW-11208041-121824-BW-009	GW-11208041-121824-BW-010	GW-11208041-121824-BW-007	GW-11208041-121824-BW-008	GW-11208041-121824-BW-006	GW-11208041-121924-BW-013	GW-11208041-121924-BW-012
Sample Date:		EGLE MCL	EGLE GSI	EPA MCL	12/18/2024	12/18/2024	12/18/2024 (Duplicate)	12/18/2024	12/18/2024	12/18/2024	12/19/2024	12/19/2024
Parameters	**Units**											
PFAS		a	b	c								
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ng/L	-	-	-	1.6 U	1.8 U	1.9 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluoro-3-(trifluoromethoxy)propoxy]-propanoic acid (DONA)	ng/L	-	-	-	1.6 U	1.8 U	1.9 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	ng/L	-	-	-	1.6 U	1.8 U	1.9 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Fluorotelomer sulfonic acid (4:2)	ng/L	-	-	-	3.1 U	3.5 U	3.7 U	3.2 U	3.2 U	3.5 U	3.2 U	3.3 U
Fluorotelomer sulfonic acid (6:2)	ng/L	-	-	-	3.1 U	3.5 U	3.7 U	3.2 U	3.2 U	3.5 U	3.2 U	3.3 U
Fluorotelomer sulfonic acid (8:2)	ng/L	-	-	-	3.1 U	3.5 U	3.7 U	3.2 U	3.2 U	3.5 U	3.2 U	3.3 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ng/L	370	-	10	1.2 U	1.3 U	1.4 U	1.2 U	1.2 U	1.3 U	1.2 U	1.2 U
N-Ethyl perfluorooctane sulfonamido acetic acid (N-EtFOSAA)	ng/L	-	-	-	1.6 U	1.8 U	1.9 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
N-Methyl perfluorooctane sulfonamido acetic acid	ng/L	-	-	-	1.6 U	1.8 U	1.9 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Perfluorobutane sulfonic acid (PFBS)	ng/L	420	670000	-	0.87 J	1.6 J	1.6 J	2.7	1.4 J	0.92 J	0.75 J	0.49 J
Perfluorobutanoic acid (PFBA)	ng/L	-	-	-	4.4	28	28	17	6.5	9.1	4.6	8.3
Perfluorodecanesulfonic acid (PFDS)	ng/L	-	-	-	1.6 U	1.8 U	1.9 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Perfluorodecanoic acid (PFDA)	ng/L	-	-	-	1.6 U	1.8 U	1.9 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Perfluorododecanoic acid (PFDoDA)	ng/L	-	-	-	1.6 U	1.8 U	1.9 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Perfluoroheptane sulfonic acid (PFHpS)	ng/L	-	-	-	1.6 U	1.8 U	1.9 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Perfluoroheptanoic acid (PFHpA)	ng/L	-	-	-	0.75 J	2.9	3.0	2.7	1.8	0.93 J	0.77 J	0.47 J
Perfluorohexane sulfonic acid (PFHxS)	ng/L	51	210	10	1.1 J	2.0	2.0	1.6 U	1.1 J	1.0 J	0.78 J	0.45 J
Perfluorohexanoic acid (PFHxA)	ng/L	400000	-	-	3.2	5.0	4.6	2.4	1.8	2.6	1.6 U	1.6 U
Perfluorononane sulfonic acid (PFNS)	ng/L	-	-	-	1.6 U	1.8 U	1.9 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Perfluorononanoic acid (PFNA)	ng/L	6	30	10	1.0 J	1.8 U	1.9 U	0.48 J	0.91 J	1.7 U	0.83 J	0.52 J
Perfluorooctane sulfonamide (FOSA)	ng/L	-	-	-	1.6 U	1.8 U	1.9 U	1.6 U	0.74 J	1.7 U	0.40 J	0.86 J
Perfluorooctane sulfonic acid (PFOS)	ng/L	16	12	4	**5.3[c]**	2.6	2.7	0.57 J	**4.7[c]**	**11[c]**	**4.7[c]**	4.0
Perfluorooctanoic acid (PFOA)	ng/L	8	170	4	4.0	**8.5[ac]**	**8.4[ac]**	**8.5[ac]**	**5.4[c]**	**5.9[c]**	**5.7[c]**	2.4
Perfluoropentane sulfonic acid (PFPeS)	ng/L	-	-	-	1.6 U	0.51 J	0.61 J	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Perfluoropentanoic acid (PFPeA)	ng/L	-	-	-	0.87 J	4.2	4.3	1.5 J	1.2 J	1.1 J	1.2 J	1.1 J
Perfluorotetradecanoic acid (PFTeDA)	ng/L	-	-	-	1.6 U	1.8 U	1.9 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Perfluorotridecanoic acid (PFTrDA)	ng/L	-	-	-	1.6 U	1.8 U	1.9 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
Perfluoroundecanoic acid (PFUnA)	ng/L	-	-	-	1.6 U	1.8 U	1.9 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U
EPA PFAS Hazard Index - April 2024	none	-	-	1	0.210	0.201	0.201	0.0494	0.202	0.100	0.161	0.0972

Notes:

ng/L	Nanograms per Liter
U	Not detected at the associated reporting limit.
J	Estimated concentration.
5.3[c]	Boxed cell denotes exceedance of cleanup criteria screening level identified by superscript.
a	EGLE Drinking Water Maximum Contaminant Levels (MCLs) (08/03/2020)
b	EGLE Part 201 Groundwater-Surface Water Interface (GSI) Criteria (10/12/2023)
c	U.S. EPA National Primary Drinking Water Regulation (NPDWR) MCLs (4/10/2024)

Figures



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Plot Date: 10 March 2025 4:26 PM

Data Source: USGS QUADRANGLE MAP; SAGINAW, MI; 2019

LEGEND

APPROXIMATE LIMITS OF RACER PROPERTY AND LAND SUBJECT TO THE REQUIREMENTS OF RCRA CORRECTIVE ACTION

REGULATED WETLAND (PER WETLAND DELINEATION COMPLETED BY NISWANDER ENVIRONMENTAL [JULY 22, 2015])

0 250 500 1000 ft

Coordinate System: MI83-SF

N

GHD

RACER
SAGINAW NODULAR INDUSTRIAL LAND
SAGINAW, MICHIGAN

RACER PROPERTY

Project No. **11208041**
Date **March 2025**

FIGURE 1.2

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Plot Date: 10 March 2025 4:31 PM

Data Source: Source: U.S. Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP). Acquired 3-Jul-2018.
TOPO - SANBORN, 1996.

MW-05038	7/10/2023	8/18/2023	12/18/2024
PFAS			
EPA PFAS Hazard Index - April 2024	0.130/0.120	0.120	0.100
Hexafluoropropylene oxide dimer acid (HFPO-DA)	3.9 U/3.8 U	3.9 U	1.3 U
Perfluorobutane sulfonic acid (PFBS)	0.69 J/0.84 J	0.80 J	0.92 J
Perfluorohexane sulfonic acid (PFHxS)	1.2 J/1.3 J	1.2 J	1.0 J
Perfluorohexanoic acid (PFHxA)	2.0 U/1.6 J	2.4	2.6
Perfluorononanoic acid (PFNA)	1.9 U/2.0 U	1.9 U	1.7 U
Perfluorooctane sulfonic acid (PFOS)	13 (BC)/13 (BC)	12 (C)	11 (C)
Perfluorooctanoic acid (PFOA)	4.9 (C)/5.2 (C)	5.1 (C)	5.9 (C)

MW-04438R	7/11/2023	12/18/2024
PFAS		
EPA PFAS Hazard Index - April 2024	0.0432	0.0494
Hexafluoropropylene oxide dimer acid (HFPO-DA)	3.9 U	1.2 U
Perfluorobutane sulfonic acid (PFBS)	4.3	2.7
Perfluorohexane sulfonic acid (PFHxS)	1.9 U	1.6 U
Perfluorohexanoic acid (PFHxA)	3.2	2.4
Perfluorononanoic acid (PFNA)	0.41 J	0.48 J
Perfluorooctane sulfonic acid (PFOS)	1.9 U	0.57 J
Perfluorooctanoic acid (PFOA)	5.0 (C)	8.5 (AC)

MW-04336	7/11/2023	12/18/2024
PFAS		
EPA PFAS Hazard Index - April 2024	0.191	0.201/0.201
Hexafluoropropylene oxide dimer acid (HFPO-DA)	3.8 U	1.3 U/1.4 U
Perfluorobutane sulfonic acid (PFBS)	1.2 J	1.6 J/1.6 J
Perfluorohexane sulfonic acid (PFHxS)	1.9	2.0/2.0
Perfluorohexanoic acid (PFHxA)	4.8	5.0/4.6
Perfluorononanoic acid (PFNA)	1.9 U	1.8 U/1.9 U
Perfluorooctane sulfonic acid (PFOS)	1.9 U	2.6/2.7
Perfluorooctanoic acid (PFOA)	6.0 (C)	8.5 (AC)/8.4 (AC)

MW-05452	8/18/2023	12/19/2024
PFAS		
EPA PFAS Hazard Index - April 2024	0.000335	0.161
Hexafluoropropylene oxide dimer acid (HFPO-DA)	4.0 U	1.2 U
Perfluorobutane sulfonic acid (PFBS)	0.67 J	0.75 J
Perfluorohexane sulfonic acid (PFHxS)	2.0 U	0.78 J
Perfluorohexanoic acid (PFHxA)	1.7 J	1.6 U
Perfluorononanoic acid (PFNA)	2.0 U	0.83 J
Perfluorooctane sulfonic acid (PFOS)	4.4 (C)	4.7 (C)
Perfluorooctanoic acid (PFOA)	3.8	5.7 (C)

MW-05443	8/18/2023
PFAS	
EPA PFAS Hazard Index - April 2024	0.00
Hexafluoropropylene oxide dimer acid (HFPO-DA)	3.8 U
Perfluorobutane sulfonic acid (PFBS)	1.9 U
Perfluorohexane sulfonic acid (PFHxS)	1.9 U
Perfluorohexanoic acid (PFHxA)	2.9
Perfluorononanoic acid (PFNA)	1.9 U
Perfluorooctane sulfonic acid (PFOS)	1.9 U
Perfluorooctanoic acid (PFOA)	1.2 J

MW-06445	12/19/2024
PFAS	
EPA PFAS Hazard Index - April 2024	0.0972
Hexafluoropropylene oxide dimer acid (HFPO-DA)	1.2 U
Perfluorobutane sulfonic acid (PFBS)	0.49 J
Perfluorohexane sulfonic acid (PFHxS)	0.45 J
Perfluorohexanoic acid (PFHxA)	1.6 U
Perfluorononanoic acid (PFNA)	0.52 J
Perfluorooctane sulfonic acid (PFOS)	4.0
Perfluorooctanoic acid (PFOA)	2.4

MW-8R	7/10/2023	12/18/2024
PFAS		
EPA PFAS Hazard Index - April 2024	0.227	0.210
Hexafluoropropylene oxide dimer acid (HFPO-DA)	3.8 U	1.2 U
Perfluorobutane sulfonic acid (PFBS)	1.4 J	0.87 J
Perfluorohexane sulfonic acid (PFHxS)	1.4 J	1.1 J
Perfluorohexanoic acid (PFHxA)	1.7 J	3.2
Perfluorononanoic acid (PFNA)	0.86 J	1.0 J
Perfluorooctane sulfonic acid (PFOS)	8.2 (C)	5.3 (C)
Perfluorooctanoic acid (PFOA)	4.8 (C)	4.0

MW-05036R	7/11/2023	12/18/2024
PFAS		
EPA PFAS Hazard Index - April 2024	0.192	0.202
Hexafluoropropylene oxide dimer acid (HFPO-DA)	4.1 U	1.2 U
Perfluorobutane sulfonic acid (PFBS)	3.0	1.4 J
Perfluorohexane sulfonic acid (PFHxS)	1.3 J	1.1 J
Perfluorohexanoic acid (PFHxA)	3.2	1.8
Perfluorononanoic acid (PFNA)	0.60 J	0.91 J
Perfluorooctane sulfonic acid (PFOS)	6.1 (C)	4.7 (C)
Perfluorooctanoic acid (PFOA)	4.4 (C)	5.4 (C)

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- MW-06445 ● MONITORING WELL LOCATION
- MW-05443 ● 2024 PFAS MONITORING LOCATION
- MW-8 ■ ABANDONED MONITORING WELL LOCATION
- APPROXIMATE LOCATION OF FORMER PAINT SPRAY BUILDING AND FORMER NODULAR IRON PLANT WASTE PAINT SHED
- U NOT DETECTED AT THE ASSOCIATED REPORTING LIMIT
- J ESTIMATED CONCENTRATION
- EXCEEDANCE OF SCREENING LEVEL

IDENTIFICATION

MW-8R	7/10/2023	12/18/2024
PFAS		
EPA PFAS Hazard Index - April 2024	0.227	0.210
Hexafluoropropylene oxide dimer acid (HFPO-DA)	3.8 U	1.2 U
Perfluorobutane sulfonic acid (PFBS)	1.4 J	0.87 J
Perfluorohexane sulfonic acid (PFHxS)	1.4 J	1.1 J
Perfluorohexanoic acid (PFHxA)	1.7 J	3.2
Perfluorononanoic acid (PFNA)	0.86 J	1.0 J
Perfluorooctane sulfonic acid (PFOS)	8.2 (C)	5.3 (C)
Perfluorooctanoic acid (PFOA)	4.8 (C)	4.0

RESULT (ng/L)

PARAMETER

Parameter	EGLE MCL a	EGLE GSI b	EPA MCL c	Unit
PFOS	16	12	4	ng/L
PFOA	8	170	4	ng/L
PFNA	6	30	10	ng/L
PFHxS	51	210	10	ng/L
PFHxA	400000	-	-	ng/L
PFBS	420	670000	-	ng/L
HFPO-DA	370	-	10	ng/L
EPA PFAS Hazard Index - April 2024	-	-	1	none

Notes:
U - Not detected at the associated reporting limit.
J - Estimated concentration.
a EGLE Drinking Water Maximum Contaminant Levels (MCLs) (08/03/2020)
b EGLE Part 201 Groundwater-Surface Water Interface (GSI) Criteria (10/12/2023)
c U.S. EPA National Primary Drinking Water Regulation (NPDWR) MCLs (4/10/2024)

KEY MAP

0 150 300 600 ft

Coordinate System: MI83-SF

N

GHD

RACER
SAGINAW NODULAR INDUSTRIAL LAND
SAGINAW, MICHIGAN

2024 PFAS
MONITORING RESULTS

Project No. 11208041
Date March 2025

FIGURE 3.1

Filename: N:\CA\Waterloo\Projects\662\11208041\Digital_Design\ACAD 2020\Figures\RPT007\11208041-GHD-00-00-RPT-EN-D102_DE-007.dwg
Plot Date: 11 March 2025 11:21 AM

Appendices

Appendix A
Approval

REGION 5
CHICAGO, IL 60604

December 6, 2024

Mr. David Favero
Cleanup Manager
RACER Trust
660 Woodward Avenue, Suite 1521
Detroit, Michigan 48226

RE: 2024 PFAS Sampling and Analysis Plan
RACER Nodular Industrial Land Facility
2100 Veterans Memorial Parkway
Saginaw, Michigan
MID 041 793 340

Dear Mr. Favero:

The U.S. Environmental Protection Agency, Region 5 (EPA) has reviewed the 2024 Per- and Polyfluoroalkyl Substances (PFAS) Sampling and Analysis Plan (SAP), prepared by GHD and submitted on December 3, 2024. The SAP proposes additional sampling of groundwater at existing permanent monitoring wells at the Nodular Industrial Land Facility (Site) for PFAS. This deliverable was first requested as a general comment in EPA's response to RACER's draft Corrective Measures Proposal, dated July 31, 2024.

As presented in the SAP, four (4) groundwater monitoring wells positioned downgradient will be sampled, two (2) monitoring wells located within the former plant area of operations will be sampled, and one upgradient well will be sampled, if located.

After review of the SAP, EPA grants approval to proceed with the proposed activities indicated therein. It is expected that sampling collection procedures, laboratory analytical methods, implementation of quality assurance/quality controls, data review and validation, and reporting will be conducted as stated in the SAP. Any deviations in approach must be approved by EPA in writing ahead of execution.

If there are any questions regarding this determination, please contact me at (312) 886-7159 or via email at grossett.william@epa.gov.

Sincerely,

Will Grossett, P.E.
RCRA Hazardous Waste Cleanup Manager
Remediation Branch
Land, Chemicals, and Redevelopment Division

cc: Brendan Mullen, RACER
John-Eric Pardys, GHD
Jessica Gallaway, GHD

Appendix B

Analytical Reports

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Ms. Ruth Mickle
GHD Services Inc.
26850 Haggerty Rd.
Farmington Hills, Michigan 48331

Generated 12/26/2024 10:01:02 AM

JOB DESCRIPTION

11208041, RACER Nodular Iron

JOB NUMBER

240-216986-1

Eurofins Cleveland
180 S. Van Buren Avenue
Barberton OH 44203

See page two for job notes and contact information.

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization

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Authorized for release by
Denise Heckler, Project Manager II
Denise.Heckler@et.eurofinsus.com
(330)966-9477

Table of Contents

Job Narrative
240-216986-1

Receipt
The samples were received on 12/20/2024 8:00 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 3.2°C.

PFAS
Method 1633_Final: The low-level continuing calibration verification (CCVL) associated with batch 240-639658 recovered above the upper control limit for 1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS). The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

Method 1633_Final: Isotope Dilution Analyte (IDA) recovery is above the method recommended limit for the Method Blank (MB) and Low-Level Laboratory Control Sample (LLCS) associated with prep batch 240-639638. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries. The MB is non-detect for associated target analyte(s) and the LLCS is recovering within limits for the associated target analytes(s), therefore, the associated samples are reported. The following samples are affected:GW-11208041-121824-BW-005 (240-216986-1), GW-11208041-121824-BW-006 (240-216986-2), GW-11208041-121824-BW-007 (240-216986-3), GW-11208041-121824-BW-008 (240-216986-4), GW-11208041-121824-BW-009 (240-216986-5), GW-11208041-121824-BW-010 (240-216986-6), GW-11208041-121924-BW-011 (240-216986-7), GW-11208041-121924-BW-012 (240-216986-8), GW-11208041-121924-BW-013 (240-216986-9), GW-11208041-121924-BW-013 (240-216986-9[MS]), GW-11208041-121924-BW-013 (240-216986-9[MSD]), TB-11208041 (240-216986-10) and GW-11208041-121924-BW-014 (240-216986-11).

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

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: 11208041, RACER Nodular Iron

Job ID: 240-216986-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*5+	Isotope dilution analyte is outside acceptance limits, high biased.
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

Glossary

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

Sample Summary

Client: GHD Services Inc.
Job ID: 240-216986-1
Project/Site: 11208041, RACER Nodular Iron

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-216986-1	GW-11208041-121824-BW-005	Water	12/18/24 09:20	12/20/24 08:00
240-216986-2	GW-11208041-121824-BW-006	Water	12/18/24 10:36	12/20/24 08:00
240-216986-3	GW-11208041-121824-BW-007	Water	12/18/24 11:41	12/20/24 08:00
240-216986-4	GW-11208041-121824-BW-008	Water	12/18/24 12:53	12/20/24 08:00
240-216986-5	GW-11208041-121824-BW-009	Water	12/18/24 14:49	12/20/24 08:00
240-216986-6	GW-11208041-121824-BW-010	Water	12/18/24 14:59	12/20/24 08:00
240-216986-7	GW-11208041-121924-BW-011	Water	12/19/24 09:17	12/20/24 08:00
240-216986-8	GW-11208041-121924-BW-012	Water	12/19/24 10:08	12/20/24 08:00
240-216986-9	GW-11208041-121924-BW-013	Water	12/19/24 11:33	12/20/24 08:00
240-216986-10	TB-11208041	Water	12/19/24 00:00	12/20/24 08:00
240-216986-11	GW-11208041-121924-BW-014	Water	12/19/24 11:34	12/20/24 08:00

Detection Summary

Client: GHD Services Inc.
Project/Site: 11208041, RACER Nodular Iron

Job ID: 240-216986-1

Client Sample ID: GW-11208041-121824-BW-005 — Lab Sample ID: 240-216986-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	5.3		1.6	0.39	ng/L	1		1633	Total/NA
Perfluoropentanoic acid (PFPeA)	0.87	J	1.6	0.47	ng/L	1		1633	Total/NA
Perfluorohexanoic acid (PFHxA)	3.2		1.6	0.39	ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	4.0		1.6	0.42	ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	1.6	0.39	ng/L	1		1633	Total/NA
Perfluorobutanoic acid (PFBA)	4.4		3.1	0.78	ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.87	J	1.6	0.39	ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.75	J	1.6	0.40	ng/L	1		1633	Total/NA
Perfluorononanoic acid (PFNA)	1.0	J	1.6	0.39	ng/L	1		1633	Total/NA

Client Sample ID: GW-11208041-121824-BW-006 — Lab Sample ID: 240-216986-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	11		1.7	0.44	ng/L	1		1633	Total/NA
Perfluoropentanoic acid (PFPeA)	1.1	J	1.7	0.52	ng/L	1		1633	Total/NA
Perfluorohexanoic acid (PFHxA)	2.6		1.7	0.44	ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	5.9		1.7	0.47	ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.0	J	1.7	0.44	ng/L	1		1633	Total/NA
Perfluorobutanoic acid (PFBA)	9.1		3.5	0.87	ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.92	J	1.7	0.44	ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.93	J	1.7	0.45	ng/L	1		1633	Total/NA

Client Sample ID: GW-11208041-121824-BW-007 — Lab Sample ID: 240-216986-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	0.57	J	1.6	0.40	ng/L	1		1633	Total/NA
Perfluoropentanoic acid (PFPeA)	1.5	J	1.6	0.49	ng/L	1		1633	Total/NA
Perfluorohexanoic acid (PFHxA)	2.4		1.6	0.40	ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	8.5		1.6	0.44	ng/L	1		1633	Total/NA
Perfluorobutanoic acid (PFBA)	17		3.2	0.81	ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.7		1.6	0.40	ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.7		1.6	0.41	ng/L	1		1633	Total/NA
Perfluorononanoic acid (PFNA)	0.48	J	1.6	0.40	ng/L	1		1633	Total/NA

Client Sample ID: GW-11208041-121824-BW-008 — Lab Sample ID: 240-216986-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	4.7		1.6	0.40	ng/L	1		1633	Total/NA
Perfluoropentanoic acid (PFPeA)	1.2	J	1.6	0.49	ng/L	1		1633	Total/NA
Perfluorohexanoic acid (PFHxA)	1.8		1.6	0.40	ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	5.4		1.6	0.44	ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	1.6	0.40	ng/L	1		1633	Total/NA
Perfluorobutanoic acid (PFBA)	6.5		3.2	0.81	ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.4	J	1.6	0.40	ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.8		1.6	0.41	ng/L	1		1633	Total/NA
Perfluorononanoic acid (PFNA)	0.91	J	1.6	0.40	ng/L	1		1633	Total/NA
Perfluorooctanesulfonamide (PFOSA)	0.74	J	1.6	0.40	ng/L	1		1633	Total/NA

Client Sample ID: GW-11208041-121824-BW-009 — Lab Sample ID: 240-216986-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	2.6		1.8	0.44	ng/L	1		1633	Total/NA
Perfluoropentanoic acid (PFPeA)	4.2		1.8	0.53	ng/L	1		1633	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cleveland

Client Sample ID: GW-11208041-121824-BW-009 (Continued) — Lab Sample ID: 240-216986-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoropentanesulfonic acid (PFPeS)	0.51	J	1.8	0.44	ng/L	1		1633	Total/NA
Perfluorohexanoic acid (PFHxA)	5.0		1.8	0.44	ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	8.5		1.8	0.48	ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.0		1.8	0.44	ng/L	1		1633	Total/NA
Perfluorobutanoic acid (PFBA)	28		3.5	0.89	ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.6	J	1.8	0.44	ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.9		1.8	0.45	ng/L	1		1633	Total/NA

Client Sample ID: GW-11208041-121824-BW-010 — Lab Sample ID: 240-216986-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	2.7		1.9	0.47	ng/L	1		1633	Total/NA
Perfluoropentanoic acid (PFPeA)	4.3		1.9	0.56	ng/L	1		1633	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	0.61	J	1.9	0.47	ng/L	1		1633	Total/NA
Perfluorohexanoic acid (PFHxA)	4.6		1.9	0.47	ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	8.4		1.9	0.50	ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.0		1.9	0.47	ng/L	1		1633	Total/NA
Perfluorobutanoic acid (PFBA)	28		3.7	0.93	ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.6	J	1.9	0.47	ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.0		1.9	0.47	ng/L	1		1633	Total/NA

Client Sample ID: GW-11208041-121924-BW-011 — Lab Sample ID: 240-216986-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.83	J	1.6	0.39	ng/L	1		1633	Total/NA

Client Sample ID: GW-11208041-121924-BW-012 — Lab Sample ID: 240-216986-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	4.0		1.6	0.41	ng/L	1		1633	Total/NA
Perfluoropentanoic acid (PFPeA)	1.1	J	1.6	0.49	ng/L	1		1633	Total/NA
Perfluorohexanoic acid (PFHxA)	1.0	J	1.6	0.41	ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	2.4		1.6	0.44	ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.45	J	1.6	0.41	ng/L	1		1633	Total/NA
Perfluorobutanoic acid (PFBA)	8.3		3.3	0.81	ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.49	J	1.6	0.41	ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.47	J	1.6	0.41	ng/L	1		1633	Total/NA
Perfluorononanoic acid (PFNA)	0.52	J	1.6	0.41	ng/L	1		1633	Total/NA
Perfluorooctanesulfonamide (PFOSA)	0.86	J	1.6	0.41	ng/L	1		1633	Total/NA

Client Sample ID: GW-11208041-121924-BW-013 — Lab Sample ID: 240-216986-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	4.7		1.6	0.40	ng/L	1		1633	Total/NA
Perfluoropentanoic acid (PFPeA)	1.2	J	1.6	0.48	ng/L	1		1633	Total/NA
Perfluorohexanoic acid (PFHxA)	1.5	J	1.6	0.40	ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	5.7		1.6	0.43	ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.78	J	1.6	0.40	ng/L	1		1633	Total/NA
Perfluorobutanoic acid (PFBA)	4.6		3.2	0.79	ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.75	J	1.6	0.40	ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.77	J	1.6	0.41	ng/L	1		1633	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: GW-11208041-121924-BW-013 (Continued)
Lab Sample ID: 240-216986-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.83	J	1.6	0.40	ng/L	1		1633	Total/NA
Perfluorooctanesulfonamide (PFOSA)	0.40	J	1.6	0.40	ng/L	1		1633	Total/NA

Client Sample ID: TB-11208041
Lab Sample ID: 240-216986-10

No Detections.

Client Sample ID: GW-11208041-121924-BW-014
Lab Sample ID: 240-216986-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.94	J	1.9	0.47	ng/L	1		1633	Total/NA

This Detection Summary does not include radiochemical test results.

Method Summary

Client: GHD Services Inc.
Project/Site: 11208041, RACER Nodular Iron

Job ID: 240-216986-1

Method	Method Description	Protocol	Laboratory
1633	Per- and Polyfluoroalkyl Substances by LC/MS/MS	EPA	EET CLE
1633	Solid-Phase Extraction (SPE)	EPA	EET CLE

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

EET CLE = Eurofins Cleveland, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS

Client Sample ID: GW-11208041-121824-BW-005
Date Collected: 12/18/24 09:20
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	1.2	U	1.2	0.36	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluorooctanesulfonic acid (PFOS)	**5.3**		1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluoroundecanoic acid (PFUnA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.6	U	1.6	0.52	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluoropentanoic acid (PFPeA)	**0.87**	**J**	1.6	0.47	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluoropentanesulfonic acid (PFPeS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	3.1	U	3.1	0.81	ng/L		12/20/24 12:01	12/21/24 06:40	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluorohexanoic acid (PFHxA)	**3.2**		1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluorododecanoic acid (PFDoA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluorooctanoic acid (PFOA)	**4.0**		1.6	0.42	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluorodecanoic acid (PFDA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluorodecanesulfonic acid (PFDS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluorohexanesulfonic acid (PFHxS)	**1.1**	**J**	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluorobutanoic acid (PFBA)	**4.4**		3.1	0.78	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluorobutanesulfonic acid (PFBS)	**0.87**	**J**	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluoroheptanoic acid (PFHpA)	**0.75**	**J**	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluoroheptanesulfonic acid (PFHpS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluorononanoic acid (PFNA)	**1.0**	**J**	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluorotetradecanoic acid (PFTeDA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	3.1	U	3.1	0.78	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluorononanesulfonic acid (PFNS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluorotridecanoic acid (PFTrDA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
Perfluorooctanesulfonamide (PFOSA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	3.1	U	3.1	0.90	ng/L		12/20/24 12:01	12/21/24 06:40	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 06:40	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*82.2*		*5 - 130*	*12/20/24 12:01*	*12/21/24 06:40*	*1*
13C5 PFPeA	*74.4*		*40 - 130*	*12/20/24 12:01*	*12/21/24 06:40*	*1*
13C5 PFHxA	*74.9*		*40 - 130*	*12/20/24 12:01*	*12/21/24 06:40*	*1*
13C4 PFHpA	*76.8*		*40 - 130*	*12/20/24 12:01*	*12/21/24 06:40*	*1*
13C3 HFPO-DA	*89.7*		*40 - 130*	*12/20/24 12:01*	*12/21/24 06:40*	*1*
13C8 PFOA	*78.7*		*40 - 130*	*12/20/24 12:01*	*12/21/24 06:40*	*1*
13C9 PFNA	*81.3*		*40 - 130*	*12/20/24 12:01*	*12/21/24 06:40*	*1*
13C6 PFDA	*81.3*		*40 - 130*	*12/20/24 12:01*	*12/21/24 06:40*	*1*
13C7 PFUnA	*84.8*		*30 - 130*	*12/20/24 12:01*	*12/21/24 06:40*	*1*
13C2-PFDoDA	*84.2*		*10 - 130*	*12/20/24 12:01*	*12/21/24 06:40*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Client Sample ID: GW-11208041-121824-BW-005
Date Collected: 12/18/24 09:20
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-1
Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFTeDA	65.1		10 - 130	12/20/24 12:01	12/21/24 06:40	1
13C3 PFBS	83.8		40 - 135	12/20/24 12:01	12/21/24 06:40	1
13C3 PFHxS	83.7		40 - 130	12/20/24 12:01	12/21/24 06:40	1
M2-4:2 FTS	120		40 - 200	12/20/24 12:01	12/21/24 06:40	1
M2-6:2 FTS	80.3		40 - 200	12/20/24 12:01	12/21/24 06:40	1
M2-8:2 FTS	83.6		40 - 300	12/20/24 12:01	12/21/24 06:40	1
13C8 PFOS	75.8		40 - 130	12/20/24 12:01	12/21/24 06:40	1
13C8 PFOSA	64.7		40 - 130	12/20/24 12:01	12/21/24 06:40	1
d5-NEtFOSAA	94.1		25 - 135	12/20/24 12:01	12/21/24 06:40	1
d3-NMeFOSAA	74.8		40 - 170	12/20/24 12:01	12/21/24 06:40	1

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS

Client Sample ID: GW-11208041-121824-BW-006
Date Collected: 12/18/24 10:36
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	1.3	U	1.3	0.40	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluorooctanesulfonic acid (PFOS)	**11**		1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluoroundecanoic acid (PFUnA)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.7	U	1.7	0.59	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluoropentanoic acid (PFPeA)	**1.1**	**J**	1.7	0.52	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluoropentanesulfonic acid (PFPeS)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	3.5	U	3.5	0.90	ng/L		12/20/24 12:01	12/21/24 06:57	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluorohexanoic acid (PFHxA)	**2.6**		1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluorododecanoic acid (PFDoA)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluorooctanoic acid (PFOA)	**5.9**		1.7	0.47	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluorodecanoic acid (PFDA)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluorodecanesulfonic acid (PFDS)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluorohexanesulfonic acid (PFHxS)	**1.0**	**J**	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluorobutanoic acid (PFBA)	**9.1**		3.5	0.87	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluorobutanesulfonic acid (PFBS)	**0.92**	**J**	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluoroheptanoic acid (PFHpA)	**0.93**	**J**	1.7	0.45	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluoroheptanesulfonic acid (PFHpS)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluorononanoic acid (PFNA)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluorotetradecanoic acid (PFTeDA)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	3.5	U	3.5	0.87	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluorononanesulfonic acid (PFNS)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluorotridecanoic acid (PFTrDA)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
Perfluorooctanesulfonamide (PFOSA)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	3.5	U	3.5	1.0	ng/L		12/20/24 12:01	12/21/24 06:57	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.7	U	1.7	0.44	ng/L		12/20/24 12:01	12/21/24 06:57	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*71.2*		*5 - 130*	*12/20/24 12:01*	*12/21/24 06:57*	*1*
13C5 PFPeA	*66.0*		*40 - 130*	*12/20/24 12:01*	*12/21/24 06:57*	*1*
13C5 PFHxA	*64.7*		*40 - 130*	*12/20/24 12:01*	*12/21/24 06:57*	*1*
13C4 PFHpA	*62.5*		*40 - 130*	*12/20/24 12:01*	*12/21/24 06:57*	*1*
13C3 HFPO-DA	*77.6*		*40 - 130*	*12/20/24 12:01*	*12/21/24 06:57*	*1*
13C8 PFOA	*66.0*		*40 - 130*	*12/20/24 12:01*	*12/21/24 06:57*	*1*
13C9 PFNA	*68.5*		*40 - 130*	*12/20/24 12:01*	*12/21/24 06:57*	*1*
13C6 PFDA	*68.2*		*40 - 130*	*12/20/24 12:01*	*12/21/24 06:57*	*1*
13C7 PFUnA	*73.2*		*30 - 130*	*12/20/24 12:01*	*12/21/24 06:57*	*1*
13C2-PFDoDA	*73.1*		*10 - 130*	*12/20/24 12:01*	*12/21/24 06:57*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Client Sample ID: GW-11208041-121824-BW-006
Date Collected: 12/18/24 10:36
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-2
Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFTeDA	57.4		10 - 130	12/20/24 12:01	12/21/24 06:57	1
13C3 PFBS	70.7		40 - 135	12/20/24 12:01	12/21/24 06:57	1
13C3 PFHxS	71.3		40 - 130	12/20/24 12:01	12/21/24 06:57	1
M2-4:2 FTS	89.1		40 - 200	12/20/24 12:01	12/21/24 06:57	1
M2-6:2 FTS	66.9		40 - 200	12/20/24 12:01	12/21/24 06:57	1
M2-8:2 FTS	71.7		40 - 300	12/20/24 12:01	12/21/24 06:57	1
13C8 PFOS	65.3		40 - 130	12/20/24 12:01	12/21/24 06:57	1
13C8 PFOSA	54.6		40 - 130	12/20/24 12:01	12/21/24 06:57	1
d5-NEtFOSAA	88.4		25 - 135	12/20/24 12:01	12/21/24 06:57	1
d3-NMeFOSAA	67.9		40 - 170	12/20/24 12:01	12/21/24 06:57	1

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS

Client Sample ID: GW-11208041-121824-BW-007
Date Collected: 12/18/24 11:41
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	1.2	U	1.2	0.37	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluorooctanesulfonic acid (PFOS)	**0.57**	**J**	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluoroundecanoic acid (PFUnA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.6	U	1.6	0.54	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluoropentanoic acid (PFPeA)	**1.5**	**J**	1.6	0.49	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluoropentanesulfonic acid (PFPeS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	3.2	U	3.2	0.83	ng/L		12/20/24 12:01	12/21/24 07:13	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluorohexanoic acid (PFHxA)	**2.4**		1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluorododecanoic acid (PFDoA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluorooctanoic acid (PFOA)	**8.5**		1.6	0.44	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluorodecanoic acid (PFDA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluorodecanesulfonic acid (PFDS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluorohexanesulfonic acid (PFHxS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluorobutanoic acid (PFBA)	**17**		3.2	0.81	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluorobutanesulfonic acid (PFBS)	**2.7**		1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluoroheptanoic acid (PFHpA)	**2.7**		1.6	0.41	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluoroheptanesulfonic acid (PFHpS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluorononanoic acid (PFNA)	**0.48**	**J**	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluorotetradecanoic acid (PFTeDA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	3.2	U	3.2	0.81	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluorononanesulfonic acid (PFNS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluorotridecanoic acid (PFTrDA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
Perfluorooctanesulfonamide (PFOSA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	3.2	U	3.2	0.93	ng/L		12/20/24 12:01	12/21/24 07:13	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:13	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*76.4*		*5 - 130*	*12/20/24 12:01*	*12/21/24 07:13*	*1*
13C5 PFPeA	*72.0*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:13*	*1*
13C5 PFHxA	*71.5*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:13*	*1*
13C4 PFHpA	*71.1*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:13*	*1*
13C3 HFPO-DA	*82.9*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:13*	*1*
13C8 PFOA	*72.7*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:13*	*1*
13C9 PFNA	*73.8*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:13*	*1*
13C6 PFDA	*70.6*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:13*	*1*
13C7 PFUnA	*69.5*		*30 - 130*	*12/20/24 12:01*	*12/21/24 07:13*	*1*
13C2-PFDoDA	*63.3*		*10 - 130*	*12/20/24 12:01*	*12/21/24 07:13*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Client Sample ID: GW-11208041-121824-BW-007
Date Collected: 12/18/24 11:41
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-3
Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFTeDA	48.2		10 - 130	12/20/24 12:01	12/21/24 07:13	1
13C3 PFBS	81.1		40 - 135	12/20/24 12:01	12/21/24 07:13	1
13C3 PFHxS	82.2		40 - 130	12/20/24 12:01	12/21/24 07:13	1
M2-4:2 FTS	103		40 - 200	12/20/24 12:01	12/21/24 07:13	1
M2-6:2 FTS	80.4		40 - 200	12/20/24 12:01	12/21/24 07:13	1
M2-8:2 FTS	76.0		40 - 300	12/20/24 12:01	12/21/24 07:13	1
13C8 PFOS	72.5		40 - 130	12/20/24 12:01	12/21/24 07:13	1
13C8 PFOSA	61.5		40 - 130	12/20/24 12:01	12/21/24 07:13	1
d5-NEtFOSAA	74.3		25 - 135	12/20/24 12:01	12/21/24 07:13	1
d3-NMeFOSAA	66.3		40 - 170	12/20/24 12:01	12/21/24 07:13	1

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS

Client Sample ID: GW-11208041-121824-BW-008
Date Collected: 12/18/24 12:53
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	1.2	U	1.2	0.37	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluorooctanesulfonic acid (PFOS)	**4.7**		1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluoroundecanoic acid (PFUnA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.6	U	1.6	0.54	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluoropentanoic acid (PFPeA)	**1.2**	**J**	1.6	0.49	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluoropentanesulfonic acid (PFPeS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	3.2	U	3.2	0.83	ng/L		12/20/24 12:01	12/21/24 07:30	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluorohexanoic acid (PFHxA)	**1.8**		1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluorododecanoic acid (PFDoA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluorooctanoic acid (PFOA)	**5.4**		1.6	0.44	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluorodecanoic acid (PFDA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluorodecanesulfonic acid (PFDS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluorohexanesulfonic acid (PFHxS)	**1.1**	**J**	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluorobutanoic acid (PFBA)	**6.5**		3.2	0.81	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluorobutanesulfonic acid (PFBS)	**1.4**	**J**	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluoroheptanoic acid (PFHpA)	**1.8**		1.6	0.41	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluoroheptanesulfonic acid (PFHpS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluorononanoic acid (PFNA)	**0.91**	**J**	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluorotetradecanoic acid (PFTeDA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	3.2	U	3.2	0.81	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluorononanesulfonic acid (PFNS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluorotridecanoic acid (PFTrDA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
Perfluorooctanesulfonamide (PFOSA)	**0.74**	**J**	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	3.2	U	3.2	0.93	ng/L		12/20/24 12:01	12/21/24 07:30	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 07:30	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*74.6*		*5 - 130*	*12/20/24 12:01*	*12/21/24 07:30*	*1*
13C5 PFPeA	*67.1*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:30*	*1*
13C5 PFHxA	*68.2*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:30*	*1*
13C4 PFHpA	*70.2*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:30*	*1*
13C3 HFPO-DA	*80.6*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:30*	*1*
13C8 PFOA	*71.8*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:30*	*1*
13C9 PFNA	*73.3*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:30*	*1*
13C6 PFDA	*75.2*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:30*	*1*
13C7 PFUnA	*82.5*		*30 - 130*	*12/20/24 12:01*	*12/21/24 07:30*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Client Sample ID: GW-11208041-121824-BW-008
Date Collected: 12/18/24 12:53
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-4
Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2-PFDoDA	83.0		10 - 130	12/20/24 12:01	12/21/24 07:30	1
13C2 PFTeDA	66.8		10 - 130	12/20/24 12:01	12/21/24 07:30	1
13C3 PFBS	83.4		40 - 135	12/20/24 12:01	12/21/24 07:30	1
13C3 PFHxS	81.6		40 - 130	12/20/24 12:01	12/21/24 07:30	1
M2-4:2 FTS	66.7		40 - 200	12/20/24 12:01	12/21/24 07:30	1
M2-6:2 FTS	76.0		40 - 200	12/20/24 12:01	12/21/24 07:30	1
M2-8:2 FTS	82.4		40 - 300	12/20/24 12:01	12/21/24 07:30	1
13C8 PFOS	76.4		40 - 130	12/20/24 12:01	12/21/24 07:30	1
13C8 PFOSA	65.3		40 - 130	12/20/24 12:01	12/21/24 07:30	1
d5-NEtFOSAA	96.7		25 - 135	12/20/24 12:01	12/21/24 07:30	1
d3-NMeFOSAA	82.0		40 - 170	12/20/24 12:01	12/21/24 07:30	1

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS

Client Sample ID: GW-11208041-121824-BW-009
Date Collected: 12/18/24 14:49
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	1.3	U	1.3	0.41	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluorooctanesulfonic acid (PFOS)	**2.6**		1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluoroundecanoic acid (PFUnA)	1.8	U	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.8	U	1.8	0.59	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluoropentanoic acid (PFPeA)	**4.2**		1.8	0.53	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluoropentanesulfonic acid (PFPeS)	**0.51**	**J**	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	3.5	U	3.5	0.91	ng/L		12/20/24 12:01	12/21/24 07:46	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.8	U	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluorohexanoic acid (PFHxA)	**5.0**		1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluorododecanoic acid (PFDoA)	1.8	U	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluorooctanoic acid (PFOA)	**8.5**		1.8	0.48	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluorodecanoic acid (PFDA)	1.8	U	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluorodecanesulfonic acid (PFDS)	1.8	U	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluorohexanesulfonic acid (PFHxS)	**2.0**		1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluorobutanoic acid (PFBA)	**28**		3.5	0.89	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluorobutanesulfonic acid (PFBS)	**1.6**	**J**	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluoroheptanoic acid (PFHpA)	**2.9**		1.8	0.45	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluoroheptanesulfonic acid (PFHpS)	1.8	U	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluorononanoic acid (PFNA)	1.8	U	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluorotetradecanoic acid (PFTeDA)	1.8	U	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	3.5	U	3.5	0.89	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluorononanesulfonic acid (PFNS)	1.8	U	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluorotridecanoic acid (PFTrDA)	1.8	U	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
Perfluorooctanesulfonamide (PFOSA)	1.8	U	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	1.8	U	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	3.5	U	3.5	1.0	ng/L		12/20/24 12:01	12/21/24 07:46	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	1.8	U	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.8	U	1.8	0.44	ng/L		12/20/24 12:01	12/21/24 07:46	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*56.4*		*5 - 130*	*12/20/24 12:01*	*12/21/24 07:46*	*1*
13C5 PFPeA	*49.5*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:46*	*1*
13C5 PFHxA	*51.0*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:46*	*1*
13C4 PFHpA	*52.1*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:46*	*1*
13C3 HFPO-DA	*60.4*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:46*	*1*
13C8 PFOA	*55.9*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:46*	*1*
13C9 PFNA	*66.4*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:46*	*1*
13C6 PFDA	*70.0*		*40 - 130*	*12/20/24 12:01*	*12/21/24 07:46*	*1*
13C7 PFUnA	*70.1*		*30 - 130*	*12/20/24 12:01*	*12/21/24 07:46*	*1*
13C2-PFDoDA	*64.0*		*10 - 130*	*12/20/24 12:01*	*12/21/24 07:46*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Client Sample ID: GW-11208041-121824-BW-009
Date Collected: 12/18/24 14:49
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-5
Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFTeDA	50.5		10 - 130	12/20/24 12:01	12/21/24 07:46	1
13C3 PFBS	56.6		40 - 135	12/20/24 12:01	12/21/24 07:46	1
13C3 PFHxS	63.3		40 - 130	12/20/24 12:01	12/21/24 07:46	1
M2-4:2 FTS	84.5		40 - 200	12/20/24 12:01	12/21/24 07:46	1
M2-6:2 FTS	62.8		40 - 200	12/20/24 12:01	12/21/24 07:46	1
M2-8:2 FTS	73.8		40 - 300	12/20/24 12:01	12/21/24 07:46	1
13C8 PFOS	70.4		40 - 130	12/20/24 12:01	12/21/24 07:46	1
13C8 PFOSA	58.7		40 - 130	12/20/24 12:01	12/21/24 07:46	1
d5-NEtFOSAA	78.7		25 - 135	12/20/24 12:01	12/21/24 07:46	1
d3-NMeFOSAA	67.1		40 - 170	12/20/24 12:01	12/21/24 07:46	1

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS

Client Sample ID: GW-11208041-121824-BW-010
Date Collected: 12/18/24 14:59
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-6
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	1.4	U	1.4	0.43	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluorooctanesulfonic acid (PFOS)	**2.7**		1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluoroundecanoic acid (PFUnA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.9	U	1.9	0.62	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluoropentanoic acid (PFPeA)	**4.3**		1.9	0.56	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluoropentanesulfonic acid (PFPeS)	**0.61**	**J**	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	3.7	U	3.7	0.96	ng/L		12/20/24 12:01	12/21/24 08:03	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluorohexanoic acid (PFHxA)	**4.6**		1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluorododecanoic acid (PFDoA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluorooctanoic acid (PFOA)	**8.4**		1.9	0.50	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluorodecanoic acid (PFDA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluorodecanesulfonic acid (PFDS)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluorohexanesulfonic acid (PFHxS)	**2.0**		1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluorobutanoic acid (PFBA)	**28**		3.7	0.93	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluorobutanesulfonic acid (PFBS)	**1.6**	**J**	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluoroheptanoic acid (PFHpA)	**3.0**		1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluoroheptanesulfonic acid (PFHpS)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluorononanoic acid (PFNA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluorotetradecanoic acid (PFTeDA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	3.7	U	3.7	0.93	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluorononanesulfonic acid (PFNS)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluorotridecanoic acid (PFTrDA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
Perfluorooctanesulfonamide (PFOSA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	3.7	U	3.7	1.1	ng/L		12/20/24 12:01	12/21/24 08:03	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 08:03	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*77.7*		*5 - 130*	*12/20/24 12:01*	*12/21/24 08:03*	*1*
13C5 PFPeA	*72.1*		*40 - 130*	*12/20/24 12:01*	*12/21/24 08:03*	*1*
13C5 PFHxA	*73.4*		*40 - 130*	*12/20/24 12:01*	*12/21/24 08:03*	*1*
13C4 PFHpA	*72.8*		*40 - 130*	*12/20/24 12:01*	*12/21/24 08:03*	*1*
13C3 HFPO-DA	*84.3*		*40 - 130*	*12/20/24 12:01*	*12/21/24 08:03*	*1*
13C8 PFOA	*78.2*		*40 - 130*	*12/20/24 12:01*	*12/21/24 08:03*	*1*
13C9 PFNA	*80.4*		*40 - 130*	*12/20/24 12:01*	*12/21/24 08:03*	*1*
13C6 PFDA	*83.4*		*40 - 130*	*12/20/24 12:01*	*12/21/24 08:03*	*1*
13C7 PFUnA	*91.3*		*30 - 130*	*12/20/24 12:01*	*12/21/24 08:03*	*1*
13C2-PFDoDA	*86.6*		*10 - 130*	*12/20/24 12:01*	*12/21/24 08:03*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Client Sample ID: GW-11208041-121824-BW-010
Date Collected: 12/18/24 14:59
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-6
Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFTeDA	64.9		10 - 130	12/20/24 12:01	12/21/24 08:03	1
13C3 PFBS	83.9		40 - 135	12/20/24 12:01	12/21/24 08:03	1
13C3 PFHxS	86.4		40 - 130	12/20/24 12:01	12/21/24 08:03	1
M2-4:2 FTS	118		40 - 200	12/20/24 12:01	12/21/24 08:03	1
M2-6:2 FTS	84.9		40 - 200	12/20/24 12:01	12/21/24 08:03	1
M2-8:2 FTS	90.4		40 - 300	12/20/24 12:01	12/21/24 08:03	1
13C8 PFOS	83.5		40 - 130	12/20/24 12:01	12/21/24 08:03	1
13C8 PFOSA	71.4		40 - 130	12/20/24 12:01	12/21/24 08:03	1
d5-NEtFOSAA	93.5		25 - 135	12/20/24 12:01	12/21/24 08:03	1
d3-NMeFOSAA	84.2		40 - 170	12/20/24 12:01	12/21/24 08:03	1

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS

Client Sample ID: GW-11208041-121924-BW-011
Date Collected: 12/19/24 09:17
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	1.2	U	1.2	0.36	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluorooctanesulfonic acid (PFOS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluoroundecanoic acid (PFUnA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.6	U	1.6	0.53	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluoropentanoic acid (PFPeA)	1.6	U	1.6	0.47	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluoropentanesulfonic acid (PFPeS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	3.1	U	3.1	0.81	ng/L		12/20/24 12:01	12/21/24 08:53	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluorohexanoic acid (PFHxA)	**0.83**	**J**	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluorododecanoic acid (PFDoA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluorooctanoic acid (PFOA)	1.6	U	1.6	0.42	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluorodecanoic acid (PFDA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluorodecanesulfonic acid (PFDS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluorohexanesulfonic acid (PFHxS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluorobutanoic acid (PFBA)	3.1	U	3.1	0.78	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluorobutanesulfonic acid (PFBS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluoroheptanoic acid (PFHpA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluoroheptanesulfonic acid (PFHpS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluorononanoic acid (PFNA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluorotetradecanoic acid (PFTeDA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	3.1	U	3.1	0.78	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluorononanesulfonic acid (PFNS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluorotridecanoic acid (PFTrDA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
Perfluorooctanesulfonamide (PFOSA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	3.1	U	3.1	0.90	ng/L		12/20/24 12:01	12/21/24 08:53	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.6	U	1.6	0.39	ng/L		12/20/24 12:01	12/21/24 08:53	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*96.2*		*5 - 130*	*12/20/24 12:01*	*12/21/24 08:53*	*1*
13C5 PFPeA	*91.8*		*40 - 130*	*12/20/24 12:01*	*12/21/24 08:53*	*1*
13C5 PFHxA	*96.9*		*40 - 130*	*12/20/24 12:01*	*12/21/24 08:53*	*1*
13C4 PFHpA	*94.6*		*40 - 130*	*12/20/24 12:01*	*12/21/24 08:53*	*1*
13C3 HFPO-DA	*113*		*40 - 130*	*12/20/24 12:01*	*12/21/24 08:53*	*1*
13C8 PFOA	*97.2*		*40 - 130*	*12/20/24 12:01*	*12/21/24 08:53*	*1*
13C9 PFNA	*96.0*		*40 - 130*	*12/20/24 12:01*	*12/21/24 08:53*	*1*
13C6 PFDA	*101*		*40 - 130*	*12/20/24 12:01*	*12/21/24 08:53*	*1*
13C7 PFUnA	*106*		*30 - 130*	*12/20/24 12:01*	*12/21/24 08:53*	*1*
13C2-PFDoDA	*102*		*10 - 130*	*12/20/24 12:01*	*12/21/24 08:53*	*1*
13C2 PFTeDA	*79.8*		*10 - 130*	*12/20/24 12:01*	*12/21/24 08:53*	*1*
13C3 PFBS	*106*		*40 - 135*	*12/20/24 12:01*	*12/21/24 08:53*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Client Sample ID: GW-11208041-121924-BW-011
Date Collected: 12/19/24 09:17
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-7
Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 PFHxS	110		40 - 130	12/20/24 12:01	12/21/24 08:53	1
M2-4:2 FTS	114		40 - 200	12/20/24 12:01	12/21/24 08:53	1
M2-6:2 FTS	104		40 - 200	12/20/24 12:01	12/21/24 08:53	1
M2-8:2 FTS	108		40 - 300	12/20/24 12:01	12/21/24 08:53	1
13C8 PFOS	99.6		40 - 130	12/20/24 12:01	12/21/24 08:53	1
13C8 PFOSA	85.8		40 - 130	12/20/24 12:01	12/21/24 08:53	1
d5-NEtFOSAA	135		25 - 135	12/20/24 12:01	12/21/24 08:53	1
d3-NMeFOSAA	102		40 - 170	12/20/24 12:01	12/21/24 08:53	1

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS

Client Sample ID: GW-11208041-121924-BW-012
Date Collected: 12/19/24 10:08
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-8
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	1.2	U	1.2	0.37	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluorooctanesulfonic acid (PFOS)	**4.0**		1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluoroundecanoic acid (PFUnA)	1.6	U	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.6	U	1.6	0.54	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluoropentanoic acid (PFPeA)	**1.1**	**J**	1.6	0.49	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluoropentanesulfonic acid (PFPeS)	1.6	U	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	3.3	U	3.3	0.84	ng/L		12/20/24 12:01	12/21/24 09:09	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.6	U	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluorohexanoic acid (PFHxA)	**1.0**	**J**	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluorododecanoic acid (PFDoA)	1.6	U	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluorooctanoic acid (PFOA)	**2.4**		1.6	0.44	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluorodecanoic acid (PFDA)	1.6	U	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluorodecanesulfonic acid (PFDS)	1.6	U	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluorohexanesulfonic acid (PFHxS)	**0.45**	**J**	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluorobutanoic acid (PFBA)	**8.3**		3.3	0.81	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluorobutanesulfonic acid (PFBS)	**0.49**	**J**	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluoroheptanoic acid (PFHpA)	**0.47**	**J**	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluoroheptanesulfonic acid (PFHpS)	1.6	U	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluorononanoic acid (PFNA)	**0.52**	**J**	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluorotetradecanoic acid (PFTeDA)	1.6	U	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	3.3	U	3.3	0.81	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluorononanesulfonic acid (PFNS)	1.6	U	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluorotridecanoic acid (PFTrDA)	1.6	U	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
Perfluorooctanesulfonamide (PFOSA)	**0.86**	**J**	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	1.6	U	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	3.3	U	3.3	0.94	ng/L		12/20/24 12:01	12/21/24 09:09	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	1.6	U	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.6	U	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:09	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*69.1*		*5 - 130*	*12/20/24 12:01*	*12/21/24 09:09*	*1*
13C5 PFPeA	*60.5*		*40 - 130*	*12/20/24 12:01*	*12/21/24 09:09*	*1*
13C5 PFHxA	*60.3*		*40 - 130*	*12/20/24 12:01*	*12/21/24 09:09*	*1*
13C4 PFHpA	*59.0*		*40 - 130*	*12/20/24 12:01*	*12/21/24 09:09*	*1*
13C3 HFPO-DA	*71.4*		*40 - 130*	*12/20/24 12:01*	*12/21/24 09:09*	*1*
13C8 PFOA	*62.5*		*40 - 130*	*12/20/24 12:01*	*12/21/24 09:09*	*1*
13C9 PFNA	*59.5*		*40 - 130*	*12/20/24 12:01*	*12/21/24 09:09*	*1*
13C6 PFDA	*62.5*		*40 - 130*	*12/20/24 12:01*	*12/21/24 09:09*	*1*
13C7 PFUnA	*68.7*		*30 - 130*	*12/20/24 12:01*	*12/21/24 09:09*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Client Sample ID: GW-11208041-121924-BW-012
Date Collected: 12/19/24 10:08
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-8
Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2-PFDoDA	65.6		10 - 130	12/20/24 12:01	12/21/24 09:09	1
13C2 PFTeDA	53.0		10 - 130	12/20/24 12:01	12/21/24 09:09	1
13C3 PFBS	68.7		40 - 135	12/20/24 12:01	12/21/24 09:09	1
13C3 PFHxS	68.9		40 - 130	12/20/24 12:01	12/21/24 09:09	1
M2-4:2 FTS	83.6		40 - 200	12/20/24 12:01	12/21/24 09:09	1
M2-6:2 FTS	66.2		40 - 200	12/20/24 12:01	12/21/24 09:09	1
M2-8:2 FTS	64.6		40 - 300	12/20/24 12:01	12/21/24 09:09	1
13C8 PFOS	59.6		40 - 130	12/20/24 12:01	12/21/24 09:09	1
13C8 PFOSA	51.0		40 - 130	12/20/24 12:01	12/21/24 09:09	1
d5-NEtFOSAA	74.4		25 - 135	12/20/24 12:01	12/21/24 09:09	1
d3-NMeFOSAA	59.8		40 - 170	12/20/24 12:01	12/21/24 09:09	1

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS

Client Sample ID: GW-11208041-121924-BW-013
Date Collected: 12/19/24 11:33
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-9
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	1.2	U	1.2	0.37	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluorooctanesulfonic acid (PFOS)	**4.7**		1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluoroundecanoic acid (PFUnA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.6	U	1.6	0.53	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluoropentanoic acid (PFPeA)	**1.2**	**J**	1.6	0.48	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluoropentanesulfonic acid (PFPeS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	3.2	U	3.2	0.82	ng/L		12/20/24 12:01	12/21/24 09:26	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.6	U F1	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluorohexanoic acid (PFHxA)	**1.5**	**J**	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluorododecanoic acid (PFDoA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluorooctanoic acid (PFOA)	**5.7**		1.6	0.43	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluorodecanoic acid (PFDA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluorodecanesulfonic acid (PFDS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluorohexanesulfonic acid (PFHxS)	**0.78**	**J**	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluorobutanoic acid (PFBA)	**4.6**		3.2	0.79	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluorobutanesulfonic acid (PFBS)	**0.75**	**J**	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluoroheptanoic acid (PFHpA)	**0.77**	**J**	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluoroheptanesulfonic acid (PFHpS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluorononanoic acid (PFNA)	**0.83**	**J**	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluorotetradecanoic acid (PFTeDA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	3.2	U	3.2	0.79	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluorononanesulfonic acid (PFNS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluorotridecanoic acid (PFTrDA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
Perfluorooctanesulfonamide (PFOSA)	**0.40**	**J**	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	3.2	U	3.2	0.91	ng/L		12/20/24 12:01	12/21/24 09:26	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 09:26	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*70.6*		*5 - 130*	*12/20/24 12:01*	*12/21/24 09:26*	*1*
13C5 PFPeA	*61.1*		*40 - 130*	*12/20/24 12:01*	*12/21/24 09:26*	*1*
13C5 PFHxA	*62.3*		*40 - 130*	*12/20/24 12:01*	*12/21/24 09:26*	*1*
13C4 PFHpA	*64.4*		*40 - 130*	*12/20/24 12:01*	*12/21/24 09:26*	*1*
13C3 HFPO-DA	*72.7*		*40 - 130*	*12/20/24 12:01*	*12/21/24 09:26*	*1*
13C8 PFOA	*69.2*		*40 - 130*	*12/20/24 12:01*	*12/21/24 09:26*	*1*
13C9 PFNA	*69.7*		*40 - 130*	*12/20/24 12:01*	*12/21/24 09:26*	*1*
13C6 PFDA	*73.6*		*40 - 130*	*12/20/24 12:01*	*12/21/24 09:26*	*1*
13C7 PFUnA	*75.7*		*30 - 130*	*12/20/24 12:01*	*12/21/24 09:26*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Client Sample ID: GW-11208041-121924-BW-013
Date Collected: 12/19/24 11:33
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-9
Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2-PFDoDA	71.4		10 - 130	12/20/24 12:01	12/21/24 09:26	1
13C2 PFTeDA	62.6		10 - 130	12/20/24 12:01	12/21/24 09:26	1
13C3 PFBS	77.7		40 - 135	12/20/24 12:01	12/21/24 09:26	1
13C3 PFHxS	77.6		40 - 130	12/20/24 12:01	12/21/24 09:26	1
M2-4:2 FTS	97.4		40 - 200	12/20/24 12:01	12/21/24 09:26	1
M2-6:2 FTS	71.8		40 - 200	12/20/24 12:01	12/21/24 09:26	1
M2-8:2 FTS	87.3		40 - 300	12/20/24 12:01	12/21/24 09:26	1
13C8 PFOS	73.4		40 - 130	12/20/24 12:01	12/21/24 09:26	1
13C8 PFOSA	61.1		40 - 130	12/20/24 12:01	12/21/24 09:26	1
d5-NEtFOSAA	86.5		25 - 135	12/20/24 12:01	12/21/24 09:26	1
d3-NMeFOSAA	72.3		40 - 170	12/20/24 12:01	12/21/24 09:26	1

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS

Client Sample ID: TB-11208041
Date Collected: 12/19/24 00:00
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-10
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	1.2	U	1.2	0.37	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluorooctanesulfonic acid (PFOS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluoroundecanoic acid (PFUnA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.6	U	1.6	0.54	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluoropentanoic acid (PFPeA)	1.6	U	1.6	0.48	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluoropentanesulfonic acid (PFPeS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	3.2	U	3.2	0.83	ng/L		12/20/24 12:01	12/21/24 10:16	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluorohexanoic acid (PFHxA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluorododecanoic acid (PFDoA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluorooctanoic acid (PFOA)	1.6	U	1.6	0.43	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluorodecanoic acid (PFDA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluorodecanesulfonic acid (PFDS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluorohexanesulfonic acid (PFHxS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluorobutanoic acid (PFBA)	3.2	U	3.2	0.80	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluorobutanesulfonic acid (PFBS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluoroheptanoic acid (PFHpA)	1.6	U	1.6	0.41	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluoroheptanesulfonic acid (PFHpS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluorononanoic acid (PFNA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluorotetradecanoic acid (PFTeDA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	3.2	U	3.2	0.80	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluorononanesulfonic acid (PFNS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluorotridecanoic acid (PFTrDA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
Perfluorooctanesulfonamide (PFOSA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	3.2	U	3.2	0.92	ng/L		12/20/24 12:01	12/21/24 10:16	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.6	U	1.6	0.40	ng/L		12/20/24 12:01	12/21/24 10:16	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*72.2*		*5 - 130*	*12/20/24 12:01*	*12/21/24 10:16*	*1*
13C5 PFPeA	*65.6*		*40 - 130*	*12/20/24 12:01*	*12/21/24 10:16*	*1*
13C5 PFHxA	*66.4*		*40 - 130*	*12/20/24 12:01*	*12/21/24 10:16*	*1*
13C4 PFHpA	*67.6*		*40 - 130*	*12/20/24 12:01*	*12/21/24 10:16*	*1*
13C3 HFPO-DA	*81.5*		*40 - 130*	*12/20/24 12:01*	*12/21/24 10:16*	*1*
13C8 PFOA	*68.3*		*40 - 130*	*12/20/24 12:01*	*12/21/24 10:16*	*1*
13C9 PFNA	*68.2*		*40 - 130*	*12/20/24 12:01*	*12/21/24 10:16*	*1*
13C6 PFDA	*68.4*		*40 - 130*	*12/20/24 12:01*	*12/21/24 10:16*	*1*
13C7 PFUnA	*71.7*		*30 - 130*	*12/20/24 12:01*	*12/21/24 10:16*	*1*
13C2-PFDoDA	*70.3*		*10 - 130*	*12/20/24 12:01*	*12/21/24 10:16*	*1*
13C2 PFTeDA	*54.0*		*10 - 130*	*12/20/24 12:01*	*12/21/24 10:16*	*1*
13C3 PFBS	*77.9*		*40 - 135*	*12/20/24 12:01*	*12/21/24 10:16*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Client Sample ID: TB-11208041
Date Collected: 12/19/24 00:00
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-10
Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 PFHxS	77.6		40 - 130	12/20/24 12:01	12/21/24 10:16	1
M2-4:2 FTS	86.4		40 - 200	12/20/24 12:01	12/21/24 10:16	1
M2-6:2 FTS	78.1		40 - 200	12/20/24 12:01	12/21/24 10:16	1
M2-8:2 FTS	75.4		40 - 300	12/20/24 12:01	12/21/24 10:16	1
13C8 PFOS	71.5		40 - 130	12/20/24 12:01	12/21/24 10:16	1
13C8 PFOSA	58.9		40 - 130	12/20/24 12:01	12/21/24 10:16	1
d5-NEtFOSAA	95.5		25 - 135	12/20/24 12:01	12/21/24 10:16	1
d3-NMeFOSAA	69.8		40 - 170	12/20/24 12:01	12/21/24 10:16	1

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS

Client Sample ID: GW-11208041-121924-BW-014
Date Collected: 12/19/24 11:34
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-11
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	1.4	U	1.4	0.43	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluorooctanesulfonic acid (PFOS)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluoroundecanoic acid (PFUnA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.9	U	1.9	0.62	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluoropentanoic acid (PFPeA)	1.9	U	1.9	0.56	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluoropentanesulfonic acid (PFPeS)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	3.7	U	3.7	0.96	ng/L		12/20/24 12:01	12/21/24 10:32	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluorohexanoic acid (PFHxA)	**0.94**	**J**	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluorododecanoic acid (PFDoA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluorooctanoic acid (PFOA)	1.9	U	1.9	0.50	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluorodecanoic acid (PFDA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluorodecanesulfonic acid (PFDS)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluorohexanesulfonic acid (PFHxS)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluorobutanoic acid (PFBA)	3.7	U	3.7	0.93	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluorobutanesulfonic acid (PFBS)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluoroheptanoic acid (PFHpA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluoroheptanesulfonic acid (PFHpS)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluorononanoic acid (PFNA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluorotetradecanoic acid (PFTeDA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	3.7	U	3.7	0.93	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluorononanesulfonic acid (PFNS)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluorotridecanoic acid (PFTrDA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
Perfluorooctanesulfonamide (PFOSA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	3.7	U	3.7	1.1	ng/L		12/20/24 12:01	12/21/24 10:32	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.9	U	1.9	0.47	ng/L		12/20/24 12:01	12/21/24 10:32	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*83.8*		*5 - 130*	*12/20/24 12:01*	*12/21/24 10:32*	*1*
13C5 PFPeA	*79.8*		*40 - 130*	*12/20/24 12:01*	*12/21/24 10:32*	*1*
13C5 PFHxA	*80.9*		*40 - 130*	*12/20/24 12:01*	*12/21/24 10:32*	*1*
13C4 PFHpA	*81.4*		*40 - 130*	*12/20/24 12:01*	*12/21/24 10:32*	*1*
13C3 HFPO-DA	*97.2*		*40 - 130*	*12/20/24 12:01*	*12/21/24 10:32*	*1*
13C8 PFOA	*80.7*		*40 - 130*	*12/20/24 12:01*	*12/21/24 10:32*	*1*
13C9 PFNA	*79.8*		*40 - 130*	*12/20/24 12:01*	*12/21/24 10:32*	*1*
13C6 PFDA	*79.9*		*40 - 130*	*12/20/24 12:01*	*12/21/24 10:32*	*1*
13C7 PFUnA	*85.4*		*30 - 130*	*12/20/24 12:01*	*12/21/24 10:32*	*1*
13C2-PFDoDA	*81.5*		*10 - 130*	*12/20/24 12:01*	*12/21/24 10:32*	*1*
13C2 PFTeDA	*62.6*		*10 - 130*	*12/20/24 12:01*	*12/21/24 10:32*	*1*
13C3 PFBS	*85.0*		*40 - 135*	*12/20/24 12:01*	*12/21/24 10:32*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Client Sample ID: GW-11208041-121924-BW-014
Date Collected: 12/19/24 11:34
Date Received: 12/20/24 08:00

Lab Sample ID: 240-216986-11
Matrix: Water

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 PFHxS	88.2		40 - 130	12/20/24 12:01	12/21/24 10:32	1
M2-4:2 FTS	101		40 - 200	12/20/24 12:01	12/21/24 10:32	1
M2-6:2 FTS	89.1		40 - 200	12/20/24 12:01	12/21/24 10:32	1
M2-8:2 FTS	91.3		40 - 300	12/20/24 12:01	12/21/24 10:32	1
13C8 PFOS	82.6		40 - 130	12/20/24 12:01	12/21/24 10:32	1
13C8 PFOSA	66.6		40 - 130	12/20/24 12:01	12/21/24 10:32	1
d5-NEtFOSAA	93.4		25 - 135	12/20/24 12:01	12/21/24 10:32	1
d3-NMeFOSAA	78.8		40 - 170	12/20/24 12:01	12/21/24 10:32	1

LCMS

Prep Batch: 639638

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-216986-1	GW-11208041-121824-BW-005	Total/NA	Water	1633	
240-216986-2	GW-11208041-121824-BW-006	Total/NA	Water	1633	
240-216986-3	GW-11208041-121824-BW-007	Total/NA	Water	1633	
240-216986-4	GW-11208041-121824-BW-008	Total/NA	Water	1633	
240-216986-5	GW-11208041-121824-BW-009	Total/NA	Water	1633	
240-216986-6	GW-11208041-121824-BW-010	Total/NA	Water	1633	
240-216986-7	GW-11208041-121924-BW-011	Total/NA	Water	1633	
240-216986-8	GW-11208041-121924-BW-012	Total/NA	Water	1633	
240-216986-9	GW-11208041-121924-BW-013	Total/NA	Water	1633	
240-216986-10	TB-11208041	Total/NA	Water	1633	
240-216986-11	GW-11208041-121924-BW-014	Total/NA	Water	1633	
MB 240-639638/1-A	Method Blank	Total/NA	Water	1633	
LCS 240-639638/3-A	Lab Control Sample	Total/NA	Water	1633	
LLCS 240-639638/2-A	Lab Control Sample	Total/NA	Water	1633	
240-216986-9 MS	GW-11208041-121924-BW-013	Total/NA	Water	1633	
240-216986-9 MSD	GW-11208041-121924-BW-013	Total/NA	Water	1633	

Analysis Batch: 639658

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-216986-1	GW-11208041-121824-BW-005	Total/NA	Water	1633	639638
240-216986-2	GW-11208041-121824-BW-006	Total/NA	Water	1633	639638
240-216986-3	GW-11208041-121824-BW-007	Total/NA	Water	1633	639638
240-216986-4	GW-11208041-121824-BW-008	Total/NA	Water	1633	639638
240-216986-5	GW-11208041-121824-BW-009	Total/NA	Water	1633	639638
240-216986-6	GW-11208041-121824-BW-010	Total/NA	Water	1633	639638
240-216986-7	GW-11208041-121924-BW-011	Total/NA	Water	1633	639638
240-216986-8	GW-11208041-121924-BW-012	Total/NA	Water	1633	639638
240-216986-9	GW-11208041-121924-BW-013	Total/NA	Water	1633	639638
240-216986-10	TB-11208041	Total/NA	Water	1633	639638
240-216986-11	GW-11208041-121924-BW-014	Total/NA	Water	1633	639638
MB 240-639638/1-A	Method Blank	Total/NA	Water	1633	639638
LCS 240-639638/3-A	Lab Control Sample	Total/NA	Water	1633	639638
LLCS 240-639638/2-A	Lab Control Sample	Total/NA	Water	1633	639638
240-216986-9 MS	GW-11208041-121924-BW-013	Total/NA	Water	1633	639638
240-216986-9 MSD	GW-11208041-121924-BW-013	Total/NA	Water	1633	639638

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS

Lab Sample ID: MB 240-639638/1-A
Matrix: Water
Analysis Batch: 639658

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 639638

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	1.5	U	1.5	0.46	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluorooctanesulfonic acid (PFOS)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluoroundecanoic acid (PFUnA)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2.0	U	2.0	0.67	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluoropentanoic acid (PFPeA)	2.0	U	2.0	0.60	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluoropentanesulfonic acid (PFPeS)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	4.0	U	4.0	1.0	ng/L		12/20/24 12:01	12/21/24 05:50	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluorohexanoic acid (PFHxA)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluorododecanoic acid (PFDoA)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluorooctanoic acid (PFOA)	2.0	U	2.0	0.54	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluorodecanoic acid (PFDA)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluorodecanesulfonic acid (PFDS)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluorohexanesulfonic acid (PFHxS)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluorobutanoic acid (PFBA)	4.0	U	4.0	1.0	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluorobutanesulfonic acid (PFBS)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluoroheptanoic acid (PFHpA)	2.0	U	2.0	0.51	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluoroheptanesulfonic acid (PFHpS)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluorononanoic acid (PFNA)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluorotetradecanoic acid (PFTeDA)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	4.0	U	4.0	1.0	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluorononanesulfonic acid (PFNS)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluorotridecanoic acid (PFTrDA)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
Perfluorooctanesulfonamide (PFOSA)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	4.0	U	4.0	1.2	ng/L		12/20/24 12:01	12/21/24 05:50	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	2.0	U	2.0	0.50	ng/L		12/20/24 12:01	12/21/24 05:50	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*129*		*5 - 130*	*12/20/24 12:01*	*12/21/24 05:50*	*1*
13C5 PFPeA	*142*	*5+	*40 - 130*	*12/20/24 12:01*	*12/21/24 05:50*	*1*
13C5 PFHxA	*139*	*5+	*40 - 130*	*12/20/24 12:01*	*12/21/24 05:50*	*1*
13C4 PFHpA	*146*	*5+	*40 - 130*	*12/20/24 12:01*	*12/21/24 05:50*	*1*
13C3 HFPO-DA	*162*	*5+	*40 - 130*	*12/20/24 12:01*	*12/21/24 05:50*	*1*
13C8 PFOA	*135*	*5+	*40 - 130*	*12/20/24 12:01*	*12/21/24 05:50*	*1*
13C9 PFNA	*139*	*5+	*40 - 130*	*12/20/24 12:01*	*12/21/24 05:50*	*1*
13C6 PFDA	*134*	*5+	*40 - 130*	*12/20/24 12:01*	*12/21/24 05:50*	*1*
13C7 PFUnA	*134*	*5+	*30 - 130*	*12/20/24 12:01*	*12/21/24 05:50*	*1*
13C2-PFDoDA	*126*		*10 - 130*	*12/20/24 12:01*	*12/21/24 05:50*	*1*

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Lab Sample ID: MB 240-639638/1-A
Matrix: Water
Analysis Batch: 639658

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 639638

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFTeDA	101		10 - 130	12/20/24 12:01	12/21/24 05:50	1
13C3 PFBS	140	*5+	40 - 135	12/20/24 12:01	12/21/24 05:50	1
13C3 PFHxS	148	*5+	40 - 130	12/20/24 12:01	12/21/24 05:50	1
M2-4:2 FTS	159		40 - 200	12/20/24 12:01	12/21/24 05:50	1
M2-6:2 FTS	152		40 - 200	12/20/24 12:01	12/21/24 05:50	1
M2-8:2 FTS	135		40 - 300	12/20/24 12:01	12/21/24 05:50	1
13C8 PFOS	127		40 - 130	12/20/24 12:01	12/21/24 05:50	1
13C8 PFOSA	103		40 - 130	12/20/24 12:01	12/21/24 05:50	1
d5-NEtFOSAA	149	*5+	25 - 135	12/20/24 12:01	12/21/24 05:50	1
d3-NMeFOSAA	115		40 - 170	12/20/24 12:01	12/21/24 05:50	1

Lab Sample ID: LCS 240-639638/3-A
Matrix: Water
Analysis Batch: 639658

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 639638

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	30.0	35.0		ng/L		117	70 - 140
Perfluorooctanesulfonic acid (PFOS)	37.1	40.7		ng/L		110	55 - 150
Perfluoroundecanoic acid (PFUnA)	40.0	38.2		ng/L		96	70 - 145
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	44.7		ng/L		112	50 - 140
Perfluoropentanoic acid (PFPeA)	40.0	44.2		ng/L		110	65 - 135
Perfluoropentanesulfonic acid (PFPeS)	37.5	38.6		ng/L		103	65 - 140
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	75.8	75.2		ng/L		99	65 - 155
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	46.6		ng/L		117	70 - 145
Perfluorohexanoic acid (PFHxA)	40.0	40.7		ng/L		102	70 - 145
Perfluorododecanoic acid (PFDoA)	40.0	40.4		ng/L		101	70 - 140
Perfluorooctanoic acid (PFOA)	40.0	51.2		ng/L		128	70 - 150
Perfluorodecanoic acid (PFDA)	40.0	44.1		ng/L		110	70 - 140
Perfluorodecanesulfonic acid (PFDS)	38.6	42.1		ng/L		109	60 - 145
Perfluorohexanesulfonic acid (PFHxS)	36.4	37.3		ng/L		102	65 - 145
Perfluorobutanoic acid (PFBA)	80.0	94.0		ng/L		117	70 - 140
Perfluorobutanesulfonic acid (PFBS)	35.4	38.9		ng/L		110	60 - 145
Perfluoroheptanoic acid (PFHpA)	40.0	45.0		ng/L		113	70 - 150
Perfluoroheptanesulfonic acid (PFHpS)	38.1	43.9		ng/L		115	70 - 150
Perfluorononanoic acid (PFNA)	40.0	42.2		ng/L		106	70 - 150
Perfluorotetradecanoic acid (PFTeDA)	40.0	42.4		ng/L		106	60 - 140
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	76.6	80.1		ng/L		105	60 - 150
Perfluorononanesulfonic acid (PFNS)	38.4	42.2		ng/L		110	65 - 145

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Lab Sample ID: LCS 240-639638/3-A
Matrix: Water
Analysis Batch: 639658

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 639638

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorotridecanoic acid (PFTrDA)	40.0	43.3		ng/L		108	65 - 140
Perfluorooctanesulfonamide (PFOSA)	40.0	48.4		ng/L		121	70 - 145
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	37.3	38.8		ng/L		104	70 - 155
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	74.7	79.5		ng/L		106	70 - 145
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	37.7	37.5		ng/L		100	55 - 160
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	39.2		ng/L		104	65 - 145

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFBA	*77.9*		*5 - 130*
13C5 PFPeA	*75.0*		*40 - 130*
13C5 PFHxA	*78.2*		*40 - 130*
13C4 PFHpA	*76.7*		*40 - 130*
13C3 HFPO-DA	*91.1*		*40 - 130*
13C8 PFOA	*73.3*		*40 - 130*
13C9 PFNA	*76.5*		*40 - 130*
13C6 PFDA	*73.5*		*40 - 130*
13C7 PFUnA	*82.2*		*30 - 130*
13C2-PFDoDA	*79.8*		*10 - 130*
13C2 PFTeDA	*65.4*		*10 - 130*
13C3 PFBS	*77.1*		*40 - 135*
13C3 PFHxS	*79.5*		*40 - 130*
M2-4:2 FTS	*85.3*		*40 - 200*
M2-6:2 FTS	*77.4*		*40 - 200*
M2-8:2 FTS	*83.4*		*40 - 300*
13C8 PFOS	*70.8*		*40 - 130*
13C8 PFOSA	*58.9*		*40 - 130*
d5-NEtFOSAA	*93.4*		*25 - 135*
d3-NMeFOSAA	*69.1*		*40 - 170*

Lab Sample ID: LLCS 240-639638/2-A
Matrix: Water
Analysis Batch: 639658

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 639638

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec Limits
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	3.00	4.03		ng/L		134	70 - 140
Perfluorooctanesulfonic acid (PFOS)	3.71	4.46		ng/L		120	55 - 150
Perfluoroundecanoic acid (PFUnA)	4.00	3.98		ng/L		100	70 - 145
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	4.00	4.85		ng/L		121	50 - 140
Perfluoropentanoic acid (PFPeA)	4.00	4.68		ng/L		117	65 - 135

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Lab Sample ID: LLCS 240-639638/2-A
Matrix: Water
Analysis Batch: 639658

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 639638

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoropentanesulfonic acid (PFPeS)	3.75	4.30		ng/L		115	65 - 140
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	7.58	8.54		ng/L		113	65 - 155
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	4.00	4.81		ng/L		120	70 - 145
Perfluorohexanoic acid (PFHxA)	4.00	4.88		ng/L		122	70 - 145
Perfluorododecanoic acid (PFDoA)	4.00	4.35		ng/L		109	70 - 140
Perfluorooctanoic acid (PFOA)	4.00	5.51		ng/L		138	70 - 150
Perfluorodecanoic acid (PFDA)	4.00	4.97		ng/L		124	70 - 140
Perfluorodecanesulfonic acid (PFDS)	3.86	4.35		ng/L		113	60 - 145
Perfluorohexanesulfonic acid (PFHxS)	3.64	4.23		ng/L		116	65 - 145
Perfluorobutanoic acid (PFBA)	8.00	9.55		ng/L		119	70 - 140
Perfluorobutanesulfonic acid (PFBS)	3.54	4.03		ng/L		114	60 - 145
Perfluoroheptanoic acid (PFHpA)	4.00	5.07		ng/L		127	70 - 150
Perfluoroheptanesulfonic acid (PFHpS)	3.81	4.67		ng/L		123	70 - 150
Perfluorononanoic acid (PFNA)	4.00	4.53		ng/L		113	70 - 150
Perfluorotetradecanoic acid (PFTeDA)	4.00	4.71		ng/L		118	60 - 140
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	7.66	8.99		ng/L		117	60 - 150
Perfluorononanesulfonic acid (PFNS)	3.84	4.55		ng/L		118	65 - 145
Perfluorotridecanoic acid (PFTrDA)	4.00	4.64		ng/L		116	65 - 140
Perfluorooctanesulfonamide (PFOSA)	4.00	4.92		ng/L		123	70 - 145
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	3.73	4.15		ng/L		111	70 - 155
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	7.47	8.49		ng/L		114	70 - 145
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	3.77	3.98		ng/L		106	55 - 160
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	3.77	4.08		ng/L		108	65 - 145

Isotope Dilution	*LLCS %Recovery*	*LLCS Qualifier*	*Limits*
13C4 PFBA	*76.6*		*5 - 130*
13C5 PFPeA	*69.8*		*40 - 130*
13C5 PFHxA	*73.2*		*40 - 130*
13C4 PFHpA	*73.1*		*40 - 130*
13C3 HFPO-DA	*80.7*		*40 - 130*
13C8 PFOA	*70.4*		*40 - 130*
13C9 PFNA	*71.9*		*40 - 130*
13C6 PFDA	*69.9*		*40 - 130*
13C7 PFUnA	*75.4*		*30 - 130*

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Lab Sample ID: LLCS 240-639638/2-A
Matrix: Water
Analysis Batch: 639658

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 639638

Isotope Dilution	*LLCS %Recovery*	*LLCS Qualifier*	*Limits*
13C2-PFDoDA	*71.6*		*10 - 130*
13C2 PFTeDA	*59.3*		*10 - 130*
13C3 PFBS	*72.5*		*40 - 135*
13C3 PFHxS	*73.9*		*40 - 130*
M2-4:2 FTS	*83.6*		*40 - 200*
M2-6:2 FTS	*73.2*		*40 - 200*
M2-8:2 FTS	*72.8*		*40 - 300*
13C8 PFOS	*67.0*		*40 - 130*
13C8 PFOSA	*56.0*		*40 - 130*
d5-NEtFOSAA	*90.3*		*25 - 135*
d3-NMeFOSAA	*66.2*		*40 - 170*

Lab Sample ID: 240-216986-9 MS
Matrix: Water
Analysis Batch: 639658

Client Sample ID: GW-11208041-121924-BW-013
Prep Type: Total/NA
Prep Batch: 639638

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	1.2	U	23.7	29.2		ng/L		123	70 - 140
Perfluorooctanesulfonic acid (PFOS)	4.7		29.4	40.5		ng/L		122	55 - 150
Perfluoroundecanoic acid (PFUnA)	1.6	U	31.7	36.5		ng/L		115	70 - 145
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.6	U	31.7	43.9		ng/L		139	50 - 140
Perfluoropentanoic acid (PFPeA)	1.2	J	31.7	36.5		ng/L		111	65 - 135
Perfluoropentanesulfonic acid (PFPeS)	1.6	U	29.7	32.5		ng/L		109	65 - 140
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	3.2	U	60.0	60.4		ng/L		101	65 - 155
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.6	U F1	31.7	50.4	F1	ng/L		159	70 - 145
Perfluorohexanoic acid (PFHxA)	1.5	J	31.7	35.7		ng/L		108	70 - 145
Perfluorododecanoic acid (PFDoA)	1.6	U	31.7	38.9		ng/L		123	70 - 140
Perfluorooctanoic acid (PFOA)	5.7		31.7	46.7		ng/L		130	70 - 150
Perfluorodecanoic acid (PFDA)	1.6	U	31.7	38.6		ng/L		122	70 - 140
Perfluorodecanesulfonic acid (PFDS)	1.6	U	30.5	37.0		ng/L		121	60 - 145
Perfluorohexanesulfonic acid (PFHxS)	0.78	J	28.8	31.2		ng/L		106	65 - 145
Perfluorobutanoic acid (PFBA)	4.6		63.3	81.3		ng/L		121	70 - 140
Perfluorobutanesulfonic acid (PFBS)	0.75	J	28.0	30.7		ng/L		107	60 - 145
Perfluoroheptanoic acid (PFHpA)	0.77	J	31.7	39.0		ng/L		121	70 - 150
Perfluoroheptanesulfonic acid (PFHpS)	1.6	U	30.1	39.8		ng/L		132	70 - 150
Perfluorononanoic acid (PFNA)	0.83	J	31.7	36.2		ng/L		112	70 - 150
Perfluorotetradecanoic acid (PFTeDA)	1.6	U	31.7	41.2		ng/L		130	60 - 140
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	3.2	U	60.7	72.3		ng/L		119	60 - 150

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Lab Sample ID: 240-216986-9 MS
Matrix: Water
Analysis Batch: 639658

Client Sample ID: GW-11208041-121924-BW-013
Prep Type: Total/NA
Prep Batch: 639638

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorononanesulfonic acid (PFNS)	1.6	U	30.4	38.4		ng/L		126	65 - 145
Perfluorotridecanoic acid (PFTrDA)	1.6	U	31.7	42.8		ng/L		135	65 - 140
Perfluorooctanesulfonamide (PFOSA)	0.40	J	31.7	45.2		ng/L		143	70 - 145
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	1.6	U	29.5	33.8		ng/L		115	70 - 155
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	3.2	U	59.2	65.5		ng/L		111	70 - 145
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	1.6	U	29.8	31.5		ng/L		106	55 - 160
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.6	U	29.8	31.9		ng/L		107	65 - 145

Isotope Dilution	*MS %Recovery*	*MS Qualifier*	*Limits*
13C4 PFBA	*91.3*		*5 - 130*
13C5 PFPeA	*86.0*		*40 - 130*
13C5 PFHxA	*85.6*		*40 - 130*
13C4 PFHpA	*84.3*		*40 - 130*
13C3 HFPO-DA	*97.5*		*40 - 130*
13C8 PFOA	*84.7*		*40 - 130*
13C9 PFNA	*86.7*		*40 - 130*
13C6 PFDA	*81.1*		*40 - 130*
13C7 PFUnA	*81.9*		*30 - 130*
13C2-PFDoDA	*76.7*		*10 - 130*
13C2 PFTeDA	*63.9*		*10 - 130*
13C3 PFBS	*98.3*		*40 - 135*
13C3 PFHxS	*93.9*		*40 - 130*
M2-4:2 FTS	*126*		*40 - 200*
M2-6:2 FTS	*91.1*		*40 - 200*
M2-8:2 FTS	*94.0*		*40 - 300*
13C8 PFOS	*81.1*		*40 - 130*
13C8 PFOSA	*65.1*		*40 - 130*
d5-NEtFOSAA	*90.1*		*25 - 135*
d3-NMeFOSAA	*74.7*		*40 - 170*

Lab Sample ID: 240-216986-9 MSD
Matrix: Water
Analysis Batch: 639658

Client Sample ID: GW-11208041-121924-BW-013
Prep Type: Total/NA
Prep Batch: 639638

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	1.2	U	24.0	28.2		ng/L		118	70 - 140	3	30
Perfluorooctanesulfonic acid (PFOS)	4.7		29.7	37.5		ng/L		111	55 - 150	8	30
Perfluoroundecanoic acid (PFUnA)	1.6	U	32.0	34.3		ng/L		107	70 - 145	6	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	1.6	U	32.0	40.1		ng/L		126	50 - 140	9	30

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Lab Sample ID: 240-216986-9 MSD
Matrix: Water
Analysis Batch: 639658

Client Sample ID: GW-11208041-121924-BW-013
Prep Type: Total/NA
Prep Batch: 639638

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluoropentanoic acid (PFPeA)	1.2	J	32.0	37.1		ng/L		112	65 - 135	2	30
Perfluoropentanesulfonic acid (PFPeS)	1.6	U	30.0	31.3		ng/L		104	65 - 140	4	30
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	3.2	U	60.6	63.4		ng/L		105	65 - 155	5	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	1.6	U F1	32.0	42.9		ng/L		134	70 - 145	16	30
Perfluorohexanoic acid (PFHxA)	1.5	J	32.0	34.6		ng/L		104	70 - 145	3	30
Perfluorododecanoic acid (PFDoA)	1.6	U	32.0	35.7		ng/L		112	70 - 140	8	30
Perfluorooctanoic acid (PFOA)	5.7		32.0	45.0		ng/L		123	70 - 150	4	30
Perfluorodecanoic acid (PFDA)	1.6	U	32.0	34.6		ng/L		108	70 - 140	11	30
Perfluorodecanesulfonic acid (PFDS)	1.6	U	30.8	36.5		ng/L		118	60 - 145	1	30
Perfluorohexanesulfonic acid (PFHxS)	0.78	J	29.1	30.6		ng/L		102	65 - 145	2	30
Perfluorobutanoic acid (PFBA)	4.6		63.9	81.1		ng/L		120	70 - 140	0	30
Perfluorobutanesulfonic acid (PFBS)	0.75	J	28.3	32.3		ng/L		112	60 - 145	5	30
Perfluoroheptanoic acid (PFHpA)	0.77	J	32.0	36.7		ng/L		113	70 - 150	6	30
Perfluoroheptanesulfonic acid (PFHpS)	1.6	U	30.4	37.3		ng/L		123	70 - 150	6	30
Perfluorononanoic acid (PFNA)	0.83	J	32.0	36.8		ng/L		113	70 - 150	2	30
Perfluorotetradecanoic acid (PFTeDA)	1.6	U	32.0	37.7		ng/L		118	60 - 140	9	30
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	3.2	U	61.3	71.8		ng/L		117	60 - 150	1	30
Perfluorononanesulfonic acid (PFNS)	1.6	U	30.7	35.4		ng/L		115	65 - 145	8	30
Perfluorotridecanoic acid (PFTrDA)	1.6	U	32.0	38.5		ng/L		120	65 - 140	11	30
Perfluorooctanesulfonamide (PFOSA)	0.40	J	32.0	43.6		ng/L		136	70 - 145	4	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	1.6	U	29.8	31.4		ng/L		105	70 - 155	8	30
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	3.2	U	59.7	65.6		ng/L		110	70 - 145	0	30
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	1.6	U	30.1	29.4		ng/L		98	55 - 160	7	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.6	U	30.1	30.6		ng/L		102	65 - 145	4	30

Isotope Dilution	*MSD %Recovery*	*MSD Qualifier*	*Limits*
13C4 PFBA	*95.7*		*5 - 130*
13C5 PFPeA	*85.0*		*40 - 130*
13C5 PFHxA	*90.1*		*40 - 130*
13C4 PFHpA	*87.7*		*40 - 130*
13C3 HFPO-DA	*103*		*40 - 130*
13C8 PFOA	*94.4*		*40 - 130*
13C9 PFNA	*90.8*		*40 - 130*
13C6 PFDA	*89.6*		*40 - 130*

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Lab Sample ID: 240-216986-9 MSD
Matrix: Water
Analysis Batch: 639658

Client Sample ID: GW-11208041-121924-BW-013
Prep Type: Total/NA
Prep Batch: 639638

Isotope Dilution	MSD %Recovery	MSD Qualifier	Limits
13C7 PFUnA	90.4		30 - 130
13C2-PFDoDA	84.0		10 - 130
13C2 PFTeDA	68.8		10 - 130
13C3 PFBS	108		40 - 135
13C3 PFHxS	106		40 - 130
M2-4:2 FTS	138		40 - 200
M2-6:2 FTS	92.7		40 - 200
M2-8:2 FTS	119		40 - 300
13C8 PFOS	92.8		40 - 130
13C8 PFOSA	74.7		40 - 130
d5-NEtFOSAA	95.0		25 - 135
d3-NMeFOSAA	87.2		40 - 170

Lab Chronicle

Client: GHD Services Inc.
Job ID: 240-216986-1
Project/Site: 11208041, RACER Nodular Iron

Client Sample ID: GW-11208041-121824-BW-005
Lab Sample ID: 240-216986-1
Date Collected: 12/18/24 09:20
Matrix: Water
Date Received: 12/20/24 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	1633			639638	CLB	EET CLE	12/20/24 12:01
Total/NA	Analysis	1633		1	639658	C4KB	EET CLE	12/21/24 06:40

Client Sample ID: GW-11208041-121824-BW-006
Lab Sample ID: 240-216986-2
Date Collected: 12/18/24 10:36
Matrix: Water
Date Received: 12/20/24 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	1633			639638	CLB	EET CLE	12/20/24 12:01
Total/NA	Analysis	1633		1	639658	C4KB	EET CLE	12/21/24 06:57

Client Sample ID: GW-11208041-121824-BW-007
Lab Sample ID: 240-216986-3
Date Collected: 12/18/24 11:41
Matrix: Water
Date Received: 12/20/24 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	1633			639638	CLB	EET CLE	12/20/24 12:01
Total/NA	Analysis	1633		1	639658	C4KB	EET CLE	12/21/24 07:13

Client Sample ID: GW-11208041-121824-BW-008
Lab Sample ID: 240-216986-4
Date Collected: 12/18/24 12:53
Matrix: Water
Date Received: 12/20/24 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	1633			639638	CLB	EET CLE	12/20/24 12:01
Total/NA	Analysis	1633		1	639658	C4KB	EET CLE	12/21/24 07:30

Client Sample ID: GW-11208041-121824-BW-009
Lab Sample ID: 240-216986-5
Date Collected: 12/18/24 14:49
Matrix: Water
Date Received: 12/20/24 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	1633			639638	CLB	EET CLE	12/20/24 12:01
Total/NA	Analysis	1633		1	639658	C4KB	EET CLE	12/21/24 07:46

Client Sample ID: GW-11208041-121824-BW-010
Lab Sample ID: 240-216986-6
Date Collected: 12/18/24 14:59
Matrix: Water
Date Received: 12/20/24 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	1633			639638	CLB	EET CLE	12/20/24 12:01
Total/NA	Analysis	1633		1	639658	C4KB	EET CLE	12/21/24 08:03

Lab Chronicle

Client: GHD Services Inc.
Job ID: 240-216986-1
Project/Site: 11208041, RACER Nodular Iron

Client Sample ID: GW-11208041-121924-BW-011
Lab Sample ID: 240-216986-7
Date Collected: 12/19/24 09:17
Matrix: Water
Date Received: 12/20/24 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	1633			639638	CLB	EET CLE	12/20/24 12:01
Total/NA	Analysis	1633		1	639658	C4KB	EET CLE	12/21/24 08:53

Client Sample ID: GW-11208041-121924-BW-012
Lab Sample ID: 240-216986-8
Date Collected: 12/19/24 10:08
Matrix: Water
Date Received: 12/20/24 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	1633			639638	CLB	EET CLE	12/20/24 12:01
Total/NA	Analysis	1633		1	639658	C4KB	EET CLE	12/21/24 09:09

Client Sample ID: GW-11208041-121924-BW-013
Lab Sample ID: 240-216986-9
Date Collected: 12/19/24 11:33
Matrix: Water
Date Received: 12/20/24 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	1633			639638	CLB	EET CLE	12/20/24 12:01
Total/NA	Analysis	1633		1	639658	C4KB	EET CLE	12/21/24 09:26

Client Sample ID: TB-11208041
Lab Sample ID: 240-216986-10
Date Collected: 12/19/24 00:00
Matrix: Water
Date Received: 12/20/24 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	1633			639638	CLB	EET CLE	12/20/24 12:01
Total/NA	Analysis	1633		1	639658	C4KB	EET CLE	12/21/24 10:16

Client Sample ID: GW-11208041-121924-BW-014
Lab Sample ID: 240-216986-11
Date Collected: 12/19/24 11:34
Matrix: Water
Date Received: 12/20/24 08:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	1633			639638	CLB	EET CLE	12/20/24 12:01
Total/NA	Analysis	1633		1	639658	C4KB	EET CLE	12/21/24 10:32

Laboratory References:
EET CLE = Eurofins Cleveland, 180 S. Van Buren Avenue, Barberton, OH 44203, TEL (330)497-9396

Accreditation/Certification Summary

Client: GHD Services Inc. Job ID: 240-216986-1
Project/Site: 11208041, RACER Nodular Iron

Laboratory: Eurofins Cleveland

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-28-25
Connecticut	State	PH-0806	12-31-26
Georgia	State	4062	02-27-25
Illinois	NELAP	200004	08-31-25
Iowa	State	421	06-01-25
Kentucky (UST)	State	112225	02-27-25
Kentucky (WW)	State	KY98016	12-30-24
Minnesota	NELAP	039-999-348	12-31-25
New Hampshire	NELAP	225024	09-30-25
New Jersey	NELAP	OH001	07-03-25
New York	NELAP	10975	04-02-25
Ohio VAP	State	ORELAP 4062	02-27-25
Oregon	NELAP	4062	02-27-25
Pennsylvania	NELAP	68-00340	08-31-25
Texas	NELAP	T104704517-22-19	08-31-25
USDA	US Federal Programs	P330-18-00281	01-05-27
Virginia	NELAP	460175	09-14-25
West Virginia DEP	State	210	12-31-24
Wisconsin	State	399167560	08-31-25

Eurofins Cleveland
180 S. Van Buren Avenue
Barberton, OH 44203
Phone: 330-497-9396 Fax: 330-497-0772

MICHIGAN
190

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler: BV	Lab PM: Heckler, Denise D	Carrier Tracking No(s):	COC No: 240-126203-43961.2
Client Contact: Ms. Ruth Mickle	Phone: 7342609865	E-Mail: Denise.Heckler@et.eurofinsus.com	State of Origin:	Page: Page 2 of 2
Company: GHD Services Inc.	PWSID:			Job #:
Address: 26850 Haggerty Rd.	Due Date Requested:	Analysis Requested		Preservation Codes: N - None
City: Farmington Hills	TAT Requested (days):			
State, Zip: MI, 48331	Compliance Project: Δ Yes Δ No			
Phone: 612-524-6872(Tel)	PO #: Purchase Order Requested			Other:
Email: ruth.mickle@ghd.com	WO #: 58502			
Project Name: 11208041, RACER Nodular Iron	Project #: 24006032			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	1633_Final - MI PFAS 28	Total Number of containers	Special Instructions/Note:
GW-11208041-121824-BV -005	12-18-24	0920	G	Water		X		
-006		1036		Water		X		
-007		1141				X		
-008		1253				X		
-009		1449				X		
-010		1459				X		
GW-11208041-121924-BV -011	12-19-24	0917				X		
-012		1008				X		
-013		1133				X		MS MSD
TB-11208041	—					X		
GW-11208041-121924-BV-014	12.19.24	1134	G	W		X		

240-216986 COC

EMPTY BATCH

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	12-19-24	GHD	[signature]	12/19/24 1457	EEN
Relinquished by: [signature]	Date/Time: 12/19/24 1500	Company EEN	Received by: MALISSA LOAR	Date/Time: 12/20/24 800	Company EEN
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Eurofins – Cleveland Sample Receipt Form/Narrative **Login # :**
Barberton Facility

Client S140 Site Name

Cooler unpacked by: MALISSA LOAR

Cooler Received on 12-20-24 Opened on 12-20-24

FedEx: 1st Grd Exp UPS FAS (Waypoint) Client Drop Off Eurofins Courier Other

Receipt After-hours Drop-off Date/Time Storage Location

Eurofins Cooler # CE Foam Box Client Cooler Box Other

Packing material used: Bubble Wrap Foam Plastic Bag (None) Other

COOLANT: (Wet Ice) Blue Ice Dry Ice Water None

1 Cooler temperature upon receipt ☐ See Multiple Cooler Form

IR GUN # 17 (CF 0.1 °C) Observed Cooler Temp. 3.1 °C Corrected Cooler Temp 3.2 °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity	(Yes)	No
-Were the seals on the outside of the cooler(s) signed & dated?	(Yes)	No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	(No)
-Were tamper/custody seals intact and uncompromised?	(Yes)	No NA
3 Shippers' packing slip attached to the cooler(s)?	Yes	(No)
4. Did custody papers accompany the sample(s)?	(Yes)	No
5 Were the custody papers relinquished & signed in the appropriate place?	(Yes)	No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	(Yes)	No
7 Did all bottles arrive in good condition (Unbroken)?	(Yes)	No
8 Could all bottle labels (ID/Date/Time) be reconciled with the COC?	(Yes)	No
9 For each sample, does the COC specify preservatives (Y/N), # of containers (Y/N), and sample type of grab/comp (Y/N)?		
10 Were correct bottle(s) used for the test(s) indicated?	(Yes)	No
11 Sufficient quantity received to perform indicated analyses?	(Yes)	No
12. Are these work share samples and all listed on the COC?	Yes	(No)
If yes, Questions 13-17 have been checked at the originating laboratory		
13 Were all preserved sample(s) at the correct pH upon receipt?	Yes No	(NA) pH Strip Lot# HC450408
14 Were VOAs on the COC?	Yes	(No)
15 Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this.	Yes No	(NA)
16 Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #	Yes	(No)
17 Was a LL Hg or Me Hg trip blank present?	Yes	(No)

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

Contacted PM Date by via Verbal Voice Mail Other

Concerning

18. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES ☐ additional next page

Samples processed by:

19 SAMPLE CONDITION

Sample(s) were received after the recommended holding time had expired

Sample(s) were received in a broken container

Sample(s) were received with bubble >6 mm in diameter (Notify PM)

20. SAMPLE PRESERVATION

Sample(s) were further preserved in the laboratory

Time preserved. Preservative(s) added/Lot number(s)

VOA Sample Preservation - Date/Time VOAs Frozen.

Isotope Dilution Summary

Client: GHD Services Inc.
Project/Site: 11208041, RACER Nodular Iron

Job ID: 240-216986-1

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFBA (5-130)	PFPeA (40-130)	13C5PHA (40-130)	C4PFHA (40-130)	HFPODA (40-130)	C8PFOA (40-130)	C9PFNA (40-130)	C6PFDA (40-130)
240-216986-1	GW-11208041-121824-BW-005	82.2	74.4	74.9	76.8	89.7	78.7	81.3	81.3
240-216986-2	GW-11208041-121824-BW-006	71.2	66.0	64.7	62.5	77.6	66.0	68.5	68.2
240-216986-3	GW-11208041-121824-BW-007	76.4	72.0	71.5	71.1	82.9	72.7	73.8	70.6
240-216986-4	GW-11208041-121824-BW-008	74.6	67.1	68.2	70.2	80.6	71.8	73.3	75.2
240-216986-5	GW-11208041-121824-BW-009	56.4	49.5	51.0	52.1	60.4	55.9	66.4	70.0
240-216986-6	GW-11208041-121824-BW-010	77.7	72.1	73.4	72.8	84.3	78.2	80.4	83.4
240-216986-7	GW-11208041-121924-BW-011	96.2	91.8	96.9	94.6	113	97.2	96.0	101
240-216986-8	GW-11208041-121924-BW-012	69.1	60.5	60.3	59.0	71.4	62.5	59.5	62.5
240-216986-9	GW-11208041-121924-BW-013	70.6	61.1	62.3	64.4	72.7	69.2	69.7	73.6
240-216986-9 MS	GW-11208041-121924-BW-013	91.3	86.0	85.6	84.3	97.5	84.7	86.7	81.1
240-216986-9 MSD	GW-11208041-121924-BW-013	95.7	85.0	90.1	87.7	103	94.4	90.8	89.6
240-216986-10	TB-11208041	72.2	65.6	66.4	67.6	81.5	68.3	68.2	68.4
240-216986-11	GW-11208041-121924-BW-014	83.8	79.8	80.9	81.4	97.2	80.7	79.8	79.9
LCS 240-639638/3-A	Lab Control Sample	77.9	75.0	78.2	76.7	91.1	73.3	76.5	73.5
LLCS 240-639638/2-A	Lab Control Sample	76.6	69.8	73.2	73.1	80.7	70.4	71.9	69.9
MB 240-639638/1-A	Method Blank	129	142 *5+	139 *5+	146 *5+	162 *5+	135 *5+	139 *5+	134 *5+

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	13C7PUA (30-130)	PFDoDA (10-130)	PFTDA (10-130)	C3PFBS (40-135)	C3PFHS (40-130)	M242FTS (40-200)	M262FTS (40-200)	M282FTS (40-300)
240-216986-1	GW-11208041-121824-BW-005	84.8	84.2	65.1	83.8	83.7	120	80.3	83.6
240-216986-2	GW-11208041-121824-BW-006	73.2	73.1	57.4	70.7	71.3	89.1	66.9	71.7
240-216986-3	GW-11208041-121824-BW-007	69.5	63.3	48.2	81.1	82.2	103	80.4	76.0
240-216986-4	GW-11208041-121824-BW-008	82.5	83.0	66.8	83.4	81.6	66.7	76.0	82.4
240-216986-5	GW-11208041-121824-BW-009	70.1	64.0	50.5	56.6	63.3	84.5	62.8	73.8
240-216986-6	GW-11208041-121824-BW-010	91.3	86.6	64.9	83.9	86.4	118	84.9	90.4
240-216986-7	GW-11208041-121924-BW-011	106	102	79.8	106	110	114	104	108
240-216986-8	GW-11208041-121924-BW-012	68.7	65.6	53.0	68.7	68.9	83.6	66.2	64.6
240-216986-9	GW-11208041-121924-BW-013	75.7	71.4	62.6	77.7	77.6	97.4	71.8	87.3
240-216986-9 MS	GW-11208041-121924-BW-013	81.9	76.7	63.9	98.3	93.9	126	91.1	94.0
240-216986-9 MSD	GW-11208041-121924-BW-013	90.4	84.0	68.8	108	106	138	92.7	119
240-216986-10	TB-11208041	71.7	70.3	54.0	77.9	77.6	86.4	78.1	75.4
240-216986-11	GW-11208041-121924-BW-014	85.4	81.5	62.6	85.0	88.2	101	89.1	91.3
LCS 240-639638/3-A	Lab Control Sample	82.2	79.8	65.4	77.1	79.5	85.3	77.4	83.4
LLCS 240-639638/2-A	Lab Control Sample	75.4	71.6	59.3	72.5	73.9	83.6	73.2	72.8
MB 240-639638/1-A	Method Blank	134 *5+	126	101	140 *5+	148 *5+	159	152	135

		Percent Isotope Dilution Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	C8PFOS (40-130)	PFOSA (40-130)	d5NEFOS (25-135)	d3NMFOS (40-170)
240-216986-1	GW-11208041-121824-BW-005	75.8	64.7	94.1	74.8
240-216986-2	GW-11208041-121824-BW-006	65.3	54.6	88.4	67.9
240-216986-3	GW-11208041-121824-BW-007	72.5	61.5	74.3	66.3
240-216986-4	GW-11208041-121824-BW-008	76.4	65.3	96.7	82.0
240-216986-5	GW-11208041-121824-BW-009	70.4	58.7	78.7	67.1
240-216986-6	GW-11208041-121824-BW-010	83.5	71.4	93.5	84.2
240-216986-7	GW-11208041-121924-BW-011	99.6	85.8	135	102
240-216986-8	GW-11208041-121924-BW-012	59.6	51.0	74.4	59.8
240-216986-9	GW-11208041-121924-BW-013	73.4	61.1	86.5	72.3
240-216986-9 MS	GW-11208041-121924-BW-013	81.1	65.1	90.1	74.7
240-216986-9 MSD	GW-11208041-121924-BW-013	92.8	74.7	95.0	87.2

Isotope Dilution Summary

Client: GHD Services Inc. Job ID: 240-216986-1
Project/Site: 11208041, RACER Nodular Iron

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS (Continued)

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	C8PFOS (40-130)	PFOSA (40-130)	d5NEFOS (25-135)	d3NMFOS (40-170)
240-216986-10	TB-11208041	71.5	58.9	95.5	69.8
240-216986-11	GW-11208041-121924-BW-014	82.6	66.6	93.4	78.8
LCS 240-639638/3-A	Lab Control Sample	70.8	58.9	93.4	69.1
LLCS 240-639638/2-A	Lab Control Sample	67.0	56.0	90.3	66.2
MB 240-639638/1-A	Method Blank	127	103	149 *5+	115

Surrogate Legend

PFBA = 13C4 PFBA
PFPeA = 13C5 PFPeA
13C5PHA = 13C5 PFHxA
C4PFHA = 13C4 PFHpA
HFPODA = 13C3 HFPO-DA
C8PFOA = 13C8 PFOA
C9PFNA = 13C9 PFNA
C6PFDA = 13C6 PFDA
13C7PUA = 13C7 PFUnA
PFDoDA = 13C2-PFDoDA
PFTDA = 13C2 PFTeDA
C3PFBS = 13C3 PFBS
C3PFHS = 13C3 PFHxS
M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 FTS
C8PFOS = 13C8 PFOS
PFOSA = 13C8 PFOSA
d5NEFOS = d5-NEtFOSAA
d3NMFOS = d3-NMeFOSAA

Appendix C

Data Validation Memorandum

Data Verification Report

February 14, 2025

To	John-Eric Pardys	**Project No.**	11208041
Copy to	Jessica Gallaway	**DVR No.**	11
From	Julie Ludie/cs/11-NF	**Contact No.**	716-242-6946
Project Name	RACER: Saginaw Nodular Iron	**Email**	Julie.Lundie@ghd.com
Subject	Analytical Results and Data Verification 2024 PFAS Sampling RACER Nodular Saginaw, Michigan December 2024		

1. Introduction

This document details a data verification of analytical results for water samples collected in support of the 2024 PFAS Sampling event at the RACER Nodular site during December. Samples were submitted to Eurofins Cleveland located in Barberton, Ohio. A sample collection and analysis summary is presented in Table 1. The validated analytical results are summarized in Table 2. A summary of the analytical methodology is presented in Table 3.

Standard GHD report deliverables were submitted by the laboratory. The final results and supporting quality assurance/quality control (QA/QC) data were assessed. Evaluation of the data was based on information obtained from the chain of custody form, finished report form, method blank data, recovery data from surrogate spikes/laboratory control samples (LCS)/matrix spikes (MS) and field QA/QC samples.

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 3 and applicable guidance from the documents entitled:

1. "National Functional Guidelines for Organic Superfund Methods Data Review", United States Environmental Protection Agency (USEPA) 540-R-20-005, November 2020.
2. "Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFASs) Analyzed Using EPA Method 537", EPA 910-R-18-001, November 2018.

Items 1. and 2. will subsequently be referred to as the "Guidelines" in this report.

2. Sample Holding Time and Preservation

The sample holding time criterion and sample preservation requirements for the analyses are summarized in Table 3. The sample chain of custody document and analytical report were used to determine sample holding times. All samples were analyzed within the required holding times.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3. Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of one per analytical batch.

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

4. Isotope Dilution Analyte (IDA) Recoveries

IDA data were evaluated for all PFAS sample analyses. IDAs are isotopically labeled analogs of the analytes of interest added to the investigative and QC samples at the time of extraction. All results are then calculated as a ratio of the IDA responses.

The IDA recovery results for each sample were evaluated against the laboratory established recovery criteria. IDA recoveries must be within laboratory control limits. All isotope dilution analytes yielded acceptable recoveries.

5. Laboratory Control Sample Analyses

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects.

For this study, LCS were analyzed at a minimum frequency of one per analytical batch.

The LCS contained all compounds of interest. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS/MSD samples. The RPD between the MS and MSD is used to assess analytical precision.

If only the MS or MSD recovery was outside of control limits, no qualification of the data was performed based on the acceptable recovery of the companion spike and the acceptable RPD.

MS/MSD analyses were performed as specified in Table 1.

The MS/MSD samples were spiked with all compounds of interest. All percent recoveries and RPD values were within the laboratory control limits, or met the above criteria, demonstrating acceptable analytical accuracy and precision.

7. Field QA/QC Samples

The field QA/QC consisted of one trip blank sample, one field blank sample, one equipment blank sample, and one field duplicate sample set.

Trip Blank Sample Analysis

To evaluate contamination from sample collection, transportation, storage, and analytical activities, one trip blank was submitted to the laboratory for PFAs analysis. All results were non-detect for the compounds of interest.

Field Blank Sample Analysis

To assess ambient conditions at the site, one field blank was submitted for analysis, as identified in Table 1. Most results were non-detect for the analytes of interest. Low-level concentrations of perfluorohexanoic acid (PFHxA) were detected. All associated samples with similar concentrations of PFHxA were qualified as non-detect in Table 4.

Equipment Blank Sample Analysis

To assess field decontamination procedures and cleanliness of sample containers, one equipment blank was submitted for analysis, as identified in Table 1. Most results were non-detect for the analytes of interest. Low-level concentrations of PFHxA were detected. No further qualification of the data was performed, as the compound was already qualified due to detection in the field blank.

Field Duplicate Sample Analysis

To assess the analytical and sampling protocol precision, one field duplicate sample set was collected and submitted "blind" to the laboratory, as specified in Table 1. The RPDs associated with these duplicate samples must be less than 50 percent for water samples. If the reported concentration in either the investigative sample or its duplicate is less than five times the reporting limit (RL), the evaluation criterion is one times the RL value.

All field duplicate results met the above criteria demonstrating acceptable sampling and analytical precision.

8. Analyte Reporting

The laboratory reported detected results down to the laboratory's sample-specific method detection limit (MDL) for each analyte. Positive analyte detections less than the RL but greater than the sample-specific MDL were qualified as estimated (J) in Table 2. Non-detect results were presented as non-detect at the RL in Table 2.

9. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are acceptable with the specific qualifications noted herein.

Regards,

Julie Lundie
Chemistry Data Validator/Analytical Coordinator

Table 1

Sample Collection and Analysis Summary
2024 PFAS Sampling
RACER Nodular
Saginaw, Michigan
December 2024

					Analysis/Parameters	
Sample Identification	**Location**	**Matrix**	**Collection Date (mm/dd/yyyy)**	**Collection Time (hr:min)**	**PFAS**	**Comments**
GW-11208041-121824-BW-005	MW-8R	Groundwater	12/18/2024	09:20	X	
GW-11208041-121824-BW-006	MW-05038	Groundwater	12/18/2024	10:36	X	
GW-11208041-121824-BW-007	MW-04438R	Groundwater	12/18/2024	11:41	X	
GW-11208041-121824-BW-008	MW-05036R	Groundwater	12/18/2024	12:53	X	
GW-11208041-121824-BW-009	MW-04336	Groundwater	12/18/2024	14:49	X	
GW-11208041-121824-BW-010	MW-04336	Groundwater	12/18/2024	14:59	X	FD(GW-11208041-121824-BW-009)
GW-11208041-121924-BW-011	--	Water Quality Control Matrix	12/19/2024	--	X	Equipment Blank
GW-11208041-121924-BW-012	MW-06445	Groundwater	12/19/2024	10:08	X	
GW-11208041-121924-BW-013	MW-05452	Groundwater	12/19/2024	11:33	X	MS/MSD
GW-11208041-121924-BW-014	--	Water Quality Control Matrix	12/19/2024	--	X	Field Blank
TB-11208041	--	Water Quality Control Matrix	12/19/2024	--	X	Trip Blank

Notes:

FD	- Field Duplicate sample of sample in parenthesis
MS/MSD	- Matrix Spike/Matrix Spike Duplicate
PFAS	- Per/Polyfluoroalkyl Substances
--	- Not Applicable

Table 2

Analytical Results Summary
2024 PFAS Sampling
RACER Nodular
Saginaw, Michigan
December 2024

Location ID:		**MW-8R**	**MW-04336**	**MW-04336**
Sample Name:		**GW-11208041-121824-BW-005**	**GW-11208041-121824-BW-009**	**GW-11208041-121824-BW-010**
Sample Date:		**12/18/2024**	**12/18/2024**	**12/18/2024**
				Duplicate
Parameters	**Unit**			
Per/Polyfluoroalkyl Substances				
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ng/L	1.6 U	1.8 U	1.9 U
2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluoro-3-(trifluoromethoxy)propoxy]-propanoic acid (DONA)	ng/L	1.6 U	1.8 U	1.9 U
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	ng/L	1.6 U	1.8 U	1.9 U
Fluorotelomer sulfonic acid (4:2)	ng/L	3.1 U	3.5 U	3.7 U
Fluorotelomer sulfonic acid (6:2)	ng/L	3.1 U	3.5 U	3.7 U
Fluorotelomer sulfonic acid (8:2)	ng/L	3.1 U	3.5 U	3.7 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ng/L	1.2 U	1.3 U	1.4 U
N-Ethyl perfluorooctane sulfonamido acetic acid (N-EtFOSAA)	ng/L	1.6 U	1.8 U	1.9 U
N-Methyl perfluorooctane sulfonamido acetic acid	ng/L	1.6 U	1.8 U	1.9 U
Perfluorobutane sulfonic acid (PFBS)	ng/L	0.87 J	1.6 J	1.6 J
Perfluorobutanoic acid (PFBA)	ng/L	4.4	28	28
Perfluorodecanesulfonic acid (PFDS)	ng/L	1.6 U	1.8 U	1.9 U
Perfluorodecanoic acid (PFDA)	ng/L	1.6 U	1.8 U	1.9 U
Perfluorododecanoic acid (PFDoDA)	ng/L	1.6 U	1.8 U	1.9 U
Perfluoroheptane sulfonic acid (PFHpS)	ng/L	1.6 U	1.8 U	1.9 U
Perfluoroheptanoic acid (PFHpA)	ng/L	0.75 J	2.9	3.0
Perfluorohexane sulfonic acid (PFHxS)	ng/L	1.1 J	2.0	2.0
Perfluorohexanoic acid (PFHxA)	ng/L	3.2	5.0	4.6
Perfluorononane sulfonic acid (PFNS)	ng/L	1.6 U	1.8 U	1.9 U
Perfluorononanoic acid (PFNA)	ng/L	1.0 J	1.8 U	1.9 U
Perfluorooctane sulfonamide (FOSA)	ng/L	1.6 U	1.8 U	1.9 U
Perfluorooctane sulfonic acid (PFOS)	ng/L	5.3	2.6	2.7
Perfluorooctanoic acid (PFOA)	ng/L	4.0	8.5	8.4
Perfluoropentane sulfonic acid (PFPeS)	ng/L	1.6 U	0.51 J	0.61 J
Perfluoropentanoic acid (PFPeA)	ng/L	0.87 J	4.2	4.3
Perfluorotetradecanoic acid (PFTeDA)	ng/L	1.6 U	1.8 U	1.9 U
Perfluorotridecanoic acid (PFTrDA)	ng/L	1.6 U	1.8 U	1.9 U
Perfluoroundecanoic acid (PFUnA)	ng/L	1.6 U	1.8 U	1.9 U
EPA PFAS Hazard Index - April 2024	none	0.210	0.201	0.201

Table 2

Analytical Results Summary
2024 PFAS Sampling
RACER Nodular
Saginaw, Michigan
December 2024

	Location ID:	**MW-04438R**	**MW-05036R**	**MW-05038**
	Sample Name:	**GW-11208041-121824-BW-007**	**GW-11208041-121824-BW-008**	**GW-11208041-121824-BW-006**
	Sample Date:	**12/18/2024**	**12/18/2024**	**12/18/2024**
Parameters	**Unit**			
Per/Polyfluoroalkyl Substances				
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ng/L	1.6 U	1.6 U	1.7 U
2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluoro-3-(trifluoromethoxy)propoxy]-propanoic acid (DONA)	ng/L	1.6 U	1.6 U	1.7 U
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	ng/L	1.6 U	1.6 U	1.7 U
Fluorotelomer sulfonic acid (4:2)	ng/L	3.2 U	3.2 U	3.5 U
Fluorotelomer sulfonic acid (6:2)	ng/L	3.2 U	3.2 U	3.5 U
Fluorotelomer sulfonic acid (8:2)	ng/L	3.2 U	3.2 U	3.5 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ng/L	1.2 U	1.2 U	1.3 U
N-Ethyl perfluorooctane sulfonamido acetic acid (N-EtFOSAA)	ng/L	1.6 U	1.6 U	1.7 U
N-Methyl perfluorooctane sulfonamido acetic acid	ng/L	1.6 U	1.6 U	1.7 U
Perfluorobutane sulfonic acid (PFBS)	ng/L	2.7	1.4 J	0.92 J
Perfluorobutanoic acid (PFBA)	ng/L	17	6.5	9.1
Perfluorodecanesulfonic acid (PFDS)	ng/L	1.6 U	1.6 U	1.7 U
Perfluorodecanoic acid (PFDA)	ng/L	1.6 U	1.6 U	1.7 U
Perfluorododecanoic acid (PFDoDA)	ng/L	1.6 U	1.6 U	1.7 U
Perfluoroheptane sulfonic acid (PFHpS)	ng/L	1.6 U	1.6 U	1.7 U
Perfluoroheptanoic acid (PFHpA)	ng/L	2.7	1.8	0.93 J
Perfluorohexane sulfonic acid (PFHxS)	ng/L	1.6 U	1.1 J	1.0 J
Perfluorohexanoic acid (PFHxA)	ng/L	2.4	1.8	2.6
Perfluorononane sulfonic acid (PFNS)	ng/L	1.6 U	1.6 U	1.7 U
Perfluorononanoic acid (PFNA)	ng/L	0.48 J	0.91 J	1.7 U
Perfluorooctane sulfonamide (FOSA)	ng/L	1.6 U	0.74 J	1.7 U
Perfluorooctane sulfonic acid (PFOS)	ng/L	0.57 J	4.7	11
Perfluorooctanoic acid (PFOA)	ng/L	8.5	5.4	5.9
Perfluoropentane sulfonic acid (PFPeS)	ng/L	1.6 U	1.6 U	1.7 U
Perfluoropentanoic acid (PFPeA)	ng/L	1.5 J	1.2 J	1.1 J
Perfluorotetradecanoic acid (PFTeDA)	ng/L	1.6 U	1.6 U	1.7 U
Perfluorotridecanoic acid (PFTrDA)	ng/L	1.6 U	1.6 U	1.7 U
Perfluoroundecanoic acid (PFUnA)	ng/L	1.6 U	1.6 U	1.7 U
EPA PFAS Hazard Index - April 2024	none	0.0494	0.202	0.100

Table 2

Analytical Results Summary
2024 PFAS Sampling
RACER Nodular
Saginaw, Michigan
December 2024

	Location ID:	**MW-05452**	**MW-06445**
	Sample Name:	**GW-11208041-121924-BW-013**	**GW-11208041-121924-BW-012**
	Sample Date:	**12/19/2024**	**12/19/2024**
Parameters	**Unit**		
Per/Polyfluoroalkyl Substances			
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ng/L	1.6 U	1.6 U
2,2,3-Trifluoro-3-[1,1,2,2,3,3-hexafluoro-3-(trifluoromethoxy)propoxy]-propanoic acid (DONA)	ng/L	1.6 U	1.6 U
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	ng/L	1.6 U	1.6 U
Fluorotelomer sulfonic acid (4:2)	ng/L	3.2 U	3.3 U
Fluorotelomer sulfonic acid (6:2)	ng/L	3.2 U	3.3 U
Fluorotelomer sulfonic acid (8:2)	ng/L	3.2 U	3.3 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ng/L	1.2 U	1.2 U
N-Ethyl perfluorooctane sulfonamido acetic acid (N-EtFOSAA)	ng/L	1.6 U	1.6 U
N-Methyl perfluorooctane sulfonamido acetic acid	ng/L	1.6 U	1.6 U
Perfluorobutane sulfonic acid (PFBS)	ng/L	0.75 J	0.49 J
Perfluorobutanoic acid (PFBA)	ng/L	4.6	8.3
Perfluorodecanesulfonic acid (PFDS)	ng/L	1.6 U	1.6 U
Perfluorodecanoic acid (PFDA)	ng/L	1.6 U	1.6 U
Perfluorododecanoic acid (PFDoDA)	ng/L	1.6 U	1.6 U
Perfluoroheptane sulfonic acid (PFHpS)	ng/L	1.6 U	1.6 U
Perfluoroheptanoic acid (PFHpA)	ng/L	0.77 J	0.47 J
Perfluorohexane sulfonic acid (PFHxS)	ng/L	0.78 J	0.45 J
Perfluorohexanoic acid (PFHxA)	ng/L	1.6 U	1.6 U
Perfluorononane sulfonic acid (PFNS)	ng/L	1.6 U	1.6 U
Perfluorononanoic acid (PFNA)	ng/L	0.83 J	0.52 J
Perfluorooctane sulfonamide (FOSA)	ng/L	0.40 J	0.86 J
Perfluorooctane sulfonic acid (PFOS)	ng/L	4.7	4.0
Perfluorooctanoic acid (PFOA)	ng/L	5.7	2.4
Perfluoropentane sulfonic acid (PFPeS)	ng/L	1.6 U	1.6 U
Perfluoropentanoic acid (PFPeA)	ng/L	1.2 J	1.1 J
Perfluorotetradecanoic acid (PFTeDA)	ng/L	1.6 U	1.6 U
Perfluorotridecanoic acid (PFTrDA)	ng/L	1.6 U	1.6 U
Perfluoroundecanoic acid (PFUnA)	ng/L	1.6 U	1.6 U
EPA PFAS Hazard Index - April 2024	none	0.161	0.0972

Notes:

U - Not detected at the associated reporting limit

J - Estimated concentration

Table 3

Analytical Methods
2024 PFAS Sampling
RACER Nodular
Saginaw, Michigan
December 2024

Parameter	Method	Matrix	Preservation	Holding Time Collection or Extraction to Analysis (Days)
Per- and Polyfluoroalkyl Substances (PFAS)	EPA 1633	Water	pH < 2 and Iced, 0-6° C	28 days

Method Reference:

EPA - "Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS0", EPA/600/R-18/352, Version 1.0, November 2018)

Table 4

Qualified Sample Data Due to Analyte Concentrations in the Field Blanks
2024 PFAS Sampling
RACER Nodular
Saginaw, Michigan
December 2024

Parameter	Rinse Blank ID	Blank Date (mm/dd/yyyy)	Analyte	Blank Result	Associated Sample ID	Original Result	Qualified Result	Units
PFAS	GW-11208041-121924-BW-014	12/19/2024	Perfluorohexanoic acid (PFHxA)	0.94 J	GW-11208041-121924-BW-012	1.0 J	1.6 U	ng/L
					GW-11208041-121924-BW-013	1.5 J	1.6 U	ng/L

Notes:

U - Not detected at the associated reporting limit
J - Estimated concentration
PFAS - Per/Polyfluoroalkyl Substances