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17975 West Sarah Lane  
Suite 100  
Brookfield, WI 53045  
T: 262.754.2560  
F: 262.923.7758  
www.gza.com

November 28, 2023  
File No. 20.0157080.00

Mr. Kevin McKnight, Advanced Hydrogeologist  
Wisconsin Department of Natural Resources  
625 East County Road Y, Suite 700  
Oshkosh, Wisconsin 54901-9731

Re: Additional Groundwater Monitoring Results  
Oshkosh Defense West Plant  
500 Waukau Avenue  
Oshkosh, Wisconsin  
WDNR BRRTS No. 02-71-587406

Dear Mr. McKnight:

GZA GeoEnvironmental, Inc. (GZA), on behalf of Oshkosh Defense LLC (Oshkosh), is submitting additional groundwater monitoring results that were collected from the monitoring well network installed at the West Plant at 500 West Waukau Avenue in Oshkosh, Wisconsin ("Site"). In the Revised Site Investigation Report (SIR), dated February 21, 2023,<sup>1</sup> two additional groundwater sampling events were proposed to evaluate the seasonal variability, stability, and/or attenuation of per- and polyfluoroalkyl substances (PFAS) detected in groundwater.

On March 23 and July 10, 2023, groundwater samples were collected from Site monitoring wells MW-1 through MW-4 using low-flow sampling techniques. The wells were purged with a peristaltic pump equipped with a flow-through cell and multimeter to measure field parameters for temperature, pH, conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity. The wells were purged in accordance with the Wisconsin Department of Natural Resources' (WDNR) Groundwater Sampling Field Manual (RR-037) until the field parameters stabilized. Following stabilization, the tubing was disconnected from the flow-through cell and the samples were collected in laboratory-supplied sample containers. The samples were placed on ice in an insulated cooler and shipped to Pace Analytical® in West Columbia, South Carolina for analysis of the Wisconsin List of 33 PFAS by isotope dilution.

The results of the groundwater samples collected at the Site during these two events and the previous events are summarized in the attached **Table 1** and the laboratory analytical reports are provided in **Attachment 1**. Depth to water measurements and the resulting groundwater elevations are provided in **Table 2**. **Figure 1** is a Site Plan that shows the location of the monitoring wells at the West Plant site.

The results of the groundwater sampling show a general consistency in detected PFAS and respective concentrations with the previous sampling events. However, fluctuating concentrations can be observed between the March and July 2023 sampling events with groundwater levels fluctuating over the same interval. The groundwater elevations were observed in March 2023 to be elevated by approximately 4.5 feet to over 7 feet in Site monitoring wells in comparison to the July sampling event when groundwater levels were similar to the August 2022 sampling event. In

<sup>1</sup> Revised Site Investigation Report, Oshkosh Defense West Plant Site, 500 West Waukau Avenue, Oshkosh, Wisconsin, BRRTS No. 02-71-587406, dated February 21, 2023, GZA File No. 20.0157080.00.



each of the events thus far, groundwater flow direction was consistently observed to be to the east/northeast. Ongoing monitoring events will aid in establishing the validity of the seasonal variation observed.

Based on the results of the two additional groundwater sampling events, Oshkosh proposes to continue groundwater monitoring to establish trends to demonstrate the stability of PFAS concentrations within the shallow groundwater flow system. As of this letter, a minimum of three monitoring events were performed at each well with monitoring well MW-1 having been sampled for five sampling events. Oshkosh proposes to perform additional groundwater sampling events for laboratory analysis of the Wisconsin List of 33 PFAS and submit sample results to the WDNR. The next sampling event will be in November 2023.

The results of these sampling events will be provided to the WDNR by letter as the results are received and evaluated. If you have questions about the results or proposed groundwater sampling plan, please feel free to contact Kevin Hedinger at (262) 754-2578 or by email at [kevin.hedinger@gza.com](mailto:kevin.hedinger@gza.com).

Sincerely,

**GZA GeoEnvironmental, Inc.**

A handwritten signature in blue ink, appearing to read 'K. Hedinger'.

Kevin M. Hedinger  
Senior Hydrogeologist

A handwritten signature in blue ink, appearing to read 'J. Osborne'.

John C. Osborne, P.G.  
Principal Hydrogeologist

J:\157000to157099\157080 Oshkosh\Report\Transmittal Letter Addl GW Mon Results - West Plant\  
FINAL 20.0157080.00 Addl GW Monitoring Results\_West Plant 11-28-23.docx

Attachments: Tables 1 and 2  
Figure 1  
Laboratory Analytical Reports



## TABLES



TABLE 1  
GROUNDWATER ANALYTICAL RESULTS - PFAS  
West Plant Site  
Oshkosh, Wisconsin

Location		NR 140 Proposed ES	NR 140 Proposed PAL	WP-MW-1					WP-MW-2			WP-MW-3 "Upgradient"			WP-MW-4 "Upgradient"			
Sample Name	Laboratory Sample ID			Sample Date	WH24026-001	WJ23011-001	XH08005-001	YC25011-004	YG11006-003	XH08005-001	YC25011-002	YG11006-004	XH08005-001	YC25011-003	YG11006-002	XH08005-001	YC25011-001	YG11006-001
Parameter (ng/L)					CAS Number	8/19/2021	10/16/2021	8/3/2022	3/22/2023	7/10/2023	8/3/2022	3/22/2023	7/10/2023	8/3/2022	3/22/2023	7/10/2023	8/3/2022	3/22/2023
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	NS	NS	<9.4	<8.6	<7.1	<360	<7.2	<7.7	<6.9	<7.0	<7.7	<7.3	<6.8	<7.8	<7.1	<7.0	
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	763051-92-9	NS	NS	<13	<12	<7.1	<360	<7.2	<7.7	<6.9	<7.0	<7.7	<7.3	<6.8	<7.8	<7.1	<7.0	
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	NS	NS	<31	<29	<7.1	<360	<7.2	<7.7	<6.9	<7.0	<7.7	<7.3	<6.8	<7.8	<7.1	<7.0	
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	NS	NS	200	140	9.4 Q	8,900	7.7	<7.7	<6.9	2.1J	<7.7	<7.3	<6.8	<7.8	<7.1	<7.0	
1H, 1H, 2H, 2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	NS	NS	<17	<16	<7.1	<360	<7.2	<7.7	<6.9	<7.0	<7.7	<7.3	<6.8	<7.8	<7.1	<7.0	
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	300	30	<41	<37	<7.1	<360	<7.2	<7.7	<6.9	<7.0	<7.7	<7.3	<6.8	<7.8	<7.1	<7.0	
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	3,000	600	<9.4	<8.6	<7.1	<360	<7.2	<7.7	<6.9	<7.0	<7.7	<7.3	<6.8	<7.8	<7.1	<7.0	
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	NS	NS	<26	<24	<7.1	<360	<7.2	<7.7	<6.9	<7.0	<7.7	<7.3	<6.8	<7.8	<7.1	<7.0	
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	20	2	<15	<13	<7.1	<360	<7.2	<7.7	<6.9	<7.0	<7.7	<7.3	<6.8	<7.8	<7.1	<7.0	
2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE)	1691-99-2	20	2	<19	<17	<7.1	<360	<7.2	<7.7	<6.9	<7.0	<7.7	<7.3	<6.8	<7.8	<7.1	<7.0	
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	NS	NS	<25	<22	<14	<710	<14	<15	<14	<14	<15	<15	<14	<16	<14	<14	
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	NS	NS	<18	<17	<7.1	<360	<7.2	<7.7	<6.9	<7.0	<7.7	<7.3	<6.8	<7.8	<7.1	<7.0	
2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE)	24448-09-7	NS	NS	<25	<23	<7.1	<360	<7.2	<7.7	<6.9	<7.0	<7.7	<7.3	<6.8	<7.8	<7.1	<7.0	
Perfluoro-1-butanefluoride (PFBS)	375-73-5	450,000	90,000	10 J	23 J	10	<180	12	16	<3.5	37	7.5	0.56 J	9.4	5.4	0.61 J	7.7	
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	NS	NS	<15	<14	<3.6	<180	<3.6	<3.8	<3.5	<3.5	<3.9	<3.6	<3.4	<3.9	<3.5	<3.5	
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	NS	NS	<9.7	<8.9	<3.6	<180	<3.6	0.73 J	<3.5	1.5J	<3.9	<3.6	1.0J	<3.9	<3.5	<3.5	
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	NS	NS	<14	<13	<3.6	<180	<3.6	<3.8	<3.5	<3.5	<3.9	<3.6	<3.4	<3.9	<3.5	<3.5	
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	20	2	<12	<11	<3.6	<180	<3.6	<3.8	<3.5	<3.5	<3.9	<3.6	<3.4	<3.9	<3.5	<3.5	
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	NS	NS	<12	<11	2.4 J	<180	2.7J	14	<3.5	35	3.0 J	<3.6	4.3	1.7 J	<3.5	3.0J	
Perfluorododecanesulfonic acid (PFDOS)	79780-39-5	NS	NS	<20	<19	<7.1	<360	<7.2	<7.7	<6.9	<7.0	<7.7	<7.3	<6.8	<7.8	<7.1	<7.0	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	40	4	<b>23 J</b>	<b>13 J</b>	<b>14</b>	<b>37 J</b>	<b>23</b>	<b>95</b>	<3.5	<b>270</b>	<b>16</b>	<3.6	<b>25</b>	<b>13</b>	<3.5	<b>18</b>	
Perfluoro-n-butanefluoride (PFBA)	375-22-4	10,000	2,000	<b>3,800</b>	1,900	<b>2,100</b>	1,300	<b>2,000</b>	36	<3.5	68	<3.9	2.8 J	1.0J	7.4	1.2 J	12	
Perfluoro-n-decanoic acid (PFDA)	335-76-2	300	60	<10	<9.3	<3.6	<180	<3.6	<3.8	<3.5	<3.5	<3.9	<3.6	<3.4	<3.9	<3.5	<3.5	
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	500	100	<9.2	<8.4	<3.6	<180	<3.6	<3.8	<3.5	<3.5	<3.9	<3.6	<3.4	<3.9	<3.5	<3.5	
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	NS	NS	1,300	560	890	1,000	770	15	<3.5	37	<3.9	<3.6	0.98J	1.7 J	<3.5	2.3J	
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	150,000	30,000	7,900	4,000	5,100	3,500	4,200	50	<3.5	160	<3.9	<3.6	1.6J	4.9	<3.5	8.7	
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	30	3	<9.0	<8.2	0.53 J	<180	1.1J	<b>6.1</b>	<3.5	<b>7.5</b>	<b>3.1 J</b>	<3.6	<b>3.2J</b>	0.56 J	<3.5	<b>3.8</b>	
Perfluoro-n-octanoic acid (PFOA)	335-67-1	20	2	<b>120</b>	<b>70 J</b>	<b>50</b>	<b>45 J</b>	<b>150</b>	<b>7.6</b>	<3.5	<b>14</b>	<3.9	<3.6	1.5J	1.7 J	<3.5	3.5	
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	NS	NS	19,000	9,900	11,000	9,300	8,900	100	<3.5	220	0.55 J	1.0 J	1.3J	6.7	<3.5	14	
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	10,000	2,000	<12	<11	<3.6	<180	<3.6	<3.8	<3.5	<3.5	<3.9	<3.6	<3.4	<3.9	<3.5	<3.5	
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	NS	NS	<10	<9.4	<3.6	<180	<3.6	<3.8	<3.5	<3.5	<3.9	<3.6	<3.4	<3.9	<3.5	<3.5	
Perfluoro-n-undecanoic acid (PFUDA)	2058-94-8	3,000	600	<12	<11	<3.6	<180	<3.6	<3.8	<3.5	<3.5	<3.9	<3.6	<3.4	<3.9	<3.5	<3.5	
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	20	2	<39	<36	<b>4.4</b>	<180	<b>6.3</b>	<b>17</b>	<3.5	<b>24</b>	<b>29</b>	<3.6	<b>43</b>	<3.9	<3.5	<b>3.5</b>	
PFOS + PFOA (Calculated)	PFOS+PFOA	20	2	<b>120</b>	<b>70 J</b>	<b>54.4</b>	<b>45 J</b>	<b>156.3</b>	<b>24.6</b>	<7.0	<b>38</b>	<b>29</b>	<7.0	<b>44.5</b>	1.7 J	<7.0	<b>7</b>	

Notes:

1. Samples were collected by GZA GeoEnvironmental, Inc. on the date indicated.
2. **Bold** concentrations indicate an exceedance of the Wisconsin Administrative Code (Wis. Adm. Code) proposed Preventive Action Limit (PAL) and **bold/underlined** concentrations indicate an exceedance of the Wis. Adm. Code proposed Enforcement Standard (ES).
3. Results are presented in nanograms per liter (ng/L).
4. "NS" indicates there is no standard for that parameter.
5. "J"-flagged concentrations indicate that the estimated result is less than the Limit of Quantitation (LOQ) and greater than or equal to the Method Detection Limit (DL).



**TABLE 2**  
**SUMMARY OF GROUNDWATER ELEVATIONS**  
**West Plant**  
**Oshkosh, Wisconsin**

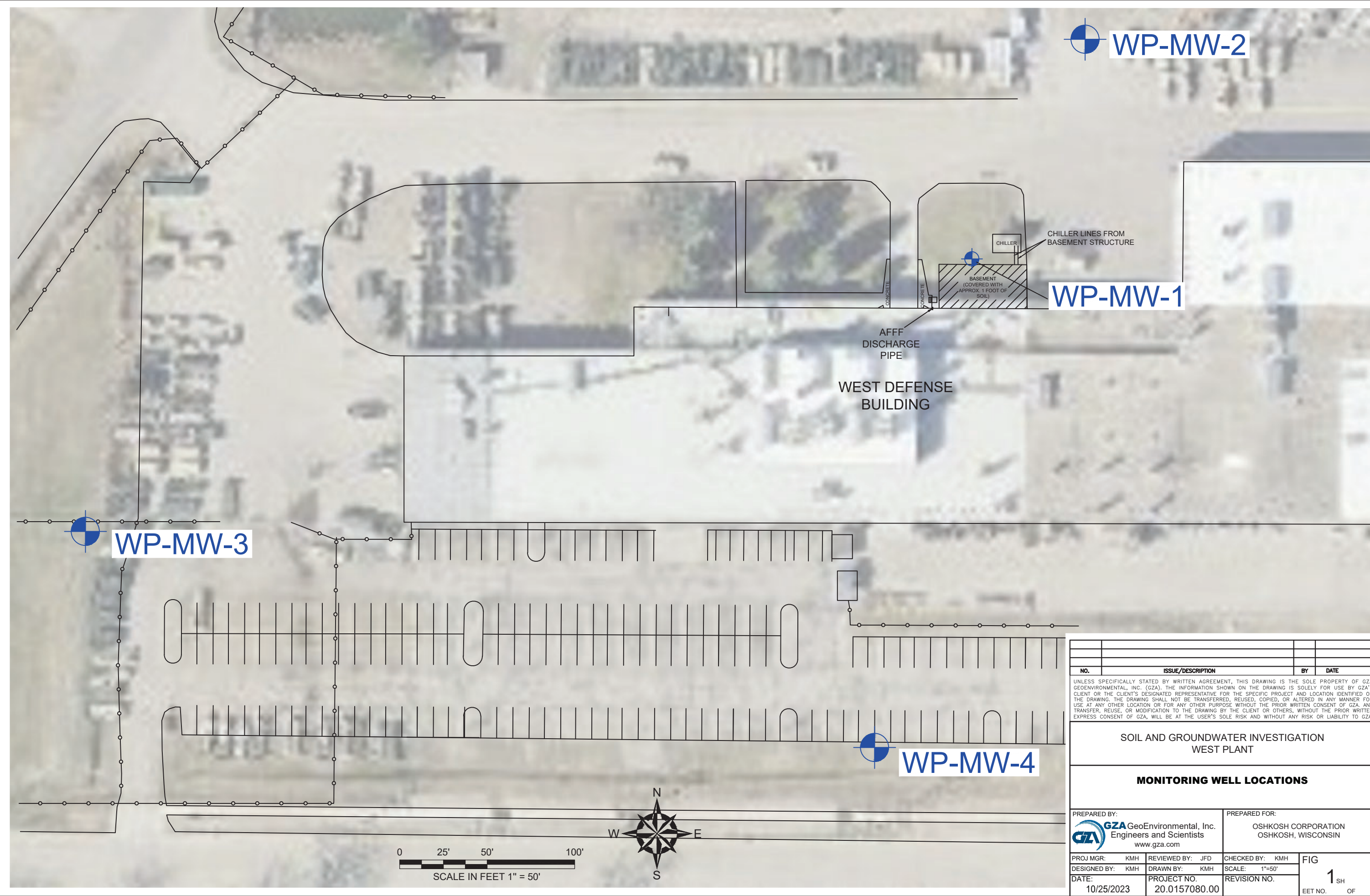
Well	Date	TOC Elevation (feet)	GS Elevation (feet)	Depth to Water (feet)	Groundwater Elevation (feet)
WP-MW-1	8/19/2021	778.02	778.51	13.43	764.59
	10/16/2021			12.73	765.29
	8/3/2022			12.48	765.54
	3/22/2023			8.45	769.57
	7/10/2023			13	765.02
WP-MW-2	8/3/2022	775.96	776.31	12.81	763.15
	3/22/2023			7.44	768.52
	7/10/2023			13.58	762.38
WP-MW-3	8/3/2022	779.80	780.15	11.42	768.38
	3/22/2023			5.09	774.71
	7/10/2023			12.50	767.3
WP-MW-4	8/3/2022	775.39	775.9	11.78	763.61
	3/22/2023			5.65	769.74
	7/10/2023			12.64	762.75

**Notes:**

1. TOC = top of casing.
2. GS = ground surface or rim elevation.



## FIGURES



 WP-MW-2

WP-MW-1

WP-MW-3


WP-MW-4

NO.	ISSUE/DESCRIPTION	BY	DATE

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEON ENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

SOIL AND GROUNDWATER INVESTIGATION  
WEST PLANT

**MONITORING WELL LOCATIONS**

PREPARED BY:  GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: OSHKOSH CORPORATION OSHKOSH, WISCONSIN	
PROJ MGR: KMH	REVIEWED BY: JFD	CHECKED BY: KMH	FIG
DESIGNED BY: KMH	DRAWN BY: KMH	SCALE: 1"=50'	1 <sup>SH</sup>
DATE: 10/25/2023	PROJECT NO. 20.0157080.00	REVISION NO.	



**ATTACHMENT 1**

**Laboratory Analytical Reports**





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## Report of Analysis

**GZA GeoEnvironmental, Inc.**  
17975 West Sarah Lane, Suite 100  
Brookfield, WI 53045  
Attention: Kevin Hedinger

Project Name: Oshkosh GW PFAS Sampling

Project Number: 20.0157080.00

Lot Number: **YC25011**

Date Completed: 04/07/2023

*Kathy Smith*

04/07/2023 9:58 AM

Approved and released by:  
Project Manager II: **Kathy E. Smith**



The electronic signature above is the equivalent of a handwritten signature.  
This report shall not be reproduced, except in its entirety, without the written approval of Pace Analytical Services, LLC.

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Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)  
106 Vantage Point Drive West Columbia, SC 29172  
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

# PACE ANALYTICAL SERVICES, LLC

SC DHEC No: 32010001

NELAC No: E87653

NC DENR No: 329

NC Field Parameters No: 5639

## Case Narrative GZA GeoEnvironmental, Inc. Lot Number: YC25011

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.3 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples were compliant with DOD QSM 5.3 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). The CF is calculated as follows:

$$CF = DF * FV / Vo$$

FV is volume of extract (mL)

Vo is initial sample volume (mL)

DF is dilution factor. For undiluted analysis, DF = 1.

Sample concentration for aqueous samples:

Concentration (ng/L) = Cs\*CF,

$$C_s = \frac{\left( \frac{A_s \times C_{is}}{A_{is}} \right) - B}{M1}$$

Where

C<sub>s</sub> is on column concentration of target analyte in the sample (ng/L)

C<sub>is</sub> is concentration of internal standard in the sample (ng/L)

A<sub>s</sub> is peak response of target analyte in the sample

A<sub>is</sub> is peak response of internal standard in the sample

M1 is the average RF from ICAL or the slope from linear regression ICAL

B is the y-intercept from the ICAL

# PACE ANALYTICAL SERVICES, LLC

SC DHEC No: 32010001

NELAC No: E87653

NC DENR No: 329

NC Field Parameters No: 5639

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

# PACE ANALYTICAL SERVICES, LLC

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**Sample Summary**  
**GZA GeoEnvironmental, Inc.**  
**Lot Number: YC25011**  
**Project Name: Oshkosh GW PFAS Sampling**  
**Project Number: 20.0157080.00**

<b>Sample Number</b>	<b>Sample ID</b>	<b>Matrix</b>	<b>Date Sampled</b>	<b>Date Received</b>
001	WP-MW-4	Aqueous	03/22/2023 1025	03/25/2023
002	WP-MW-2	Aqueous	03/22/2023 1130	03/25/2023
003	WP-MW-3	Aqueous	03/22/2023 1219	03/25/2023
004	WP-MW-1	Aqueous	03/22/2023 1230	03/25/2023
005	WL-MW-4 DUP	Aqueous	03/22/2023 1025	03/25/2023
006	WL-MW-3 DUP	Aqueous	03/22/2023 1219	03/25/2023

(6 samples)

# PACE ANALYTICAL SERVICES, LLC

**Detection Summary**  
**GZA GeoEnvironmental, Inc.**  
**Lot Number: YC25011**  
**Project Name: Oshkosh GW PFAS Sampling**  
**Project Number: 20.0157080.00**

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	WP-MW-4	Aqueous	PFBS	PFAS by ID	0.61	J	ng/L	5
001	WP-MW-4	Aqueous	PFBA	PFAS by ID	1.2	J	ng/L	5
003	WP-MW-3	Aqueous	PFBS	PFAS by ID	0.56	J	ng/L	9
003	WP-MW-3	Aqueous	PFBA	PFAS by ID	2.8	J	ng/L	9
003	WP-MW-3	Aqueous	PFPeA	PFAS by ID	1.0	J	ng/L	9
004	WP-MW-1	Aqueous	6:2 FTS	PFAS by ID	8900		ng/L	11
004	WP-MW-1	Aqueous	PFHxS	PFAS by ID	37	J	ng/L	11
004	WP-MW-1	Aqueous	PFBA	PFAS by ID	1300		ng/L	11
004	WP-MW-1	Aqueous	PFHpA	PFAS by ID	1000		ng/L	11
004	WP-MW-1	Aqueous	PFHxA	PFAS by ID	3500		ng/L	11
004	WP-MW-1	Aqueous	PFOA	PFAS by ID	45	J	ng/L	11
004	WP-MW-1	Aqueous	PFPeA	PFAS by ID	9300		ng/L	11

(12 detections)

# PFAS by LC/MS/MS

Client: **GZA GeoEnvironmental, Inc.**

Laboratory ID: **YC25011-001**

Description: **WP-MW-4**

Matrix: **Aqueous**

Date Sampled: **03/22/2023 1025**

Project Name: **Oshkosh GW PFAS Sampling**

Date Received: **03/25/2023**

Project Number: **20.0157080.00**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/05/2023 1400	ARC2	04/04/2023 1742	71805

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	MDL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.1	0.43	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.1	0.59	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.1	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.1	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.1	0.77	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.1	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.1	0.43	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	PFAS by ID SOP	ND		7.1	1.2	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.1	0.66	ng/L	1
2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE)	1691-99-2	PFAS by ID SOP	ND		7.1	0.84	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	PFAS by ID SOP	ND		14	1.1	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.1	0.83	ng/L	1
2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE)	24448-09-7	PFAS by ID SOP	ND		7.1	1.1	ng/L	1
<b>Perfluoro-1-butanefluoronic acid (PFBS)</b>	<b>375-73-5</b>	<b>PFAS by ID SOP</b>	<b>0.61</b>	<b>J</b>	<b>3.5</b>	<b>0.37</b>	<b>ng/L</b>	<b>1</b>
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.69	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.44	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.63	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.54	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluorododecanesulfonic acid (PFDOS)	79780-39-5	PFAS by ID SOP	ND		7.1	0.93	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.5	0.49	ng/L	1
<b>Perfluoro-n-butanefluoronic acid (PFBA)</b>	<b>375-22-4</b>	<b>PFAS by ID SOP</b>	<b>1.2</b>	<b>J</b>	<b>3.5</b>	<b>0.53</b>	<b>ng/L</b>	<b>1</b>
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.42	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.5	0.40	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.5	0.61	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.5	0.73	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.5	0.48	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.47	ng/L	1
Perfluoro-n-undecanoic acid (PFUDA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.55	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	1.8	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		92	25-150
13C2_6:2FTS		86	25-150
13C2_8:2FTS		88	25-150
13C2_PFDaA		82	25-150
13C2_PFTeDA		84	25-150
13C3_PFBs		93	25-150
13C3_PFHxS		89	25-150
13C3-HFPO-DA		90	25-150
13C4_PFBa		62	25-150

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: <b>GZA GeoEnvironmental, Inc.</b>	Laboratory ID: <b>YC25011-001</b>
Description: <b>WP-MW-4</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>03/22/2023 1025</b>	Project Name: <b>Oshkosh GW PFAS Sampling</b>
Date Received: <b>03/25/2023</b>	Project Number: <b>20.0157080.00</b>

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C4_PFHpA		89	25-150
13C5_PFHxA		89	25-150
13C5_PFPeA		89	25-150
13C6_PFDA		83	25-150
13C7_PFUdA		88	25-150
13C8_PFOA		90	25-150
13C8_PFOS		91	25-150
13C8_PFOSA		88	10-150
13C9_PFNA		93	25-150
d-EtFOSA		53	10-150
d5-EtFOSAA		81	25-150
d9-EtFOSE		85	10-150
d-MeFOSA		59	10-150
d3-MeFOSAA		90	25-150
d7-MeFOSE		82	10-150

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LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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# PFAS by LC/MS/MS

 Client: **GZA GeoEnvironmental, Inc.**

 Laboratory ID: **YC25011-002**

 Description: **WP-MW-2**

 Matrix: **Aqueous**

 Date Sampled: **03/22/2023 1130**

 Project Name: **Oshkosh GW PFAS Sampling**

 Date Received: **03/25/2023**

 Project Number: **20.0157080.00**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/05/2023 1412	ARC2	04/04/2023 1742	71805

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	MDL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.9	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.9	0.57	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.9	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.9	0.76	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.9	1.8	ng/L	1
4,8-dioxo-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.9	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	PFAS by ID SOP	ND		6.9	1.2	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.9	0.65	ng/L	1
2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE)	1691-99-2	PFAS by ID SOP	ND		6.9	0.82	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	PFAS by ID SOP	ND		14	1.1	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.9	0.81	ng/L	1
2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE)	24448-09-7	PFAS by ID SOP	ND		6.9	1.1	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.67	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.51	ng/L	1
Perfluorododecanesulfonic acid (PFDOS)	79780-39-5	PFAS by ID SOP	ND		6.9	0.90	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.5	0.48	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.45	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.5	0.72	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.5	0.47	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUDA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.54	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		92	25-150
13C2_6:2FTS		89	25-150
13C2_8:2FTS		90	25-150
13C2_PFDaA		87	25-150
13C2_PFTeDA		84	25-150
13C3_PFBS		93	25-150
13C3_PFHxS		91	25-150
13C3-HFPO-DA		91	25-150
13C4_PFBA		70	25-150

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: <b>GZA GeoEnvironmental, Inc.</b>	Laboratory ID: <b>YC25011-002</b>
Description: <b>WP-MW-2</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>03/22/2023 1130</b>	Project Name: <b>Oshkosh GW PFAS Sampling</b>
Date Received: <b>03/25/2023</b>	Project Number: <b>20.0157080.00</b>

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C4_PFHpA		90	25-150
13C5_PFHxA		92	25-150
13C5_PFPeA		90	25-150
13C6_PFDA		81	25-150
13C7_PFUdA		85	25-150
13C8_PFOA		90	25-150
13C8_PFOS		90	25-150
13C8_PFOSA		86	10-150
13C9_PFNA		92	25-150
d-EtFOSA		58	10-150
d5-EtFOSAA		84	25-150
d9-EtFOSE		82	10-150
d-MeFOSA		64	10-150
d3-MeFOSAA		89	25-150
d7-MeFOSE		83	10-150

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LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **GZA GeoEnvironmental, Inc.**

Laboratory ID: **YC25011-003**

Description: **WP-MW-3**

Matrix: **Aqueous**

Date Sampled: **03/22/2023 1219**

Project Name: **Oshkosh GW PFAS Sampling**

Date Received: **03/25/2023**

Project Number: **20.0157080.00**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/05/2023 1438	ARC2	04/04/2023 1742	71805

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	MDL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.3	0.44	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.3	0.60	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.3	1.5	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.3	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.3	0.80	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.3	1.9	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.3	0.44	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	PFAS by ID SOP	ND		7.3	1.2	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.3	0.68	ng/L	1
2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE)	1691-99-2	PFAS by ID SOP	ND		7.3	0.87	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	PFAS by ID SOP	ND		15	1.1	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.3	0.85	ng/L	1
2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE)	24448-09-7	PFAS by ID SOP	ND		7.3	1.2	ng/L	1
<b>Perfluoro-1-butanesulfonic acid (PFBS)</b>	<b>375-73-5</b>	<b>PFAS by ID SOP</b>	<b>0.56</b>	<b>J</b>	<b>3.6</b>	<b>0.38</b>	<b>ng/L</b>	<b>1</b>
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.6	0.71	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.6	0.45	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.6	0.65	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.6	0.56	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.6	0.54	ng/L	1
Perfluorododecanesulfonic acid (PFDOS)	79780-39-5	PFAS by ID SOP	ND		7.3	0.95	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.6	0.50	ng/L	1
<b>Perfluoro-n-butanoic acid (PFBA)</b>	<b>375-22-4</b>	<b>PFAS by ID SOP</b>	<b>2.8</b>	<b>J</b>	<b>3.6</b>	<b>0.55</b>	<b>ng/L</b>	<b>1</b>
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.6	0.48	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.6	0.43	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.6	0.41	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.6	0.63	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.6	0.42	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.6	0.76	ng/L	1
<b>Perfluoro-n-pentanoic acid (PFPeA)</b>	<b>2706-90-3</b>	<b>PFAS by ID SOP</b>	<b>1.0</b>	<b>J</b>	<b>3.6</b>	<b>0.50</b>	<b>ng/L</b>	<b>1</b>
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.6	0.55	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.6	0.48	ng/L	1
Perfluoro-n-undecanoic acid (PFUDA)	2058-94-8	PFAS by ID SOP	ND		3.6	0.57	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.6	1.8	ng/L	1

Surrogate	Run 1 Q	% Recovery	Acceptance Limits
13C2_4:2FTS		95	25-150
13C2_6:2FTS		87	25-150
13C2_8:2FTS		89	25-150
13C2_PFDaA		84	25-150
13C2_PFTeDA		82	25-150
13C3_PFBS		91	25-150
13C3_PFHxS		91	25-150
13C3-HFPO-DA		89	25-150
13C4_PFBA		70	25-150

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: <b>GZA GeoEnvironmental, Inc.</b>	Laboratory ID: <b>YC25011-003</b>
Description: <b>WP-MW-3</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>03/22/2023 1219</b>	Project Name: <b>Oshkosh GW PFAS Sampling</b>
Date Received: <b>03/25/2023</b>	Project Number: <b>20.0157080.00</b>

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C4_PFHpA		91	25-150
13C5_PFHxA		91	25-150
13C5_PFPeA		90	25-150
13C6_PFDA		85	25-150
13C7_PFUdA		84	25-150
13C8_PFOA		87	25-150
13C8_PFOS		89	25-150
13C8_PFOSA		87	10-150
13C9_PFNA		86	25-150
d-EtFOSA		61	10-150
d5-EtFOSAA		82	25-150
d9-EtFOSE		82	10-150
d-MeFOSA		65	10-150
d3-MeFOSAA		88	25-150
d7-MeFOSE		83	10-150

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LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: **GZA GeoEnvironmental, Inc.**

Laboratory ID: **YC25011-004**

Description: **WP-MW-1**

Matrix: **Aqueous**

Date Sampled: **03/22/2023 1230**

Project Name: **Oshkosh GW PFAS Sampling**

Date Received: **03/25/2023**

Project Number: **20.0157080.00**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	50	04/05/2023 1451	ARC2	04/04/2023 1742	71805

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	MDL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		360	21	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		360	30	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		360	71	ng/L	1
<b>1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)</b>	<b>27619-97-2</b>	<b>PFAS by ID SOP</b>	<b>8900</b>		<b>360</b>	<b>89</b>	<b>ng/L</b>	<b>1</b>
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		360	39	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		360	92	ng/L	1
4,8-dioxo-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		360	22	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	PFAS by ID SOP	ND		360	60	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		360	33	ng/L	1
2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE)	1691-99-2	PFAS by ID SOP	ND		360	42	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	PFAS by ID SOP	ND		710	56	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		360	42	ng/L	1
2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE)	24448-09-7	PFAS by ID SOP	ND		360	57	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		180	18	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		180	35	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		180	22	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		180	32	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		180	27	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		180	26	ng/L	1
Perfluorododecanesulfonic acid (PFDOS)	79780-39-5	PFAS by ID SOP	ND		360	47	ng/L	1
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>355-46-4</b>	<b>PFAS by ID SOP</b>	<b>37 J</b>		<b>180</b>	<b>25</b>	<b>ng/L</b>	<b>1</b>
<b>Perfluoro-n-butanoic acid (PFBA)</b>	<b>375-22-4</b>	<b>PFAS by ID SOP</b>	<b>1300</b>		<b>180</b>	<b>27</b>	<b>ng/L</b>	<b>1</b>
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		180	23	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		180	21	ng/L	1
<b>Perfluoro-n-heptanoic acid (PFHpA)</b>	<b>375-85-9</b>	<b>PFAS by ID SOP</b>	<b>1000</b>		<b>180</b>	<b>20</b>	<b>ng/L</b>	<b>1</b>
<b>Perfluoro-n-hexanoic acid (PFHxA)</b>	<b>307-24-4</b>	<b>PFAS by ID SOP</b>	<b>3500</b>		<b>180</b>	<b>31</b>	<b>ng/L</b>	<b>1</b>
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		180	21	ng/L	1
<b>Perfluoro-n-octanoic acid (PFOA)</b>	<b>335-67-1</b>	<b>PFAS by ID SOP</b>	<b>45 J</b>		<b>180</b>	<b>37</b>	<b>ng/L</b>	<b>1</b>
<b>Perfluoro-n-pentanoic acid (PFPeA)</b>	<b>2706-90-3</b>	<b>PFAS by ID SOP</b>	<b>9300</b>		<b>180</b>	<b>24</b>	<b>ng/L</b>	<b>1</b>
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		180	27	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		180	24	ng/L	1
Perfluoro-n-undecanoic acid (PFUDA)	2058-94-8	PFAS by ID SOP	ND		180	28	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		180	89	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		87	25-150
13C2_6:2FTS		85	25-150
13C2_8:2FTS		90	25-150
13C2_PFDa		87	25-150
13C2_PFTeDA		90	25-150
13C3_PFBS		95	25-150
13C3_PFHxS		90	25-150
13C3-HFPO-DA		91	25-150
13C4_PFBA		96	25-150

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: <b>GZA GeoEnvironmental, Inc.</b>	Laboratory ID: <b>YC25011-004</b>
Description: <b>WP-MW-1</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>03/22/2023 1230</b>	Project Name: <b>Oshkosh GW PFAS Sampling</b>
Date Received: <b>03/25/2023</b>	Project Number: <b>20.0157080.00</b>

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C4_PFHpA		89	25-150
13C5_PFHxA		89	25-150
13C5_PFPeA		86	25-150
13C6_PFDA		87	25-150
13C7_PFUdA		87	25-150
13C8_PFOA		91	25-150
13C8_PFOS		90	25-150
13C8_PFOSA		90	10-150
13C9_PFNA		87	25-150
d-EtFOSA		86	10-150
d5-EtFOSAA		86	25-150
d9-EtFOSE		89	10-150
d-MeFOSA		94	10-150
d3-MeFOSAA		85	25-150
d7-MeFOSE		88	10-150

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LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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## QC Summary

# PFAS by LC/MS/MS - MB

Sample ID: YQ71805-001

Matrix: Aqueous

Batch: 71805

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/04/2023 1742

Parameter	Result	Q	Dil	LOQ	MDL	Units	Analysis Date
9CI-PF3ONS	ND		1	8.0	0.48	ng/L	04/05/2023 1256
11CI-PF3OUdS	ND		1	8.0	0.66	ng/L	04/05/2023 1256
8:2 FTS	ND		1	8.0	1.6	ng/L	04/05/2023 1256
6:2 FTS	ND		1	8.0	2.0	ng/L	04/05/2023 1256
4:2 FTS	ND		1	8.0	0.87	ng/L	04/05/2023 1256
GenX	ND		1	8.0	2.1	ng/L	04/05/2023 1256
ADONA	ND		1	8.0	0.48	ng/L	04/05/2023 1256
EtFOSA	ND		1	8.0	1.4	ng/L	04/05/2023 1256
EtFOSAA	ND		1	8.0	0.75	ng/L	04/05/2023 1256
EtFOSE	ND		1	8.0	0.95	ng/L	04/05/2023 1256
MeFOSA	ND		1	16	1.3	ng/L	04/05/2023 1256
MeFOSAA	ND		1	8.0	0.93	ng/L	04/05/2023 1256
MeFOSE	ND		1	8.0	1.3	ng/L	04/05/2023 1256
PFBS	ND		1	4.0	0.41	ng/L	04/05/2023 1256
PFDS	ND		1	4.0	0.78	ng/L	04/05/2023 1256
PFHpS	ND		1	4.0	0.50	ng/L	04/05/2023 1256
PFNS	ND		1	4.0	0.71	ng/L	04/05/2023 1256
PFOSA	ND		1	4.0	0.61	ng/L	04/05/2023 1256
PFPeS	ND		1	4.0	0.59	ng/L	04/05/2023 1256
PFDOS	ND		1	8.0	1.0	ng/L	04/05/2023 1256
PFHxS	ND		1	4.0	0.55	ng/L	04/05/2023 1256
PFBA	ND		1	4.0	0.60	ng/L	04/05/2023 1256
PFDA	ND		1	4.0	0.52	ng/L	04/05/2023 1256
PFDoA	ND		1	4.0	0.47	ng/L	04/05/2023 1256
PFHpA	ND		1	4.0	0.45	ng/L	04/05/2023 1256
PFHxA	ND		1	4.0	0.69	ng/L	04/05/2023 1256
PFNA	ND		1	4.0	0.46	ng/L	04/05/2023 1256
PFOA	ND		1	4.0	0.83	ng/L	04/05/2023 1256
PFPeA	ND		1	4.0	0.54	ng/L	04/05/2023 1256
PFTeDA	ND		1	4.0	0.60	ng/L	04/05/2023 1256
PFTTrDA	ND		1	4.0	0.53	ng/L	04/05/2023 1256
PFUdA	ND		1	4.0	0.63	ng/L	04/05/2023 1256
PFOS	ND		1	4.0	2.0	ng/L	04/05/2023 1256

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		92	25-150
13C2_6:2FTS		91	25-150
13C2_8:2FTS		87	25-150
13C2_PFDoA		86	25-150
13C2_PFTeDA		87	25-150
13C3_PFBs		92	25-150
13C3_PFHxS		91	25-150
13C3-HFPO-DA		92	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

## PFAS by LC/MS/MS - MB

Sample ID: YQ71805-001

Matrix: Aqueous

Batch: 71805

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/04/2023 1742

Surrogate	Q	% Rec	Acceptance Limit
13C4_PFBA		92	25-150
13C4_PFHpA		90	25-150
13C5_PFHxA		91	25-150
13C5_PFPeA		89	25-150
13C6_PFDA		86	25-150
13C7_PFUdA		82	25-150
13C8_PFOA		92	25-150
13C8_PFOS		90	25-150
13C8_PFOA		90	25-150
13C8_PFOSA		86	10-150
13C9_PFNA		91	25-150
d-EtFOSA		47	10-150
d5-EtFOSAA		84	25-150
d9-EtFOSE		75	10-150
d-MeFOSA		53	10-150
d3-MeFOSAA		91	25-150
d7-MeFOSE		74	10-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**



# PFAS by LC/MS/MS - LCS

Sample ID: YQ71805-002

Matrix: Aqueous

Batch: 71805

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/04/2023 1742

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9CI-PF3ONS	15	18		1	117	50-150	04/05/2023 1308
11CI-PF3OUdS	15	16		1	109	50-150	04/05/2023 1308
8:2 FTS	15	18		1	120	50-150	04/05/2023 1308
6:2 FTS	15	17		1	110	50-150	04/05/2023 1308
4:2 FTS	15	18		1	121	50-150	04/05/2023 1308
GenX	32	37		1	115	50-150	04/05/2023 1308
ADONA	15	17		1	111	50-150	04/05/2023 1308
EtFOSA	16	18		1	110	50-150	04/05/2023 1308
EtFOSAA	16	18		1	115	50-150	04/05/2023 1308
EtFOSE	16	18		1	116	50-150	04/05/2023 1308
MeFOSA	16	19		1	121	50-150	04/05/2023 1308
MeFOSAA	16	18		1	111	50-150	04/05/2023 1308
MeFOSE	16	17		1	106	50-150	04/05/2023 1308
PFBS	14	16		1	111	50-150	04/05/2023 1308
PFDS	15	17		1	109	50-150	04/05/2023 1308
PFHpS	15	16		1	103	50-150	04/05/2023 1308
PFNS	15	17		1	111	50-150	04/05/2023 1308
PFOSA	16	19		1	120	50-150	04/05/2023 1308
PFPeS	15	16		1	106	50-150	04/05/2023 1308
PFDOS	15	17		1	107	50-150	04/05/2023 1308
PFHxS	15	15		1	103	50-150	04/05/2023 1308
PFBA	16	18		1	114	50-150	04/05/2023 1308
PFDA	16	16		1	101	50-150	04/05/2023 1308
PFDoA	16	19		1	118	50-150	04/05/2023 1308
PFHpA	16	19		1	116	50-150	04/05/2023 1308
PFHxA	16	18		1	112	50-150	04/05/2023 1308
PFNA	16	19		1	116	50-150	04/05/2023 1308
PFOA	16	18		1	110	50-150	04/05/2023 1308
PFPeA	16	18		1	112	50-150	04/05/2023 1308
PFTeDA	16	19		1	119	50-150	04/05/2023 1308
PFTTrDA	16	18		1	109	50-150	04/05/2023 1308
PFUdA	16	18		1	115	50-150	04/05/2023 1308
PFOS	15	17		1	113	50-150	04/05/2023 1308
Surrogate	Q	% Rec	Acceptance Limit				
13C2_4:2FTS		88	25-150				
13C2_6:2FTS		83	25-150				
13C2_8:2FTS		85	25-150				
13C2_PFDoA		86	25-150				
13C2_PFTeDA		86	25-150				
13C3_PFBS		91	25-150				
13C3_PFHxS		89	25-150				
13C3-HFPO-DA		90	25-150				

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - LCS

Sample ID: YQ71805-002

Matrix: Aqueous

Batch: 71805

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/04/2023 1742

Surrogate	Q	% Rec	Acceptance Limit
13C4_PFBAs		91	25-150
13C4_PFHpA		83	25-150
13C5_PFHxA		91	25-150
13C5_PFPeA		86	25-150
13C6_PFDA		84	25-150
13C7_PFUdA		83	25-150
13C8_PFOA		90	25-150
13C8_PFOS		87	25-150
13C8_PFOSA		84	10-150
13C9_PFNA		88	25-150
d-EtFOSA		47	10-150
d5-EtFOSAA		77	25-150
d9-EtFOSE		75	10-150
d-MeFOSA		50	10-150
d3-MeFOSAA		89	25-150
d7-MeFOSE		83	10-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MS

Sample ID: YC25011-002MS

Matrix: Aqueous

Batch: 71805

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/04/2023 1742

Parameter	Sample Amount (ng/L)	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9CI-PF3ONS	ND	14	15		1	109	50-150	04/05/2023 1425
11CI-PF3OUdS	ND	14	14		1	104	50-150	04/05/2023 1425
8:2 FTS	ND	14	14		1	100	50-150	04/05/2023 1425
6:2 FTS	ND	14	14		1	104	50-150	04/05/2023 1425
4:2 FTS	ND	14	15		1	110	50-150	04/05/2023 1425
GenX	ND	29	32		1	109	50-150	04/05/2023 1425
ADONA	ND	14	16		1	113	50-150	04/05/2023 1425
EtFOSA	ND	15	16		1	111	50-150	04/05/2023 1425
EtFOSAA	ND	15	17		1	114	50-150	04/05/2023 1425
EtFOSE	ND	15	16		1	109	50-150	04/05/2023 1425
MeFOSA	ND	15	17		1	117	50-150	04/05/2023 1425
MeFOSAA	ND	15	15		1	105	50-150	04/05/2023 1425
MeFOSE	ND	15	17		1	114	50-150	04/05/2023 1425
PFBS	ND	13	14		1	105	50-150	04/05/2023 1425
PFDS	ND	14	15		1	105	50-150	04/05/2023 1425
PFHpS	ND	14	15		1	106	50-150	04/05/2023 1425
PFNS	ND	14	15		1	106	50-150	04/05/2023 1425
PFOSA	ND	15	17		1	117	50-150	04/05/2023 1425
PFPeS	ND	14	15		1	108	50-150	04/05/2023 1425
PFDOS	ND	14	15		1	104	50-150	04/05/2023 1425
PFHxS	ND	13	14		1	109	50-150	04/05/2023 1425
PFBA	ND	15	15		1	106	50-150	04/05/2023 1425
PFDA	ND	15	16		1	108	50-150	04/05/2023 1425
PFDaA	ND	15	15		1	101	50-150	04/05/2023 1425
PFHpA	ND	15	16		1	111	50-150	04/05/2023 1425
PFHxA	ND	15	16		1	108	50-150	04/05/2023 1425
PFNA	ND	15	17		1	116	50-150	04/05/2023 1425
PFOA	ND	15	17		1	115	50-150	04/05/2023 1425
PFPeA	ND	15	15		1	104	50-150	04/05/2023 1425
PFTeDA	ND	15	17		1	117	50-150	04/05/2023 1425
PFTrDA	ND	15	16		1	112	50-150	04/05/2023 1425
PFUdA	ND	15	16		1	109	50-150	04/05/2023 1425
PFOS	ND	14	15		1	110	50-150	04/05/2023 1425
Surrogate	Q	% Rec	Acceptance Limit					
13C2_4:2FTS		88	25-150					
13C2_6:2FTS		83	25-150					
13C2_8:2FTS		85	25-150					
13C2_PFDaA		81	25-150					
13C2_PFTeDA		77	25-150					
13C3_PFBS		92	25-150					
13C3_PFHxS		85	25-150					
13C3-HFPO-DA		89	25-150					

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - MS

Sample ID: YC25011-002MS

Matrix: Aqueous

Batch: 71805

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/04/2023 1742

Surrogate	Q	% Rec	Acceptance Limit
13C4_PFBa		70	25-150
13C4_PFHpA		86	25-150
13C5_PFHxA		89	25-150
13C5_PFPeA		91	25-150
13C6_PFDA		81	25-150
13C7_PFUdA		82	25-150
13C8_PFOA		88	25-150
13C8_PFOS		89	25-150
13C8_PFOSA		87	10-150
13C9_PFNA		87	25-150
d-EtFOSA		52	10-150
d5-EtFOSAA		77	25-150
d9-EtFOSE		80	10-150
d-MeFOSA		60	10-150
d3-MeFOSAA		84	25-150
d7-MeFOSE		82	10-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# PFAS by LC/MS/MS - Duplicate

Sample ID: YC25011-004DU

Matrix: Aqueous

Batch: 71805

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/04/2023 1742

Parameter	Sample Amount (ng/L)	Result (ng/L)	Q	Dil	% RPD	%RPD Limit	Analysis Date
9CI-PF3ONS	ND	ND		50	0.00	20	04/05/2023 1504
11CI-PF3OUdS	ND	ND		50	0.00	20	04/05/2023 1504
8:2 FTS	ND	ND		50	0.00	20	04/05/2023 1504
6:2 FTS	8900	8300		50	7.3	20	04/05/2023 1504
4:2 FTS	ND	ND		50	0.00	20	04/05/2023 1504
GenX	ND	ND		50	0.00	20	04/05/2023 1504
ADONA	ND	ND		50	0.00	20	04/05/2023 1504
EtFOSA	ND	ND		50	0.00	20	04/05/2023 1504
EtFOSAA	ND	ND		50	0.00	20	04/05/2023 1504
EtFOSE	ND	ND		50	0.00	20	04/05/2023 1504
MeFOSA	ND	ND		50	0.00	20	04/05/2023 1504
MeFOSAA	ND	ND		50	0.00	20	04/05/2023 1504
MeFOSE	ND	ND		50	0.00	20	04/05/2023 1504
PFBS	ND	ND		50	0.00	20	04/05/2023 1504
PFDS	ND	ND		50	0.00	20	04/05/2023 1504
PFHpS	ND	ND		50	0.00	20	04/05/2023 1504
PFNS	ND	ND		50	0.00	20	04/05/2023 1504
PFOSA	ND	ND		50	0.00	20	04/05/2023 1504
PFPeS	ND	ND		50	0.00	20	04/05/2023 1504
PFDOS	ND	ND		50	0.00	20	04/05/2023 1504
PFHxS	37	30	J,+	50	23	20	04/05/2023 1504
PFBA	1300	1200		50	7.8	20	04/05/2023 1504
PFDA	ND	ND		50	0.00	20	04/05/2023 1504
PFDaA	ND	ND		50	0.00	20	04/05/2023 1504
PFHpA	1000	900		50	9.9	20	04/05/2023 1504
PFHxA	3500	3100		50	12	20	04/05/2023 1504
PFNA	ND	ND		50	0.00	20	04/05/2023 1504
PFOA	45	ND		50	0.00	20	04/05/2023 1504
PFPeA	9300	8200		50	13	20	04/05/2023 1504
PFTeDA	ND	ND		50	0.00	20	04/05/2023 1504
PFTTrDA	ND	ND		50	0.00	20	04/05/2023 1504
PFUdA	ND	ND		50	0.00	20	04/05/2023 1504
PFOS	ND	ND		50	0.00	20	04/05/2023 1504

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		106	25-150
13C2_6:2FTS		94	25-150
13C2_8:2FTS		98	25-150
13C2_PFDaA		102	25-150
13C2_PFTeDA		97	25-150
13C3_PFBs		107	25-150
13C3_PFHxS		102	25-150
13C3-HFPO-DA		104	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

## PFAS by LC/MS/MS - Duplicate

Sample ID: YC25011-004DU

Matrix: Aqueous

Batch: 71805

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/04/2023 1742

Surrogate	Q	% Rec	Acceptance Limit
13C4_PFBa		105	25-150
13C4_PFHpA		101	25-150
13C5_PFHxA		104	25-150
13C5_PFPeA		100	25-150
13C6_PFDA		95	25-150
13C7_PFUdA		97	25-150
13C8_PFOA		104	25-150
13C8_PFOS		103	25-150
13C8_PFOSA		104	10-150
13C9_PFNA		102	25-150
d-EtFOSA		99	10-150
d5-EtFOSAA		97	25-150
d9-EtFOSE		109	10-150
d-MeFOSA		108	10-150
d3-MeFOSAA		100	25-150
d7-MeFOSE		109	10-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria


+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

**Chain of Custody  
and  
Miscellaneous Documents**

**Pace Analytical Services, LLC.**  
 106 Vantage Point Drive  
 West Columbia, South Carolina 29172  
 Telephone No. (803) 791-9700 Fax No. (803) 791-9111  
 www.pacelabs.com

**Pace Analytical™ Chain of Custody Record**

Client: GZA GeoEnvironmental Address: 17975 W. Sarah Lane City: Brookfield State: WI Zip Code: 53045 Project Name: Oshkosh Corp GW Project Number: 20.0157080.00		Report to Contact: Kevin.hedinger@gza.com Sample's Signature: <i>Kevin Hedinger</i> Printed Name: <i>Kevin Hedinger</i>		Telephone No. / E-mail: Kevin.hedinger@gza.com An analysis (Attach list if more space is needed)		Quote No.: Page: 1 of 1 Lot # Bar Code:  YC25011 REG											
Sample ID / Description <small>(Conditions for each sample may be contained on an insert)</small>	Collection Date(s)	Collection Time (military)	G-Grab	Matrix			No. of Containers by Preservative Type					Possible Hazard Identification (List any known hazards in the remarks)	CC Requirements				
				Aqueous	Solid	Non-Aqueous	H2SO4	HNO3	HCl	H2O2	50% NaOH			Filtered			
WL-MW-4	3/22/23	1025	G	X													
WL-MW-2	3/22/23	1130	G	X													
WL-MW-3	3/22/23	1219	G	X													
WL-MW-1	3/22/23	1230	G	X													
WL-MW-4 DUP	3/22/23	1025	G	X													Hold!
WL-MW-3 DUP	3/22/23	1219	G	X													Hold!



# PACE ANALYTICAL SERVICES, LLC

DC#\_Title: ENV-FRM-WCOL-0286 v02\_Samples Receipt Checklist (SRC)  
 Effective Date: 8/2/2022

## Sample Receipt Checklist (SRC)

Client: GZA

Cooler Inspected by/date: CDR / 3/25/23

Lot #: YC25011

Means of receipt: <input type="checkbox"/> Pace <input type="checkbox"/> Client <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Other: _____	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	1. Were custody seals present on the cooler?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	2. If custody seals were present, were they intact and unbroken?
pH Strip ID: NA Chlorine Strip ID: NA Tested by: CDR	
Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA	
0.8 / 0.8 °C NA / NA °C NA / NA °C NA / NA °C	
Method: <input checked="" type="checkbox"/> Temperature Blank <input type="checkbox"/> Against Bottles IR Gun ID: 8 IR Gun Correction Factor: 0 °C	
Method of coolant: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry Ice <input type="checkbox"/> None	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one).
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	4. Is the commercial courier's packing slip attached to this form?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5. Were proper custody procedures (relinquished/received) followed?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. Were sample IDs listed on the COC and all sample containers?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7. Was collection date & time listed on the COC and all sample containers?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8. Did all container label information (ID, date, time) agree with the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9. Were tests to be performed listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	11. Was adequate sample volume available?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	12. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	13. Were all samples containers accounted for? (No missing/excess)
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	14. Were VOA, 8015C and RSK-175 samples free of bubbles >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	15. Were all DRO/metals/nutrient samples received at a pH of < 2?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	17. Were all applicable NH <sub>3</sub> /TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA	18. Was the quote number listed on the container label? If yes, Quote #
<b>Sample Preservation</b> (Must be completed for any sample(s) incorrectly preserved or with headspace.)	
Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA	
Time of preservation NA. If more than one preservative is needed, please note in the comments below.	
Sample(s) NA were received with bubbles >6 mm in diameter.	
Samples(s) NA were received with TRC > 0.5 mg/L (if #19 is <i>no</i> ) and were adjusted accordingly in sample receiving with sodium thiosulfate (Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> ) with Unique ID: NA	
Comments:	



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## Report of Analysis

**GZA GeoEnvironmental, Inc.**  
17975 West Sarah Lane, Suite 100  
Brookfield, WI 53045  
Attention: Sheryl Stephenson

Project Name: Oshkosh - West Plant

Lot Number: **YG11006**

Date Completed: 07/26/2023

*Kathy Smith*

07/27/2023 9:25 AM

Approved and released by:  
Project Manager II: **Kathy E. Smith**



The electronic signature above is the equivalent of a handwritten signature.  
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Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)  
106 Vantage Point Drive West Columbia, SC 29172  
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

# PACE ANALYTICAL SERVICES, LLC

SC DHEC No: 32010001

NELAC No: E87653

NC DENR No: 329

NC Field Parameters No: 5639

## Case Narrative GZA GeoEnvironmental, Inc. Lot Number: YG11006

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.4 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples were compliant with DOD QSM 5.4 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). The CF is calculated as follows:

$$CF = DF * FV / Vo$$

FV is volume of extract (mL)

Vo is initial sample volume (mL)

DF is dilution factor. For undiluted analysis, DF = 1.

Sample concentration for aqueous samples:

Concentration (ng/L) = Cs\*CF,

$$C_s = \frac{\left( \frac{A_s \times C_{is}}{A_{is}} \right) - B}{M1}$$

Where

C<sub>s</sub> is on column concentration of target analyte in the sample (ng/L)

C<sub>is</sub> is concentration of internal standard in the sample (ng/L)

A<sub>s</sub> is peak response of target analyte in the sample

A<sub>is</sub> is peak response of internal standard in the sample

M1 is the average RF from ICAL or the slope from linear regression ICAL

B is the y-intercept from the ICAL

# PACE ANALYTICAL SERVICES, LLC

SC DHEC No: 32010001

NELAC No: E87653

NC DENR No: 329

NC Field Parameters No: 5639

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18, PFAS by Isotope Dilution SOP.

Pace is a DoD/DoE and TNI accredited laboratory; however, Pace is not accredited for PFAS Direct Aqueous Injection or Method D8421.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

## PFAS

Surrogate recovery for the following samples was outside the upper control limit: YG11006-001, YG11006-002. This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

Surrogate recovery for the following samples was outside the upper control limit: YG11006-004, YG11006-005, YG11006-006. This sample did not contain any target analytes >1/2 LOQ; therefore, re-extraction and/or re-analysis was not performed.

# PACE ANALYTICAL SERVICES, LLC

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Sample Summary  
GZA GeoEnvironmental, Inc.  
Lot Number: YG11006  
Project Name: Oshkosh - West Plant  
Project Number:

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Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	WP-MW-4	Aqueous	07/10/2023 1200	07/11/2023
002	WP-MW-3	Aqueous	07/10/2023 1344	07/11/2023
003	WP-MW-1	Aqueous	07/10/2023 1400	07/11/2023
004	WP-MW-2	Aqueous	07/10/2023 1440	07/11/2023
005	EQ BLANK	Aqueous	07/10/2023 1445	07/11/2023
006	FIELD BLANK	Aqueous	07/10/2023 1440	07/11/2023

---

(6 samples)

# PACE ANALYTICAL SERVICES, LLC

Detection Summary  
 GZA GeoEnvironmental, Inc.  
 Lot Number: YG11006  
 Project Name: Oshkosh - West Plant  
 Project Number:

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	WP-MW-4	Aqueous	PFBS	PFAS by ID	7.7		ng/L	7
001	WP-MW-4	Aqueous	PFPeS	PFAS by ID	3.0	J	ng/L	7
001	WP-MW-4	Aqueous	PFHxS	PFAS by ID	18		ng/L	7
001	WP-MW-4	Aqueous	PFBA	PFAS by ID	12		ng/L	7
001	WP-MW-4	Aqueous	PFHpA	PFAS by ID	2.3	J	ng/L	7
001	WP-MW-4	Aqueous	PFHxA	PFAS by ID	8.7		ng/L	7
001	WP-MW-4	Aqueous	PFNA	PFAS by ID	3.8		ng/L	7
001	WP-MW-4	Aqueous	PFOA	PFAS by ID	3.5		ng/L	7
001	WP-MW-4	Aqueous	PFPeA	PFAS by ID	14		ng/L	7
001	WP-MW-4	Aqueous	PFOS	PFAS by ID	3.5		ng/L	7
002	WP-MW-3	Aqueous	PFBS	PFAS by ID	9.4		ng/L	9
002	WP-MW-3	Aqueous	PFHpS	PFAS by ID	1.0	J	ng/L	9
002	WP-MW-3	Aqueous	PFPeS	PFAS by ID	4.3		ng/L	9
002	WP-MW-3	Aqueous	PFHxS	PFAS by ID	25		ng/L	9
002	WP-MW-3	Aqueous	PFBA	PFAS by ID	1.0	J	ng/L	9
002	WP-MW-3	Aqueous	PFHpA	PFAS by ID	0.98	J	ng/L	9
002	WP-MW-3	Aqueous	PFHxA	PFAS by ID	1.6	J	ng/L	9
002	WP-MW-3	Aqueous	PFNA	PFAS by ID	3.2	J	ng/L	9
002	WP-MW-3	Aqueous	PFOA	PFAS by ID	1.5	J	ng/L	9
002	WP-MW-3	Aqueous	PFPeA	PFAS by ID	1.3	J	ng/L	9
002	WP-MW-3	Aqueous	PFOS	PFAS by ID	43		ng/L	9
003	WP-MW-1	Aqueous	6:2 FTS	PFAS by ID	7.7		ng/L	11
003	WP-MW-1	Aqueous	PFBS	PFAS by ID	12		ng/L	11
003	WP-MW-1	Aqueous	PFPeS	PFAS by ID	2.7	J	ng/L	11
003	WP-MW-1	Aqueous	PFHxS	PFAS by ID	23		ng/L	11
003	WP-MW-1	Aqueous	PFBA	PFAS by ID	2000		ng/L	11
003	WP-MW-1	Aqueous	PFHpA	PFAS by ID	770		ng/L	11
003	WP-MW-1	Aqueous	PFHxA	PFAS by ID	4200		ng/L	11
003	WP-MW-1	Aqueous	PFNA	PFAS by ID	1.1	J	ng/L	11
003	WP-MW-1	Aqueous	PFOA	PFAS by ID	150		ng/L	11
003	WP-MW-1	Aqueous	PFPeA	PFAS by ID	8900		ng/L	11
003	WP-MW-1	Aqueous	PFOS	PFAS by ID	6.3		ng/L	11
004	WP-MW-2	Aqueous	6:2 FTS	PFAS by ID	2.1	JQ	ng/L	13
004	WP-MW-2	Aqueous	PFBS	PFAS by ID	37		ng/L	13
004	WP-MW-2	Aqueous	PFHpS	PFAS by ID	1.5	J	ng/L	13
004	WP-MW-2	Aqueous	PFPeS	PFAS by ID	35		ng/L	13
004	WP-MW-2	Aqueous	PFHxS	PFAS by ID	270		ng/L	13
004	WP-MW-2	Aqueous	PFBA	PFAS by ID	68		ng/L	13
004	WP-MW-2	Aqueous	PFHpA	PFAS by ID	37		ng/L	13
004	WP-MW-2	Aqueous	PFHxA	PFAS by ID	160		ng/L	13
004	WP-MW-2	Aqueous	PFNA	PFAS by ID	7.5		ng/L	13
004	WP-MW-2	Aqueous	PFOA	PFAS by ID	14		ng/L	13
004	WP-MW-2	Aqueous	PFPeA	PFAS by ID	220		ng/L	13

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## Detection Summary (Continued)

Lot Number: YG11006

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
004	WP-MW-2	Aqueous	PFOS	PFAS by ID	24		ng/L	13
005	EQ BLANK	Aqueous	6:2 FTS	PFAS by ID	2.4	JQ	ng/L	15
006	FIELD BLANK	Aqueous	6:2 FTS	PFAS by ID	3.0	JQ	ng/L	17

(46 detections)

# PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: YG11006-001
Description: WP-MW-4	Matrix: Aqueous
Date Sampled: 07/10/2023 1200	Project Name: Oshkosh - West Plant
Date Received: 07/11/2023	Project Number:

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	07/18/2023 2258	OMNS	07/14/2023 1042	79956

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	MDL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.0	0.58	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.0	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	Q	7.0	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	7.0	0.77	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	PFAS by ID SOP	ND		7.0	1.2	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.0	0.66	ng/L	1
2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE)	1691-99-2	PFAS by ID SOP	ND		7.0	0.83	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	PFAS by ID SOP	ND		14	1.1	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.0	0.82	ng/L	1
2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE)	24448-09-7	PFAS by ID SOP	ND		7.0	1.1	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	7.7		3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.68	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.44	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.54	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	3.0	J	3.5	0.52	ng/L	1
Perfluorododecanesulfonic acid (PFDOS)	79780-39-5	PFAS by ID SOP	ND		7.0	0.92	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	18		3.5	0.48	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	12		3.5	0.53	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	2.3	J	3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	8.7		3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	3.8		3.5	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	3.5		3.5	0.73	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	14		3.5	0.48	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUDA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.55	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	3.5		3.5	1.8	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	192	25-150
13C2_6:2FTS	N	194	25-150
13C2_8:2FTS		98	25-150
13C2_PFDa		87	25-150
13C2_PFTeDA		90	25-150
13C3_PFBS		98	25-150
13C3_PFHxS		102	25-150
13C3-HFPO-DA		93	25-150
13C4_PFBA		63	25-150

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: YG11006-001
Description: WP-MW-4	Matrix: Aqueous
Date Sampled: 07/10/2023 1200	Project Name: Oshkosh - West Plant
Date Received: 07/11/2023	Project Number:

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C4_PFHpA		96	25-150
13C5_PFHxA		96	25-150
13C5_PFPeA		85	25-150
13C6_PFDA		92	25-150
13C7_PFUdA		90	25-150
13C8_PFOA		105	25-150
13C8_PFOS		84	25-150
13C8_PFOSA		98	10-150
13C9_PFNA		97	25-150
d-EtFOSA		50	10-150
d5-EtFOSAA		85	25-150
d9-EtFOSE		63	10-150
d-MeFOSA		48	10-150
d3-MeFOSAA		90	25-150
d7-MeFOSE		78	10-150

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LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: YG11006-002
Description: WP-MW-3	Matrix: Aqueous
Date Sampled: 07/10/2023 1344	Project Name: Oshkosh - West Plant
Date Received: 07/11/2023	Project Number:

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	07/18/2023 2309	OMNS	07/14/2023 1042	79956

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	MDL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.8	0.57	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.8	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	Q	6.8	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	6.8	0.75	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.8	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	PFAS by ID SOP	ND		6.8	1.2	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.8	0.64	ng/L	1
2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE)	1691-99-2	PFAS by ID SOP	ND		6.8	0.82	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	PFAS by ID SOP	ND		14	1.1	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.8	0.80	ng/L	1
2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE)	24448-09-7	PFAS by ID SOP	ND		6.8	1.1	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	9.4		3.4	0.35	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.67	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	1.0	J	3.4	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.61	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.52	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	4.3		3.4	0.51	ng/L	1
Perfluorododecanesulfonic acid (PFDOS)	79780-39-5	PFAS by ID SOP	ND		6.8	0.89	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	25		3.4	0.47	ng/L	1
Perfluoro-n-butanofluoronic acid (PFBA)	375-22-4	PFAS by ID SOP	1.0	J	3.4	0.51	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.40	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.98	J	3.4	0.38	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	1.6	J	3.4	0.59	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	3.2	J	3.4	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	1.5	J	3.4	0.71	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	1.3	J	3.4	0.47	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-undecanoic acid (PFUDA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.54	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	43		3.4	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	180	25-150
13C2_6:2FTS	N	308	25-150
13C2_8:2FTS		139	25-150
13C2_PFDa		117	25-150
13C2_PFTeDA		116	25-150
13C3_PFBS		124	25-150
13C3_PFHxS		128	25-150
13C3-HFPO-DA		123	25-150
13C4_PFBA		94	25-150

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: YG11006-002
Description: WP-MW-3	Matrix: Aqueous
Date Sampled: 07/10/2023 1344	Project Name: Oshkosh - West Plant
Date Received: 07/11/2023	Project Number:

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C4_PFHpA		125	25-150
13C5_PFHxA		123	25-150
13C5_PFPeA		124	25-150
13C6_PFDA		124	25-150
13C7_PFUdA		126	25-150
13C8_PFOA		135	25-150
13C8_PFOS		112	25-150
13C8_PFOSA		133	10-150
13C9_PFNA		123	25-150
d-EtFOSA		79	10-150
d5-EtFOSAA		118	25-150
d9-EtFOSE		96	10-150
d-MeFOSA		76	10-150
d3-MeFOSAA		130	25-150
d7-MeFOSE		104	10-150

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LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: YG11006-003
Description: WP-MW-1	Matrix: Aqueous
Date Sampled: 07/10/2023 1400	Project Name: Oshkosh - West Plant
Date Received: 07/11/2023	Project Number:

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	07/18/2023 2320	OMNS	07/14/2023 1042	79956
2	SOP SPE	PFAS by ID SOP	20	07/19/2023 1510	OMNS	07/14/2023 1042	79956
3	SOP SPE	PFAS by ID SOP	50	07/20/2023 1325	OMNS	07/14/2023 1042	79956

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	MDL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.2	0.44	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.2	0.60	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.2	1.5	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	7.7		7.2	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.2	0.79	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.2	1.9	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.2	0.44	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	PFAS by ID SOP	ND		7.2	1.2	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.2	0.68	ng/L	1
2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE)	1691-99-2	PFAS by ID SOP	ND		7.2	0.86	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	PFAS by ID SOP	ND		14	1.1	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.2	0.84	ng/L	1
2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE)	24448-09-7	PFAS by ID SOP	ND		7.2	1.2	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	12		3.6	0.38	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.6	0.70	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.6	0.45	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.6	0.64	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.6	0.56	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	2.7	J	3.6	0.54	ng/L	1
Perfluorododecanesulfonic acid (PFDOS)	79780-39-5	PFAS by ID SOP	ND		7.2	0.95	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	23		3.6	0.50	ng/L	1
Perfluoro-n-butyric acid (PFBA)	375-22-4	PFAS by ID SOP	2000		72	11	ng/L	2
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.6	0.48	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.6	0.43	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	770		72	8.1	ng/L	2
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	4200		72	12	ng/L	2
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.1	J	3.6	0.42	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	150		3.6	0.75	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	8900		180	25	ng/L	3
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.6	0.54	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.6	0.48	ng/L	1
Perfluoro-n-undecanoic acid (PFUDA)	2058-94-8	PFAS by ID SOP	ND		3.6	0.57	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	6.3		3.6	1.8	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits	Q	Run 3 % Recovery	Acceptance Limits
13C2_4:2FTS		140	25-150		110	25-150		109	25-150
13C2_6:2FTS		137	25-150	N	157	25-150		116	25-150
13C2_8:2FTS		100	25-150		114	25-150		130	25-150
13C2_PFDaA		89	25-150		99	25-150		108	25-150
13C2_PFTeDA		85	25-150		103	25-150		108	25-150
13C3_PFBs		82	25-150		100	25-150		115	25-150
13C3_PFHxS		89	25-150		116	25-150		116	25-150

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: YG11006-003
Description: WP-MW-1	Matrix: Aqueous
Date Sampled: 07/10/2023 1400	Project Name: Oshkosh - West Plant
Date Received: 07/11/2023	Project Number:

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits	Q	Run 3 % Recovery	Acceptance Limits
13C3-HFPO-DA		88	25-150		109	25-150		115	25-150
13C4_PFBFA		38	25-150		103	25-150		113	25-150
13C4_PFHpA		78	25-150		106	25-150		107	25-150
13C5_PFHxA		52	25-150		101	25-150		112	25-150
13C5_PFPeA		32	25-150		92	25-150		104	25-150
13C6_PFDA		91	25-150		107	25-150		109	25-150
13C7_PFUdA		92	25-150		103	25-150		107	25-150
13C8_PFOA		95	25-150		109	25-150		113	25-150
13C8_PFOS		85	25-150		93	25-150		106	25-150
13C8_PFOSA		90	10-150		89	10-150		112	10-150
13C9_PFNA		90	25-150		100	25-150		104	25-150
d-EtFOSA		52	10-150		73	10-150		104	10-150
d5-EtFOSAA		84	25-150		95	25-150		112	25-150
d9-EtFOSE		68	10-150		85	10-150		111	10-150
d-MeFOSA		52	10-150		74	10-150		113	10-150
d3-MeFOSAA		88	25-150		100	25-150		121	25-150
d7-MeFOSE		70	10-150		80	10-150		111	10-150

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: YG11006-004
Description: WP-MW-2	Matrix: Aqueous
Date Sampled: 07/10/2023 1440	Project Name: Oshkosh - West Plant
Date Received: 07/11/2023	Project Number:

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	07/18/2023 2331	OMNS	07/14/2023 1042	79956

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	MDL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.0	0.58	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.0	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	2.1	JQ	7.0	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	7.0	0.76	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	PFAS by ID SOP	ND		7.0	1.2	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.0	0.66	ng/L	1
2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE)	1691-99-2	PFAS by ID SOP	ND		7.0	0.83	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	PFAS by ID SOP	ND		14	1.1	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.0	0.82	ng/L	1
2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE)	24448-09-7	PFAS by ID SOP	ND		7.0	1.1	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	37		3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.68	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	1.5	J	3.5	0.44	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.54	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	35		3.5	0.52	ng/L	1
Perfluorododecanesulfonic acid (PFDOS)	79780-39-5	PFAS by ID SOP	ND		7.0	0.91	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	270		3.5	0.48	ng/L	1
Perfluoro-n-butanofluoronic acid (PFBA)	375-22-4	PFAS by ID SOP	68		3.5	0.52	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	37		3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	160		3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	7.5		3.5	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	14		3.5	0.72	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	220		3.5	0.48	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUDA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.55	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	24		3.5	1.8	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	151	25-150
13C2_6:2FTS	N	209	25-150
13C2_8:2FTS		95	25-150
13C2_PFDa		81	25-150
13C2_PFTeDA		80	25-150
13C3_PFBs		93	25-150
13C3_PFHxS		90	25-150
13C3-HFPO-DA		89	25-150
13C4_PFBa		70	25-150

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: YG11006-004
Description: WP-MW-2	Matrix: Aqueous
Date Sampled: 07/10/2023 1440	Project Name: Oshkosh - West Plant
Date Received: 07/11/2023	Project Number:

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C4_PFHpA		90	25-150
13C5_PFHxA		88	25-150
13C5_PFPeA		87	25-150
13C6_PFDA		90	25-150
13C7_PFUdA		86	25-150
13C8_PFOA		98	25-150
13C8_PFOS		82	25-150
13C8_PFOSA		93	10-150
13C9_PFNA		92	25-150
d-EtFOSA		59	10-150
d5-EtFOSAA		78	25-150
d9-EtFOSE		76	10-150
d-MeFOSA		66	10-150
d3-MeFOSAA		82	25-150
d7-MeFOSE		80	10-150

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LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: YG11006-005
Description: EQ BLANK	Matrix: Aqueous
Date Sampled: 07/10/2023 1445	Project Name: Oshkosh - West Plant
Date Received: 07/11/2023	Project Number:

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	07/18/2023 2342	OMNS	07/14/2023 1042	79956

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	MDL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.4	0.45	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.4	0.61	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.4	1.5	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	2.4	JQ	7.4	1.9	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.4	0.81	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.4	1.9	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.4	0.45	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	PFAS by ID SOP	ND		7.4	1.3	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.4	0.69	ng/L	1
2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE)	1691-99-2	PFAS by ID SOP	ND		7.4	0.88	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	PFAS by ID SOP	ND		15	1.2	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.4	0.86	ng/L	1
2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE)	24448-09-7	PFAS by ID SOP	ND		7.4	1.2	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.7	0.38	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.7	0.72	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.7	0.46	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.7	0.66	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.7	0.57	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.7	0.55	ng/L	1
Perfluorododecanesulfonic acid (PFDOS)	79780-39-5	PFAS by ID SOP	ND		7.4	0.97	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.7	0.51	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.7	0.56	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.7	0.49	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.7	0.44	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.7	0.41	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.7	0.64	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.7	0.43	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.7	0.77	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.7	0.50	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.7	0.55	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.7	0.49	ng/L	1
Perfluoro-n-undecanoic acid (PFUDA)	2058-94-8	PFAS by ID SOP	ND		3.7	0.58	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.7	1.9	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		103	25-150
13C2_6:2FTS	N	188	25-150
13C2_8:2FTS		92	25-150
13C2_PFDaA		86	25-150
13C2_PFTeDA		78	25-150
13C3_PFBS		96	25-150
13C3_PFHxS		97	25-150
13C3-HFPO-DA		91	25-150
13C4_PFBA		95	25-150

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: YG11006-005
Description: EQ BLANK	Matrix: Aqueous
Date Sampled: 07/10/2023 1445	Project Name: Oshkosh - West Plant
Date Received: 07/11/2023	Project Number:

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C4_PFHpA		100	25-150
13C5_PFHxA		96	25-150
13C5_PFPeA		92	25-150
13C6_PFDA		87	25-150
13C7_PFUdA		89	25-150
13C8_PFOA		101	25-150
13C8_PFOS		81	25-150
13C8_PFOSA		89	10-150
13C9_PFNA		94	25-150
d-EtFOSA		60	10-150
d5-EtFOSAA		80	25-150
d9-EtFOSE		77	10-150
d-MeFOSA		54	10-150
d3-MeFOSAA		93	25-150
d7-MeFOSE		81	10-150

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LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: YG11006-006
Description: FIELD BLANK	Matrix: Aqueous
Date Sampled: 07/10/2023 1440	Project Name: Oshkosh - West Plant
Date Received: 07/11/2023	Project Number:

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	07/18/2023 2353	OMNS	07/14/2023 1042	79956

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	MDL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.0	0.58	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.0	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	3.0	JQ	7.0	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.0	0.76	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	PFAS by ID SOP	ND		7.0	1.2	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.0	0.65	ng/L	1
2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE)	1691-99-2	PFAS by ID SOP	ND		7.0	0.83	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	PFAS by ID SOP	ND		14	1.1	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.0	0.81	ng/L	1
2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE)	24448-09-7	PFAS by ID SOP	ND		7.0	1.1	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.68	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluorododecanesulfonic acid (PFDOS)	79780-39-5	PFAS by ID SOP	ND		7.0	0.91	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.5	0.48	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.5	0.72	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.5	0.47	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUDA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.55	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		105	25-150
13C2_6:2FTS	N	209	25-150
13C2_8:2FTS		98	25-150
13C2_PFDaA		81	25-150
13C2_PFTeDA		81	25-150
13C3_PFBs		97	25-150
13C3_PFHxS		98	25-150
13C3-HFPO-DA		90	25-150
13C4_PFBa		95	25-150

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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# PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: YG11006-006
Description: FIELD BLANK	Matrix: Aqueous
Date Sampled: 07/10/2023 1440	Project Name: Oshkosh - West Plant
Date Received: 07/11/2023	Project Number:

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C4_PFHpA		96	25-150
13C5_PFHxA		96	25-150
13C5_PFPeA		94	25-150
13C6_PFDA		82	25-150
13C7_PFUdA		89	25-150
13C8_PFOA		104	25-150
13C8_PFOS		86	25-150
13C8_PFOSA		89	10-150
13C9_PFNA		90	25-150
d-EtFOSA		46	10-150
d5-EtFOSAA		83	25-150
d9-EtFOSE		64	10-150
d-MeFOSA		44	10-150
d3-MeFOSAA		89	25-150
d7-MeFOSE		75	10-150

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LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit      Q = Surrogate failure  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL      L = LCS/LCSD failure  
 H = Out of holding time      W = Reported on wet weight basis      S = MS/MSD failure

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## QC Summary

PFAS by LC/MS/MS - MB

Sample ID: YQ79956-001

Matrix: Aqueous

Batch: 79956

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 07/14/2023 1042

Parameter	Result	Q	Dil	LOQ	MDL	Units	Analysis Date
9CI-PF3ONS	ND		1	8.0	0.48	ng/L	07/18/2023 1855
11CI-PF3OUdS	ND		1	8.0	0.66	ng/L	07/18/2023 1855
8:2 FTS	ND		1	8.0	1.6	ng/L	07/18/2023 1855
6:2 FTS	ND		1	8.0	2.0	ng/L	07/18/2023 1855
4:2 FTS	ND		1	8.0	0.87	ng/L	07/18/2023 1855
GenX	ND		1	8.0	2.1	ng/L	07/18/2023 1855
ADONA	ND		1	8.0	0.48	ng/L	07/18/2023 1855
EtFOSA	ND		1	8.0	1.4	ng/L	07/18/2023 1855
EtFOSAA	ND		1	8.0	0.75	ng/L	07/18/2023 1855
EtFOSE	ND		1	8.0	0.95	ng/L	07/18/2023 1855
MeFOSA	ND		1	16	1.3	ng/L	07/18/2023 1855
MeFOSAA	ND		1	8.0	0.93	ng/L	07/18/2023 1855
MeFOSE	ND		1	8.0	1.3	ng/L	07/18/2023 1855
PFBS	ND		1	4.0	0.41	ng/L	07/18/2023 1855
PFDS	ND		1	4.0	0.78	ng/L	07/18/2023 1855
PFHpS	ND		1	4.0	0.50	ng/L	07/18/2023 1855
PFNS	ND		1	4.0	0.71	ng/L	07/18/2023 1855
PFOSA	ND		1	4.0	0.61	ng/L	07/18/2023 1855
PFPeS	ND		1	4.0	0.59	ng/L	07/18/2023 1855
PFDOS	ND		1	8.0	1.0	ng/L	07/18/2023 1855
PFHxS	ND		1	4.0	0.55	ng/L	07/18/2023 1855
PFBA	ND		1	4.0	0.60	ng/L	07/18/2023 1855
PFDA	ND		1	4.0	0.52	ng/L	07/18/2023 1855
PFDoA	ND		1	4.0	0.47	ng/L	07/18/2023 1855
PFHpA	ND		1	4.0	0.45	ng/L	07/18/2023 1855
PFHxA	ND		1	4.0	0.69	ng/L	07/18/2023 1855
PFNA	ND		1	4.0	0.46	ng/L	07/18/2023 1855
PFOA	ND		1	4.0	0.83	ng/L	07/18/2023 1855
PFPeA	ND		1	4.0	0.54	ng/L	07/18/2023 1855
PFTeDA	ND		1	4.0	0.60	ng/L	07/18/2023 1855
PFTTrDA	ND		1	4.0	0.53	ng/L	07/18/2023 1855
PFUdA	ND		1	4.0	0.63	ng/L	07/18/2023 1855
PFOS	ND		1	4.0	2.0	ng/L	07/18/2023 1855

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		124	25-150
13C2_6:2FTS	N	221	25-150
13C2_8:2FTS		114	25-150
13C2_PFDoA		106	25-150
13C2_PFTeDA		102	25-150
13C3_PFBs		110	25-150
13C3_PFHxS		114	25-150
13C3-HFPO-DA		108	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - MB

Sample ID: YQ79956-001

Matrix: Aqueous

Batch: 79956

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 07/14/2023 1042

Surrogate	Q	% Rec	Acceptance Limit
13C4_PFBA		114	25-150
13C4_PFHpA		113	25-150
13C5_PFHxA		114	25-150
13C5_PFPeA		113	25-150
13C6_PFDA		106	25-150
13C7_PFUdA		110	25-150
13C8_PFOA		127	25-150
13C8_PFOS		97	25-150
13C8_PFOSA		110	10-150
13C9_PFNA		112	25-150
d-EtFOSA		77	10-150
d5-EtFOSAA		102	25-150
d9-EtFOSE		91	10-150
d-MeFOSA		77	10-150
d3-MeFOSAA		113	25-150
d7-MeFOSE		101	10-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and  $\geq$  DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - LCS

Sample ID: YQ79956-002

Matrix: Aqueous

Batch: 79956

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 07/14/2023 1042

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9CI-PF3ONS	15	15		1	99	50-150	07/18/2023 1906
11CI-PF3OUdS	15	13		1	89	50-150	07/18/2023 1906
8:2 FTS	15	17		1	113	50-150	07/18/2023 1906
6:2 FTS	15	16		1	105	50-150	07/18/2023 1906
4:2 FTS	15	15		1	100	50-150	07/18/2023 1906
GenX	32	33		1	104	50-150	07/18/2023 1906
ADONA	15	17		1	111	50-150	07/18/2023 1906
EtFOSA	16	18		1	111	50-150	07/18/2023 1906
EtFOSAA	16	19		1	117	50-150	07/18/2023 1906
EtFOSE	16	21		1	128	50-150	07/18/2023 1906
MeFOSA	16	18		1	116	50-150	07/18/2023 1906
MeFOSAA	16	19		1	121	50-150	07/18/2023 1906
MeFOSE	16	15		1	93	50-150	07/18/2023 1906
PFBS	14	15		1	107	50-150	07/18/2023 1906
PFDS	15	15		1	97	50-150	07/18/2023 1906
PFHpS	15	18		1	120	50-150	07/18/2023 1906
PFNS	15	14		1	92	50-150	07/18/2023 1906
PFOSA	16	18		1	111	50-150	07/18/2023 1906
PFPeS	15	16		1	110	50-150	07/18/2023 1906
PFDOS	15	13		1	86	50-150	07/18/2023 1906
PFHxS	15	16		1	113	50-150	07/18/2023 1906
PFBA	16	17		1	105	50-150	07/18/2023 1906
PFDA	16	17		1	104	50-150	07/18/2023 1906
PFDoA	16	17		1	109	50-150	07/18/2023 1906
PFHpA	16	17		1	106	50-150	07/18/2023 1906
PFHxA	16	19		1	117	50-150	07/18/2023 1906
PFNA	16	18		1	112	50-150	07/18/2023 1906
PFOA	16	17		1	108	50-150	07/18/2023 1906
PFPeA	16	17		1	105	50-150	07/18/2023 1906
PFTeDA	16	18		1	112	50-150	07/18/2023 1906
PFTTrDA	16	16		1	102	50-150	07/18/2023 1906
PFUdA	16	18		1	110	50-150	07/18/2023 1906
PFOS	15	17		1	112	50-150	07/18/2023 1906
Surrogate	Q	% Rec	Acceptance Limit				
13C2_4:2FTS		101	25-150				
13C2_6:2FTS	N	153	25-150				
13C2_8:2FTS		95	25-150				
13C2_PFDoA		87	25-150				
13C2_PFTeDA		81	25-150				
13C3_PFBS		90	25-150				
13C3_PFHxS		91	25-150				
13C3-HFPO-DA		87	25-150				

LOQ = Limit of Quantitation

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N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

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+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - LCS

Sample ID: YQ79956-002

Matrix: Aqueous

Batch: 79956

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 07/14/2023 1042

Surrogate	Q	% Rec	Acceptance Limit
13C4_PFBFA		95	25-150
13C4_PFHpA		96	25-150
13C5_PFHxA		94	25-150
13C5_PFPeA		90	25-150
13C6_PFDA		88	25-150
13C7_PFUdA		89	25-150
13C8_PFOA		95	25-150
13C8_PFOS		86	25-150
13C8_PFOSA		90	10-150
13C9_PFNA		93	25-150
d-EtFOSA		69	10-150
d5-EtFOSAA		82	25-150
d9-EtFOSE		75	10-150
d-MeFOSA		63	10-150
d3-MeFOSAA		89	25-150
d7-MeFOSE		84	10-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

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J = Estimated result < LOQ and  $\geq$  DL

P = The RPD between two GC columns exceeds 40%

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Note: Calculations are performed before rounding to avoid round-off errors in calculated results



Chain of Custody  
and  
Miscellaneous Documents



# PACE ANALYTICAL SERVICES, LLC

DC# Title: ENV-FRM-WCOL-0286 v02\_Samples Receipt Checklist (SRC)  
 Effective Date: 8/2/2022

## Sample Receipt Checklist (SRC)

Client: GZA

Cooler Inspected by/date: KDRW / 07/11/2023

Lot #: YG11006

Means of receipt: <input type="checkbox"/> Pace <input type="checkbox"/> Client <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Other:	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	1. Were custody seals present on the cooler?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	2. If custody seals were present, were they intact and unbroken?
pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA	
Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA	
3.6 / 3.6 °C NA / NA °C NA / NA °C NA / NA °C	
Method: <input type="checkbox"/> Temperature Blank <input checked="" type="checkbox"/> Against Bottles IR Gun ID: 8 IR Gun Correction Factor: 0 °C	
Method of coolant: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry Ice <input type="checkbox"/> None	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one).
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	4. Is the commercial courier's packing slip attached to this form?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5. Were proper custody procedures (relinquished/received) followed?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. Were sample IDs listed on the COC and all sample containers?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7. Was collection date & time listed on the COC and all sample containers?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8. Did all container label information (ID, date, time) agree with the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9. Were tests to be performed listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	11. Was adequate sample volume available?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	12. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	13. Were all samples containers accounted for? (No missing/excess)
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	14. Were VOA, 8015C and RSK-175 samples free of bubbles >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	15. Were all DRO/metals/nutrient samples received at a pH of < 2?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	17. Were all applicable NH <sub>3</sub> /TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	18. Was the quote number listed on the container label? If yes, Quote # 25164

**Sample Preservation** (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub>, HCl, NaOH using SR # NA. Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is no) and were adjusted accordingly in sample receiving with sodium thiosulfate (Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>) with Unique ID: NA.

Comments:

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