

Ms. Alyssa Sellwood, P.E.
Complex Sites Project Manager, Remediation and Redevelopment Program
State of Wisconsin Department of Natural Resources
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Date: February 17, 2023
BRRTS No.: 02-38-580694
Our Ref: 30128984
Subject: Fish Tissue and Surface Water Sampling Update,
Tyco FTC PFAS, 2700 Industrial Parkway South, Marinette, WI

Dear Ms. Sellwood,

On March 8, 2022 the Wisconsin Department of Natural Resources (WDNR) provided feedback on Tyco's Fish Tissue and Surface Water Sampling Work Plan submitted November 2020. WDNR requested that Tyco collect fish tissue samples from privately owned ponds identified as SW-41 and SW-42 in addition to collecting additional information from a third privately owned pond identified as SW-19. Tyco did not evaluate fish in Ditch B in accordance with WDNR feedback which stated "Tyco does not need to evaluate fish in Ditch B at this time. Resident fish are not known to inhabit this and other drainage ditches near the Site".

Interactions with Property Owners

On May 7, 2022, Arcadis contacted the owner of SW-19 to inquire about the uses of the pond and whether they would be willing to have Tyco test their water and fish for per- and polyfluoroalkyl substances (PFAS). The owner at that time indicated that they do not fish from that pond, did not intend to fish from the pond, and they were not interested in sampling. Arcadis contacted the owner again on September 28, 2022, and the owner confirmed they do not fish from that pond, did not intend to fish from the pond, and they were still not interested in sampling.

On September 28, 2022, Arcadis contacted the owner of SW-41 to inquire about the uses of the pond and whether they would be willing to have Tyco test their water and fish for PFAS. The owner indicated that there are no fish in their pond and they were not interested in sampling.

On September 28, 2022, Arcadis contacted the owner of SW-42 to inquire about the uses of the pond and whether they would be willing to have Tyco test their water and fish for PFAS. The owner indicated the pond was not currently used for fishing, but it had previously been stocked with bullhead that they would like to have sampled. The owner did not recall exactly when the pond had been stocked, and because the pond is not actively used for fishing, the owner was unsure whether any fish remained in the pond. The owner agreed to allow Arcadis to send an ecologist to the pond to determine whether there were still fish in the pond.

Field Work

Arcadis sent an ecologist to SW-42 to observe the pond and evaluate whether fish might be present on October 5, 2022. The Arcadis ecologist indicated that adult sized game fish were not likely to live in the pond. Limited habitat and structure within the pond might support some small fish or minnows along with amphibians or reptiles, but not fish of edible size. Additionally, the size and apparent depth of the pond would likely freeze over during winters and reduce the availability of dissolved oxygen to a point that it would not support fish. No fish were observed during the site visit.

Despite no evidence of fish from a visit to the pond, Arcadis sent field technicians to fish and sample the pond on October 27, 2022. Again, no fish were observed or caught using a hook and line technique. A surface water sample was collected and sent to an independent laboratory for analysis.

Surface water sampling results are summarized in the table below and the report from the laboratory is attached to this letter.

Surface Water Results

Surface water standards established by the State of Wisconsin under Certified Rule WY-23-19 are:

- 8 nanograms per liter (ng/L) of PFOS for all waters except those that cannot naturally support fish and do not have downstream waters that support fish
- 20 ng/L of PFOA in waters classified as public water supplies under ch. NR 104, Wis. Adm. Code
- 95 ng/L of PFOA for other surface waters

Because none of the ponds in question are used for drinking water, the applicable standard is 95 ng/L of PFOA. Because SW-42 cannot naturally support fish and does not have downstream waters that support fish, there is no applicable PFOS standard. Because SW-41 was identified by the homeowner as not naturally supporting fish, but not independently field confirmed by Arcadis, it may be subject to the 8 ng/L criteria for PFOS. Regardless, previous sampling results were below any potentially applicable criteria. The third pond (SW-19) is presumed to support fish and therefore subject to the 8 ng/L criteria for PFOS.

SW-42 sampling results were consistent with previous results for the pond and below any applicable standards. The table below summarizes current and historical surface water results from ponds discussed in this letter including the most recent sampling from SW-42.

	Date	PFOA (ng/L)	PFOS (ng/L)
Pond	Applicable Criteria ¹	95	8 ¹
SW-19	5/30/2018	250	16
SW-19	6/26/2018	240	21
SW-19	9/28/2018	270	17
SW-41	12/18/2020	23	7
SW-42	12/16/2020	7.7	10
SW-42	10/27/2022	5.2	9.2

¹ Only applicable to SW-19

Conclusion

The latest analytical data from SW-42 is consistent with previous results and below any applicable standards in Wisconsin. Arcadis did not see any fish or signs of fish in multiple visits to SW-42. The owners of SW-41 indicated

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Wisconsin Department of Natural Resources
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there were no fish in their pond, and previous sampling conducted at this location contained PFAS concentrations below applicable standards. The owners of SW-19 indicated they did not wish to have their pond or fish sampled for PFAS. As such, no fish samples or additional water samples were collected as part of this effort.

Sincerely,
Arcadis U.S., Inc.



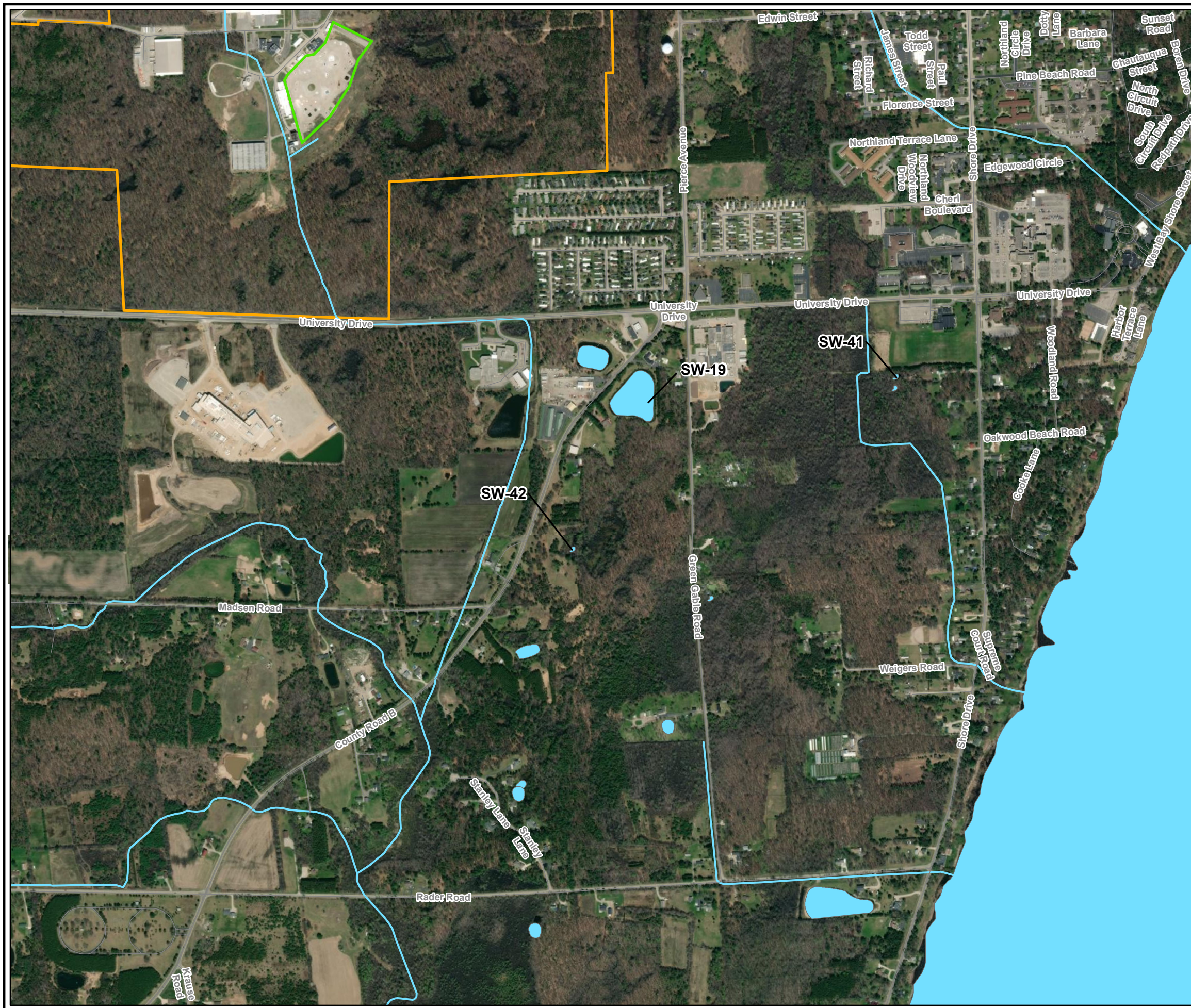
Matthew Coleman
Project Communications Manager

Email: Matthew.Coleman@arcadis.com
Direct Line: (315) 671-9641

CC. D. Nelson
S. Wahl

Attachments

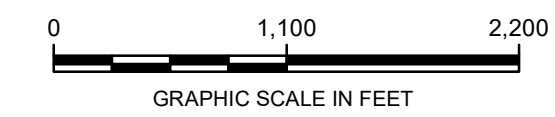
Figure 1 – Surface Water Sampling Locations
Table 1 – Surface Water Sampling Results
Laboratory Report



LEGEND:

- OUTDOOR TESTING/TRAINING AREA
- APPROXIMATE SITE PROPERTY BOUNDARY
- APPROXIMATE MARINETTE CITY BOUNDARY
- ROAD
- DITCH/STREAM
- WATERBODY

- NOTES:**
1. CITY BOUNDARY DATA SOURCE: WISCONSIN LEGISLATIVE TECHNOLOGY SERVICES BUREAU, WISCONSIN COUNTY CLERKS AND LAND INFORMATION OFFICES, ACCESSED FALL 2017.
 2. DITCH/STREAM DATA SOURCE: U.S. GEOLOGICAL SURVEY NATIONAL HYDROGRAPHY DATASET, ACCESSED FALL 2017.
 3. ROAD DATA SOURCE: OPEN STREET MAP, ACCESSED FALL 2017.
 4. AERIAL IMAGERY: 4/27/2016 DIGITALGLOBE, VIVID-USA



TYCO FIRE PRODUCTS, LP
MARINETTE, WISCONSIN

SURFACE WATER SAMPLING LOCATIONS

ARCADIS | **FIGURE 1**

Table 1
Surface Water Sampling Results
Tyco Fire Technology Center



Surface Water Non Drinking Water Standards			Location Sample ID Parent Sample ID Sample Date Sample Type	SW-42 DUP-01-102722 SW-42 (102722) 10/27/2022 FD	SW-42 SW-42 (102722) 10/27/2022 N
Analyte	CAS		Units		
PFBA	375-22-4	--	ng/l	10	14
PFPeA	2706-90-3	--	ng/l	8.5	10
PFHxA	307-24-4	--	ng/l	6.5	8.6
PFHpA	375-85-9	--	ng/l	7.4	9.1
PFOA	335-67-1	95	ng/l	4.3	5.2
PFNA	375-95-1	--	ng/l	0.85 J	1.2 J
PFDA	335-76-2	--	ng/l	< 1.6 U	< 1.6 U
PFUnA	2058-94-8	--	ng/l	< 1.6 U	< 1.6 U
PFDoA	307-55-1	--	ng/l	< 1.6 U	< 1.6 U
PFTriA	72629-94-8	--	ng/l	< 1.6 U	< 1.6 U
PFTeA	376-06-7	--	ng/l	< 1.6 U	< 1.6 U
PFHxDA	67905-19-5	--	ng/l	< 1.6 U	< 1.6 U
PFODA	16517-11-6	--	ng/l	< 1.6 U	< 1.6 U
PFBS	375-73-5	--	ng/l	3.0	3.9
PFPeS	2706-91-4	--	ng/l	< 1.6 U	< 1.6 U
PFHxS	355-46-4	--	ng/l	2.1	2.7
PFHpS	375-92-8	--	ng/l	< 1.6 U	< 1.6 U
PFOS	1763-23-1	8	ng/l	6.5	9.2

Table 1
Surface Water Sampling Results
Tyco Fire Technology Center



PFNS	68259-12-1	--	ng/l	< 1.6 U	< 1.6 U
PFDS	335-77-3	--	ng/l	< 1.6 U	< 1.6 U
PFDoS	79780-39-5	--	ng/l	< 1.6 U	< 1.6 UJ-
4:2 FTS	757124-72-4	--	ng/l	< 1.6 U	< 1.6 U
6:2 FTS	27619-97-2	--	ng/l	< 4.0 U	< 4.1 U
8:2 FTS	39108-34-4	--	ng/l	< 1.6 U	< 1.6 U
10:2 FTS	120226-60-0	--	ng/l	< 1.6 U	< 1.6 U
FOSA	754-91-6	--	ng/l	< 1.6 U	< 1.6 U
NMeFOSA	31506-32-8	--	ng/l	< 1.6 U	< 1.6 U
NEtFOSA	4151-50-2	--	ng/l	< 1.6 U	< 1.6 U
NMeFOSAA	2355-31-9	--	ng/l	< 4.0 U	< 4.1 U
NEtFOSAA	2991-50-6	--	ng/l	< 4.0 U	< 4.1 U
NMeFOSE	24448-09-7	--	ng/l	< 3.2 U	< 3.3 U
NEtFOSE	1691-99-2	--	ng/l	< 1.6 U	< 1.6 U
HFPO-DA	13252-13-6	--	ng/l	< 3.2 U	< 3.3 U
DONA	919005-14-4	--	ng/l	< 1.6 U	< 1.6 U
9CI-PF3ONS	756426-58-1	--	ng/l	< 1.6 U	< 1.6 U
11CI-PF3OUdS	763051-92-9	--	ng/l	< 1.6 U	< 1.6 U

**Table 1 Surface Water Sampling Results
Tyco Fire Technology Center**



Notes:

< = Compound not detected at reporting detection limit.

-- = No standard

N = Normal sample

ng/L = nanograms per liter

FD = Field duplicate sample

J = The analyte was positively identified; however the associated numerical value is an estimated concentration only

U = The analyte was analyzed for but the result was not detected above the method detection limit.

UJ- = The analyte was analyzed for but was not detected. The reported reporting limit (RL) is approximate and may be inaccurate or imprecise

Chemical Abbreviation:

PFBA = Perfluorobutanoic acid (C4)

PFPeA = Perfluoropentanoic acid (C5)

PFHxA = Perfluorohexanoic acid (C6)

PFHpA = Perfluoroheptanoic acid (C7)

PFOA = Perfluorooctanoic acid (C8)

PFNA = Perfluorononanoic acid (C9)

PFDA = Perfluorodecanoic acid (C10)

PFUnA = Perfluoroundecanoic acid (C11)

PFDoA = Perfluorododecanoic acid (C12)

PFTriA = Perfluorotridecanoic acid (C13)

PFTeA = Perfluorotetradecanoic acid (C14)

PFHxDA = Perfluoro-n-hexadecanoic acid (C16)

PFODA = Perfluoro-n-octadecanoic acid (C18)

PFBS = Perfluorobutanesulfonic acid (C4)

PFNS = Perfluorononanesulfonic acid (C9)

PFDS = Perfluorodecanesulfonic acid (C10)

PFDoS = Perfluorododecanesulfonic acid (C12)

4:2 FTS = 4:2 fluorotelomer sulfonate (C6)

6:2 FTS = 6:2 fluorotelomer sulfonate (C8)

8:2 FTS = 8:2 fluorotelomer sulfonate (C10)

10:2 FTS = 10:2 fluorotelomer sulfonate (C12)

FOSA = Perfluorooctanesulfonamide (C8)

NMeFOSA = N-methylperfluorooctanesulfonamide (C9)

NEtFOSA = N-ethylperfluorooctanesulfonamide (C10)

NMeFOSAA = N-methylperfluorooctanesulfonamidoacetic acid (C11)

NEtFOSAA = N-ethylperfluorooctanesulfonamidoacetic acid (C12)

NMeFOSE = N-methylperfluorooctanesulfonamidoethanol (C11)

NEtFOSE = N-ethylperfluorooctanesulfonamidoethanol (C12)

**Table 1 Surface Water Sampling Results
Tyco Fire Technology Center**



PFPeS = Perfluoropentanesulfonic acid (C5)

PFHxS = Perfluorohexanesulfonic acid (C6)

PFHpS = Perfluoroheptanesulfonic acid (C7)

PFOS = Perfluorooctanesulfonic acid (C8)

HFPO-DA = Hexafluoropropylene oxide dimer acid (C6)

DONA = 4,8-Dioxa-3H-perfluorononanoic acid (C7)

9Cl-PF3ONS = 9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (C8)

11Cl-PF3OUdS = 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (C10)

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30132447.05

Job ID: 500-224633-1

Client Sample ID: SW-42-102722

Lab Sample ID: 500-224633-1

Date Collected: 10/27/22 13:45

Matrix: Water

Date Received: 10/31/22 10:13

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	14		4.1	2.0	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluoropentanoic acid (PFPeA)	10		1.6	0.40	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluorohexanoic acid (PFHxA)	8.6		1.6	0.47	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluoroheptanoic acid (PFHpA)	9.1		1.6	0.20	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluorooctanoic acid (PFOA)	5.2		1.6	0.70	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluorononanoic acid (PFNA)	1.2	J	1.6	0.22	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluorodecanoic acid (PFDA)	<1.6		1.6	0.25	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluoroundecanoic acid (PFUnA)	<1.6		1.6	0.90	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluorododecanoic acid (PFDoA)	<1.6		1.6	0.45	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluorotridecanoic acid (PFTriA)	<1.6		1.6	1.1	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluorotetradecanoic acid (PFTeA)	<1.6		1.6	0.60	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.6		1.6	0.73	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.6		1.6	0.77	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluorobutanesulfonic acid (PFBS)	3.9		1.6	0.16	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluoropentanesulfonic acid (PFPeS)	<1.6		1.6	0.25	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluorohexanesulfonic acid (PFHxS)	2.7		1.6	0.47	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.6		1.6	0.16	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluorooctanesulfonic acid (PFOS)	9.2		1.6	0.44	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluorononanesulfonic acid (PFNS)	<1.6		1.6	0.30	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluorodecanesulfonic acid (PFDS)	<1.6		1.6	0.26	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluorododecanesulfonic acid (PFDoS)	<1.6	F1	1.6	0.79	ng/L		10/31/22 11:55	11/04/22 01:50	1
Perfluorooctanesulfonamide (FOSA)	<1.6		1.6	0.80	ng/L		10/31/22 11:55	11/04/22 01:50	1
NEtFOSA	<1.6		1.6	0.71	ng/L		10/31/22 11:55	11/04/22 01:50	1
NMeFOSA	<1.6		1.6	0.35	ng/L		10/31/22 11:55	11/04/22 01:50	1
NMeFOSAA	<4.1		4.1	0.98	ng/L		10/31/22 11:55	11/04/22 01:50	1
NEtFOSAA	<4.1		4.1	1.1	ng/L		10/31/22 11:55	11/04/22 01:50	1
NMeFOSE	<3.3		3.3	1.1	ng/L		10/31/22 11:55	11/04/22 01:50	1
NEtFOSE	<1.6		1.6	0.70	ng/L		10/31/22 11:55	11/04/22 01:50	1
4:2 FTS	<1.6		1.6	0.20	ng/L		10/31/22 11:55	11/04/22 01:50	1
6:2 FTS	<4.1		4.1	2.0	ng/L		10/31/22 11:55	11/04/22 01:50	1
8:2 FTS	<1.6		1.6	0.38	ng/L		10/31/22 11:55	11/04/22 01:50	1
10:2 FTS	<1.6		1.6	0.55	ng/L		10/31/22 11:55	11/04/22 01:50	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.6		1.6	0.33	ng/L		10/31/22 11:55	11/04/22 01:50	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	<3.3		3.3	1.2	ng/L		10/31/22 11:55	11/04/22 01:50	1
F-53B Major	<1.6		1.6	0.20	ng/L		10/31/22 11:55	11/04/22 01:50	1
F-53B Minor	<1.6		1.6	0.26	ng/L		10/31/22 11:55	11/04/22 01:50	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	47		25 - 150				10/31/22 11:55	11/04/22 01:50	1
13C5 PFPeA	66		25 - 150				10/31/22 11:55	11/04/22 01:50	1
13C2 PFHxA	72		25 - 150				10/31/22 11:55	11/04/22 01:50	1
13C4 PFHpA	79		25 - 150				10/31/22 11:55	11/04/22 01:50	1
13C4 PFOA	78		25 - 150				10/31/22 11:55	11/04/22 01:50	1

Eurofins Chicago

Client Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Marinette, WI 30132447.05

Job ID: 500-224633-1

Client Sample ID: SW-42-102722

Lab Sample ID: 500-224633-1

Date Collected: 10/27/22 13:45

Matrix: Water

Date Received: 10/31/22 10:13

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C5 PFNA	76		25 - 150	10/31/22 11:55	11/04/22 01:50	1
13C2 PFDA	82		25 - 150	10/31/22 11:55	11/04/22 01:50	1
13C2 PFUnA	77		25 - 150	10/31/22 11:55	11/04/22 01:50	1
13C2 PFDoA	70		25 - 150	10/31/22 11:55	11/04/22 01:50	1
13C2 PFTeDA	45		25 - 150	10/31/22 11:55	11/04/22 01:50	1
13C2 PFHxDA	37		25 - 150	10/31/22 11:55	11/04/22 01:50	1
13C3 PFBS	75		25 - 150	10/31/22 11:55	11/04/22 01:50	1
18O2 PFHxS	80		25 - 150	10/31/22 11:55	11/04/22 01:50	1
13C4 PFOS	75		25 - 150	10/31/22 11:55	11/04/22 01:50	1
13C8 FOSA	76		10 - 150	10/31/22 11:55	11/04/22 01:50	1
d3-NMeFOSAA	70		25 - 150	10/31/22 11:55	11/04/22 01:50	1
d5-NEtFOSAA	74		25 - 150	10/31/22 11:55	11/04/22 01:50	1
d-N-MeFOSA-M	55		10 - 150	10/31/22 11:55	11/04/22 01:50	1
d-N-EtFOSA-M	53		10 - 150	10/31/22 11:55	11/04/22 01:50	1
d7-N-MeFOSE-M	56		10 - 150	10/31/22 11:55	11/04/22 01:50	1
d9-N-EtFOSE-M	51		10 - 150	10/31/22 11:55	11/04/22 01:50	1
M2-4:2 FTS	103		25 - 150	10/31/22 11:55	11/04/22 01:50	1
M2-6:2 FTS	90		25 - 150	10/31/22 11:55	11/04/22 01:50	1
M2-8:2 FTS	86		25 - 150	10/31/22 11:55	11/04/22 01:50	1
13C3 HFPO-DA	65		25 - 150	10/31/22 11:55	11/04/22 01:50	1
13C2 10:2 FTS	81		25 - 150	10/31/22 11:55	11/04/22 01:50	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30132447.05

Job ID: 500-224633-1

Client Sample ID: DUP-01-102722

Lab Sample ID: 500-224633-2

Date Collected: 10/27/22 13:45

Matrix: Water

Date Received: 10/31/22 10:13

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	10		4.0	1.9	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluoropentanoic acid (PFPeA)	8.5		1.6	0.40	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluorohexanoic acid (PFHxA)	6.5		1.6	0.47	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluoroheptanoic acid (PFHpA)	7.4		1.6	0.20	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluorooctanoic acid (PFOA)	4.3		1.6	0.69	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluorononanoic acid (PFNA)	0.85	J	1.6	0.22	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluorodecanoic acid (PFDA)	<1.6		1.6	0.25	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluoroundecanoic acid (PFUnA)	<1.6		1.6	0.89	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluorododecanoic acid (PFDoA)	<1.6		1.6	0.44	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluorotridecanoic acid (PFTriA)	<1.6		1.6	1.1	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluorotetradecanoic acid (PFTeA)	<1.6		1.6	0.59	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.6		1.6	0.72	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.6		1.6	0.76	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluorobutanesulfonic acid (PFBS)	3.0		1.6	0.16	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluoropentanesulfonic acid (PFPeS)	<1.6		1.6	0.24	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluorohexanesulfonic acid (PFHxS)	2.1		1.6	0.46	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.6		1.6	0.15	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluorooctanesulfonic acid (PFOS)	6.5		1.6	0.44	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluorononanesulfonic acid (PFNS)	<1.6		1.6	0.30	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluorodecanesulfonic acid (PFDS)	<1.6		1.6	0.26	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluorododecanesulfonic acid (PFDoS)	<1.6		1.6	0.78	ng/L		10/31/22 11:55	11/04/22 02:20	1
Perfluorooctanesulfonamide (FOSA)	<1.6		1.6	0.79	ng/L		10/31/22 11:55	11/04/22 02:20	1
NEtFOSA	<1.6		1.6	0.70	ng/L		10/31/22 11:55	11/04/22 02:20	1
NMeFOSA	<1.6		1.6	0.35	ng/L		10/31/22 11:55	11/04/22 02:20	1
NMeFOSAA	<4.0		4.0	0.97	ng/L		10/31/22 11:55	11/04/22 02:20	1
NEtFOSAA	<4.0		4.0	1.1	ng/L		10/31/22 11:55	11/04/22 02:20	1
NMeFOSE	<3.2		3.2	1.1	ng/L		10/31/22 11:55	11/04/22 02:20	1
NEtFOSE	<1.6		1.6	0.69	ng/L		10/31/22 11:55	11/04/22 02:20	1
4:2 FTS	<1.6		1.6	0.19	ng/L		10/31/22 11:55	11/04/22 02:20	1
6:2 FTS	<4.0		4.0	2.0	ng/L		10/31/22 11:55	11/04/22 02:20	1
8:2 FTS	<1.6		1.6	0.37	ng/L		10/31/22 11:55	11/04/22 02:20	1
10:2 FTS	<1.6		1.6	0.54	ng/L		10/31/22 11:55	11/04/22 02:20	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.6		1.6	0.32	ng/L		10/31/22 11:55	11/04/22 02:20	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	<3.2		3.2	1.2	ng/L		10/31/22 11:55	11/04/22 02:20	1
F-53B Major	<1.6		1.6	0.19	ng/L		10/31/22 11:55	11/04/22 02:20	1
F-53B Minor	<1.6		1.6	0.26	ng/L		10/31/22 11:55	11/04/22 02:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	47		25 - 150				10/31/22 11:55	11/04/22 02:20	1
13C5 PFPeA	60		25 - 150				10/31/22 11:55	11/04/22 02:20	1
13C2 PFHxA	68		25 - 150				10/31/22 11:55	11/04/22 02:20	1
13C4 PFHpA	67		25 - 150				10/31/22 11:55	11/04/22 02:20	1
13C4 PFOA	66		25 - 150				10/31/22 11:55	11/04/22 02:20	1

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Client Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Marinette, WI 30132447.05

Job ID: 500-224633-1

Client Sample ID: DUP-01-102722

Lab Sample ID: 500-224633-2

Date Collected: 10/27/22 13:45

Matrix: Water

Date Received: 10/31/22 10:13

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C5 PFNA	65		25 - 150	10/31/22 11:55	11/04/22 02:20	1
13C2 PFDA	69		25 - 150	10/31/22 11:55	11/04/22 02:20	1
13C2 PFUnA	63		25 - 150	10/31/22 11:55	11/04/22 02:20	1
13C2 PFDoA	60		25 - 150	10/31/22 11:55	11/04/22 02:20	1
13C2 PFTeDA	43		25 - 150	10/31/22 11:55	11/04/22 02:20	1
13C2 PFHxDA	40		25 - 150	10/31/22 11:55	11/04/22 02:20	1
13C3 PFBS	72		25 - 150	10/31/22 11:55	11/04/22 02:20	1
18O2 PFHxS	72		25 - 150	10/31/22 11:55	11/04/22 02:20	1
13C4 PFOS	69		25 - 150	10/31/22 11:55	11/04/22 02:20	1
13C8 FOSA	66		10 - 150	10/31/22 11:55	11/04/22 02:20	1
d3-NMeFOSAA	60		25 - 150	10/31/22 11:55	11/04/22 02:20	1
d5-NEtFOSAA	62		25 - 150	10/31/22 11:55	11/04/22 02:20	1
d-N-MeFOSA-M	48		10 - 150	10/31/22 11:55	11/04/22 02:20	1
d-N-EtFOSA-M	47		10 - 150	10/31/22 11:55	11/04/22 02:20	1
d7-N-MeFOSE-M	51		10 - 150	10/31/22 11:55	11/04/22 02:20	1
d9-N-EtFOSE-M	49		10 - 150	10/31/22 11:55	11/04/22 02:20	1
M2-4:2 FTS	92		25 - 150	10/31/22 11:55	11/04/22 02:20	1
M2-6:2 FTS	81		25 - 150	10/31/22 11:55	11/04/22 02:20	1
M2-8:2 FTS	72		25 - 150	10/31/22 11:55	11/04/22 02:20	1
13C3 HFPO-DA	56		25 - 150	10/31/22 11:55	11/04/22 02:20	1
13C2 10:2 FTS	68		25 - 150	10/31/22 11:55	11/04/22 02:20	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30132447.05

Job ID: 500-224633-1

Client Sample ID: FB-01-102722

Lab Sample ID: 500-224633-3

Date Collected: 10/27/22 13:45

Matrix: Water

Date Received: 10/31/22 10:13

Method: EPA 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	<4.4		4.4	2.1	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluoropentanoic acid (PFPeA)	<1.8		1.8	0.43	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluorohexanoic acid (PFHxA)	<1.8		1.8	0.51	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluoroheptanoic acid (PFHpA)	<1.8		1.8	0.22	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluorooctanoic acid (PFOA)	<1.8		1.8	0.75	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluorononanoic acid (PFNA)	<1.8		1.8	0.24	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.27	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	0.97	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.49	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluorotridecanoic acid (PFTriA)	<1.8		1.8	1.1	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.64	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.79	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.83	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluorobutanesulfonic acid (PFBS)	<1.8		1.8	0.18	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.26	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluorohexanesulfonic acid (PFHxS)	<1.8		1.8	0.50	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluoroheptanesulfonic acid (PFHpS)	<1.8		1.8	0.17	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluorooctanesulfonic acid (PFOS)	<1.8		1.8	0.48	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.33	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.28	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.86	ng/L		10/31/22 11:55	11/04/22 02:30	1
Perfluorooctanesulfonamide (FOSA)	<1.8		1.8	0.86	ng/L		10/31/22 11:55	11/04/22 02:30	1
NEtFOSA	<1.8		1.8	0.77	ng/L		10/31/22 11:55	11/04/22 02:30	1
NMeFOSA	<1.8		1.8	0.38	ng/L		10/31/22 11:55	11/04/22 02:30	1
NMeFOSAA	<4.4		4.4	1.1	ng/L		10/31/22 11:55	11/04/22 02:30	1
NEtFOSAA	<4.4		4.4	1.1	ng/L		10/31/22 11:55	11/04/22 02:30	1
NMeFOSE	<3.5		3.5	1.2	ng/L		10/31/22 11:55	11/04/22 02:30	1
NEtFOSE	<1.8		1.8	0.75	ng/L		10/31/22 11:55	11/04/22 02:30	1
4:2 FTS	<1.8		1.8	0.21	ng/L		10/31/22 11:55	11/04/22 02:30	1
6:2 FTS	<4.4		4.4	2.2	ng/L		10/31/22 11:55	11/04/22 02:30	1
8:2 FTS	<1.8		1.8	0.41	ng/L		10/31/22 11:55	11/04/22 02:30	1
10:2 FTS	<1.8		1.8	0.59	ng/L		10/31/22 11:55	11/04/22 02:30	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	<1.8		1.8	0.35	ng/L		10/31/22 11:55	11/04/22 02:30	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	<3.5		3.5	1.3	ng/L		10/31/22 11:55	11/04/22 02:30	1
F-53B Major	<1.8		1.8	0.21	ng/L		10/31/22 11:55	11/04/22 02:30	1
F-53B Minor	<1.8		1.8	0.28	ng/L		10/31/22 11:55	11/04/22 02:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	101		25 - 150				10/31/22 11:55	11/04/22 02:30	1
13C5 PFPeA	107		25 - 150				10/31/22 11:55	11/04/22 02:30	1
13C2 PFHxA	101		25 - 150				10/31/22 11:55	11/04/22 02:30	1
13C4 PFHpA	97		25 - 150				10/31/22 11:55	11/04/22 02:30	1
13C4 PFOA	99		25 - 150				10/31/22 11:55	11/04/22 02:30	1
13C5 PFNA	100		25 - 150				10/31/22 11:55	11/04/22 02:30	1
13C2 PFDA	102		25 - 150				10/31/22 11:55	11/04/22 02:30	1

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Client Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Marinette, WI 30132447.05

Job ID: 500-224633-1

Client Sample ID: FB-01-102722

Lab Sample ID: 500-224633-3

Date Collected: 10/27/22 13:45

Matrix: Water

Date Received: 10/31/22 10:13

Method: EPA 537 (modified) - Fluorinated Alkyl Substances (Continued)

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C2 PUnA	94		25 - 150	10/31/22 11:55	11/04/22 02:30	1
13C2 PFDaA	99		25 - 150	10/31/22 11:55	11/04/22 02:30	1
13C2 PFTeDA	95		25 - 150	10/31/22 11:55	11/04/22 02:30	1
13C2 PFHxDA	102		25 - 150	10/31/22 11:55	11/04/22 02:30	1
13C3 PFBS	110		25 - 150	10/31/22 11:55	11/04/22 02:30	1
18O2 PFHxS	102		25 - 150	10/31/22 11:55	11/04/22 02:30	1
13C4 PFOS	97		25 - 150	10/31/22 11:55	11/04/22 02:30	1
13C8 FOSA	97		10 - 150	10/31/22 11:55	11/04/22 02:30	1
d3-NMeFOSAA	89		25 - 150	10/31/22 11:55	11/04/22 02:30	1
d5-NEtFOSAA	91		25 - 150	10/31/22 11:55	11/04/22 02:30	1
d-N-MeFOSA-M	79		10 - 150	10/31/22 11:55	11/04/22 02:30	1
d-N-EtFOSA-M	79		10 - 150	10/31/22 11:55	11/04/22 02:30	1
d7-N-MeFOSE-M	92		10 - 150	10/31/22 11:55	11/04/22 02:30	1
d9-N-EtFOSE-M	93		10 - 150	10/31/22 11:55	11/04/22 02:30	1
M2-4:2 FTS	94		25 - 150	10/31/22 11:55	11/04/22 02:30	1
M2-6:2 FTS	98		25 - 150	10/31/22 11:55	11/04/22 02:30	1
M2-8:2 FTS	103		25 - 150	10/31/22 11:55	11/04/22 02:30	1
13C3 HFPO-DA	84		25 - 150	10/31/22 11:55	11/04/22 02:30	1
13C2 10:2 FTS	103		25 - 150	10/31/22 11:55	11/04/22 02:30	1