

David Neste
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Subject:

Sample Results Notification, Tyco Fire Technology Center PFAS, 2700 Industrial Parkway South, Marinette, Wisconsin
BRRTS Activity#: 02-38-580694

ENVIRONMENT

Dear Mr. Neste:

Date:

October 2, 2020

On behalf of Tyco Fire Products LP (Tyco), Arcadis is providing this *Sample Results Notification* for the Tyco Fire Technology Center PFAS site located at 2700 Industrial Parkway South in Marinette, Wisconsin (Site).

Contact:

Ben Verburg

Phone:

414 276 7742

Email:

Ben.Verburg@arcadis.com

Our ref:

30015294

A large amount of data is collected through the site investigation process. Tyco has included in work plans an estimated schedule for data transmittal to the Wisconsin Department of Natural Resources (WDNR). As requested by the WDNR, Tyco provided a project schedule with report dates and other related project tasks/milestones for review and comment on March 12, 2020, and updated versions of that schedule were provided in June and September. Tyco proposed summary reports that would convey site investigation data to the WDNR (providing data per s. NR 716.14(3)). This *Sample Results Notification* is being provided to satisfy NR716.14(2) for surface water samples that were collected from Green Bay. As described below, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) concentrations were not present in surface water above the current proposed WDNR surface water quality guidelines (420 nanograms per liter [ng/L] for PFOA and 11 ng/L for PFOS). No further sampling is recommended for the Bay of Green Bay at this time.

On September 14, 2020, four surface water samples were collected in Green Bay in the vicinity of the mouth of Ditch B. The locations of these samples were described in an August 28, 2020 letter to WDNR, and Figure 1 (attached) presents the sample locations. As noted in the August 28 letter, the sample locations were selected based on the results of a June 2020 hydrodynamic evaluation. The surface water was collected by Arcadis staff using grab sampling techniques. The samples were collected for analysis of per- and polyfluoroalkyl

substances (PFAS) using Method 537 (modified) and total suspended solids (TSS) using Method SM 2540D.

Table 1 below summarizes the PFAS detections in the samples as well as the Total Suspended Solids (TSS) results. Values for the parent samples are shown first, with values for the duplicate sample shown in brackets.

Table 1 Summary of Detections – PFAS

	SW-B1 (ng/L)	SW-GB1 (ng/L)	SW-GB2 (ng/L)	SW-GB4 (ng/L)
Total Suspended Solids (TSS)	11	3.5 J	3.5 J	5.0 [6.0]
4:2 Fluorotelomer sulfonate	1.5 J	0.21 U	0.21 U	0.22 U [0.25 U]
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	93	2.2 U	2.2 U	2.2 U [2.7 U]
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	2.7	0.41 U	0.41 U	0.41 U [0.49 U]
Perfluorobutane sulfonic acid (PFBS)	0.40 J	0.18 J	0.20 J	0.18 U [0.21U]
Perfluorobutanoic acid (PFBA)	8.5	2.7 J	2.7 J	2.8 J [2.7J]
Perfluoroheptanoic acid (PFHpA)	9.2	1.0 J	0.96 J	1.1 J [1.2J]
Perfluorohexane sulfonic acid (PFHxS)	4.1	0.96 J	0.83 J	0.87 J [0.71J]
Perfluorohexanoic acid (PFHxA)	22	1.9	1.9	2.0 [2.2]
Perfluorononanoic acid (PFNA)	4.1	0.28 J	0.24 U	0.24 U [0.29U]
Perfluorooctane sulfonamide (PFOSA)	1.3 J	0.93 J	0.86 U	0.94 J [1.0 U]
Perfluoropentane sulfonic acid (PFPeS)	0.33 J	0.26 U	0.26 U	0.27 U [0.32 U]
Perfluoropentanoic acid (PFPeA)	19	1.6 J	1.6 J	1.7 J [1.9 J]
Perfluorooctane sulfonic acid (PFOS)	8.6	2.8	2.2	2.1 [2.3]
Perfluorooctanoic acid (PFOA)	120 J-	2.6	2.1	2.8 [3.1]

Notes:

- J Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
 - J- The result is an estimated quantity. The associated numerical value is expected to have a negative or low bias.
 - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
- ng/L nanograms per liter
 Bracketed results are duplicate sample analytical results.

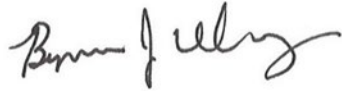
The current proposed WDNR surface water quality guidelines are 420 ng/L for PFOA and 11 ng/L for PFOS. The PFOA and PFOS concentrations were not present in surface water above those guidelines. Any further discussion regarding the cause or significance will be provided in a future Site Investigation Report. No further sampling is recommended for the Bay of Green Bay at this time.

David Neste
Wisconsin Department of Natural Resources
October 2, 2020

Please do not hesitate to call us if you have any questions.

Sincerely,

Arcadis U.S., Inc.



Benjamin J. Verburg, P.E.
Principal Engineer

Copies:

Jeff Danko
Scott Wahl

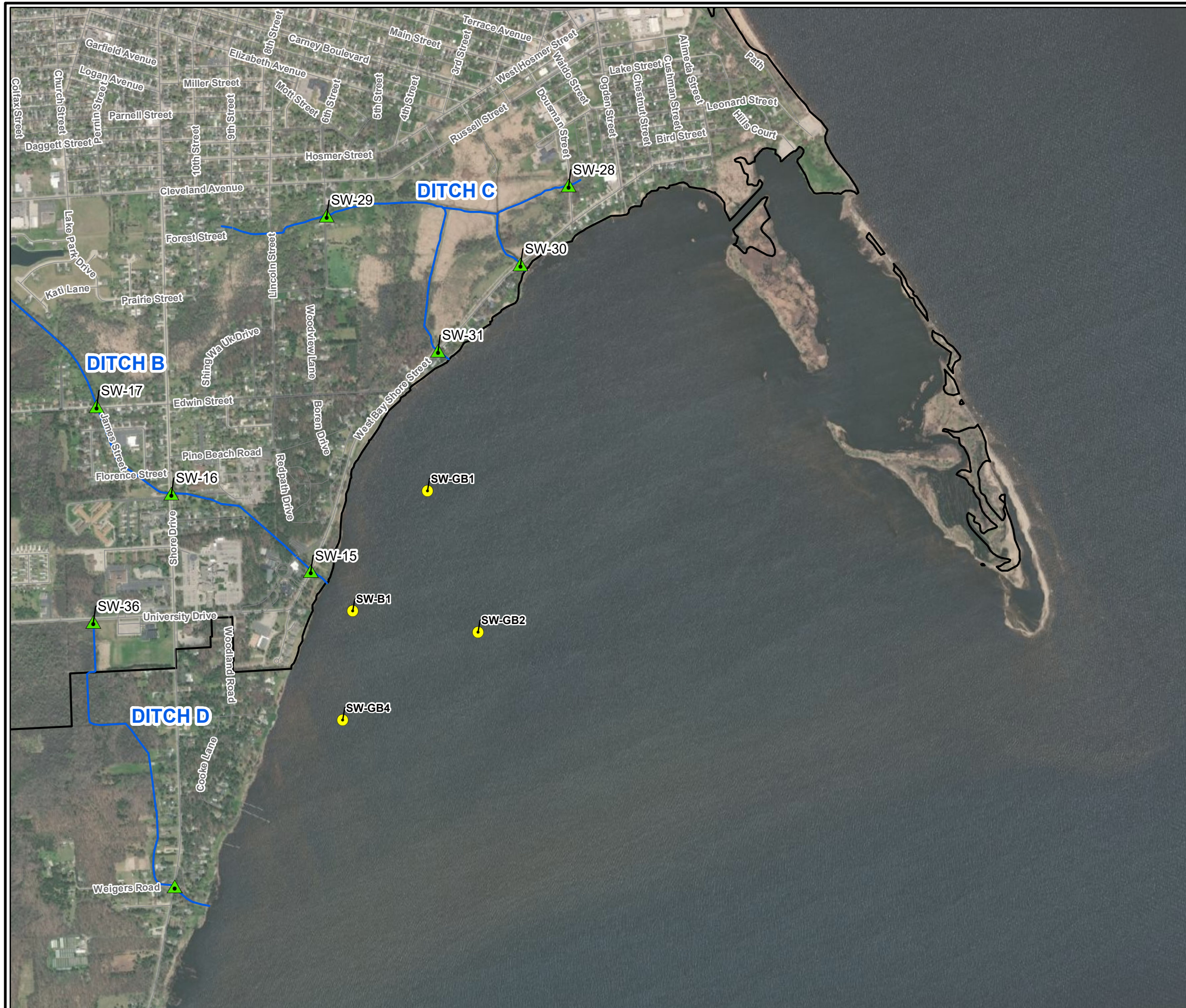
Enclosures:

Figures

- 1 Green Bay Surface Water Sample Locations

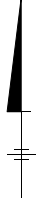
Attachments

Eurofins Analytical Reports (2)



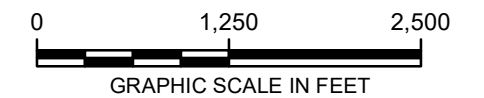
LEGEND:

- SEPTEMBER 2020 SURFACE WATER SAMPLE LOCATION
- ▲ 2018 SURFACE WATER SAMPLE
- APPROXIMATE SITE PROPERTY BOUNDARY
- APPROXIMATE MARINETTE CITY BOUNDARY
- ROAD
- DITCH/STREAM



NOTES:

1. AERIAL SOURCE = GOOGLE EARTH PRO VERSION 7.1, 2019 TERRAMETRICS, 2018 GOOGLE IMAGE NOAA IMAGERY DATE: 10/10/2013, LAT 45.068006° LONG -87.602603°.



TYCO FIRE PRODUCTS, LP
 MARINETTE, WISCONSIN

**GREEN BAY SURFACE
 WATER SAMPLE LOCATIONS**



Tyco Fire Products LLC.

DATA REVIEW

Marinette, Wisconsin

Perfluorinated Alkyl Acids (PFAA) Analyses

SDG #320-64589-1

Analyses Performed By:


Eurofins TestAmerica Laboratories, Inc.

West Sacramento, California

Report #38380R

Review Level: Stage 2 Review

Project: 30015294.00001



DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #320-64589-1 for samples collected in association with the for the Tyco Fire Products, LLC., Marinette, Wisconsin Site. The review was conducted as a Stage 2 review evaluation and included review of data package completeness (USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, EPA 540-R-08-005, January 2009). Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis	
					PFAAS	MISC
SW-GB4 (091420)	320-64589-1	Water	9/14/2020		X	
SW-B1 (091420)	320-64589-2	Water	9/14/2020		X	
SW-GB2 (091420)	320-64589-3	Water	9/14/2020		X	
SW-GB1 (091420)	320-64589-4	Water	9/14/2020		X	
DUP-01 (091420)	320-64589-5	Water	9/14/2020	SW-GB4 (091420)	X	
FIELD BLANK-09-14-2020	320-64589-6	Water	9/14/2020		X	

Note:

1. The matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location SW-B1 (091420).

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) Method 537 Modified and laboratory standard operating procedure (SOP) WS-LC-0025r2-9 PFAS by CLMSMS, 11/22/2017, "Per- and Polyfluorinated Substances (PFAS) in Water, Soils, Sediments and Tissue. [Method 537 (Modified), Method PFAS by LCMSMS Compliant with QSM 5.1 Table B-15]", Data were reviewed in accordance with USEPA National Functional Guidelines for Organic Superfund Methods Data Review, EPA 540-R-2017-002, January 2017 (with reference to the historical USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999, as appropriate). Department of Defense (DoD) Quality Systems Manual (QSM) 5.1 Table B-15, and/or Wisconsin PFAS Aqueous (Non-Potable Water) and Non-Aqueous Matrices Method Expectations, (EA-19-0001, December 2019).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
 - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The compound was quantitated above the calibration range.
 - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
 - UB Compound is considered non-detect at the listed value due to associated blank contamination.
 - J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
 - J+ The result is an estimated quantity. The associated numerical value is expected to have a positive or high bias.
 - J- The result is an estimated quantity. The associated numerical value is expected to have a negative or low bias.
 - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.

DATA REVIEW REPORT

- JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

PERFLUORINATED ALKYL ACIDS (PFAA) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
EPA 537 Modified	Water	28 days from collection to extraction and 30 days from extraction to analysis	Cool to <6 °C; Extracts must be stored at room temperature until analysis.

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the limit of detection (LOD). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the LOD in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Internal Standard Isotopically Labelled Standards

3.1 Extracted Internal Standard (EIS)/Isotopically Labelled Standards

Labeled standards must be added to all field samples and QC samples prior to extraction. For aqueous samples prepared by serial dilution instead of solid phase extraction, they must be added to samples prior to analysis. EIS recoveries must be within the control limits of 25% to 150% with exception of compounds FOSA, NMeFOSA, NEtFOSA, NMeFOSE, and NEtFOSE, whereas a control limit of 10-150% is required).

EIS recoveries were within control limits.

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within 70-130% or within 50-150% at the low-level fortified amount (near the LOQ). The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

DATA REVIEW REPORT

Sample Locations	Compound	MS Recovery	MSD Recovery
SW-B1 (091420)	Perfluorooctanoic acid (PFOA)	AC	<LL but >10%

Note:

AC = acceptable

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J+
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J-
< 10%	Non-detect	X
	Detect	J-
SR>4X: Parent sample concentration > four times the MS/MSD spiking solution concentration.	Detect	No Action
	Non-detect	

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within 70-130%.

Compounds associated with the LCS analysis exhibited recoveries within the control limits. The LCSD analysis was not performed on a sample location within this SDG.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the LOQ, a control limit of two times the LOQ is applied for water matrices.

Results for field duplicate samples are summarized in the following table.

Sample ID/ Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
SW-GB4 (091420)/ DUP-01 (091420)	Perfluorobutanoic acid (PFBA)	2.8 J	2.7 J	AC
	Perfluoroheptanoic acid (PFHpA)	1.1 J	1.2 J	AC
	Perfluorohexane sulfonic acid (PFHxS)	0.87 J	0.71 J	AC
	Perfluorohexanoic acid (PFHxA)	2	2.2	9.5%

DATA REVIEW REPORT

Sample ID/ Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
	Perfluorooctane sulfonamide (PFOSA)	0.94 J	2.1 U	AC
	Perfluorooctane sulfonic acid (PFOS)	2.1	2.3	AC
	Perfluorooctanoic acid (PFOA)	2.8	3.1	AC
	Perfluoropentanoic acid (PFPeA)	1.7 J	1.9 J	AC

Notes:

AC = acceptable

The calculated RPD and/or results between the parent sample and field duplicate were acceptable.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR PFAAs

SVOCs: EPA 537 Modified	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)					
Stage 2 Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Field/Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Extracted Internal Standard/Extracted Internal Standard (EIS)		X		X	
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R = percent recovery

RPD = relative percent difference

%D = percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Todd Church

SIGNATURE:



DATE: September 22, 2020

PEER REVIEW: Dennis Capria

DATE: September 24, 2020

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



Eurofins TestAmerica, Chicago

2417 Bond Street
University Park, IL 60484
Phone: 708-534-5200 Fax: 708-534-5211

Chain of Custody Record

Client Information				Sampler: K. KEON		Lab PM: Fredrick, Sandie		Carrier Tracking No(s):		COC No: 500-85133-35234.1	
Client Contact: Jessie Murray				Phone:		E-Mail: sandra.fredrick@eurofinset.com				Page: Page 1 of 2	
Company: ARCADIS U.S., Inc.								Analysis Requested			
Address: 126 North Jefferson Street Suite 400				Due Date Requested:				Preservation Codes: A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Z - other (specify)			
City: Milwaukee				TAT Requested (days): 10 day							
State, Zip: WI, 53202				PO #: 30015294							
Phone:				WO #:							
Email: Jessie.Murray@arcadis.com				Project #: 50016516							
Project Name: Marinette, WI 30015294				SSOW#:				Other: Special Instructions/Note:			
Site: MARINETTE, WI											
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFC_IDA - PFAS	2640D - TSS	Total Number of containers		
										Preservation Code:	
SW-GB4 (091420)	9.14.20	1045	G	Water	N	N	2				
SW-BI (091420)	9.14.20	1105	G	Water	N	Y	6				
SW-GB2 (091420)	9.14.20	1135	G	Water	N	Z	2				
SW-GB1 (091420)	9.14.20	1200	G	Water	N	Z	2				
DUP-01	9.14.20	-	G	Water	N	Z	2				
FIELD BLANK-09-14-2020	9.14.20	1140	G	Water	N	Z	2				
				Water							
				Water							
				Water							
				Water							
				Water							
Possible Hazard Identification				Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)							
<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological				<input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months							
Deliverable Requested: I, II, III, IV, Other (specify)				Special Instructions/QC Requirements:							
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:					
Relinquished by: Underlin		Date/Time: 9.14.20/1530		Company: ARCADIS		Received by: Underlin		Date/Time: 9/15/20 1030		Company: ETA	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:	
Custody Seals Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.: 991266		Cooler Temperature(s) °C and Other Remarks: 0.2°/0.7°							



320-64589 Chain of Custody

Definitions/Glossary

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30015294

Job ID: 320-64589-1

Qualifiers

LCMS

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

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

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30015294

Job ID: 320-64589-1

Client Sample ID: SW-GB4 (091420)

Lab Sample ID: 320-64589-1

Date Collected: 09/14/20 10:45

Matrix: Water

Date Received: 09/15/20 10:30

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	2.8	J	4.5	2.2	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluoropentanoic acid (PFPeA)	1.7	J	1.8	0.44	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluorohexanoic acid (PFHxA)	2.0		1.8	0.52	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluoroheptanoic acid (PFHpA)	1.1	J	1.8	0.22	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluorooctanoic acid (PFOA)	2.8		1.8	0.76	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluorononanoic acid (PFNA)	<1.8		1.8	0.24	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.28	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	0.99	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.49	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluorotridecanoic acid (PFTriA)	<1.8		1.8	1.2	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.66	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.80	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.84	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluorobutanesulfonic acid (PFBS)	<1.8		1.8	0.18	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.27	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluorohexanesulfonic acid (PFHxS)	0.87	J	1.8	0.51	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluoroheptanesulfonic Acid (PFHpS)	<1.8		1.8	0.17	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluorooctanesulfonic acid (PFOS)	2.1		1.8	0.49	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.33	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.29	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.87	ng/L		09/16/20 11:58	09/17/20 12:49	1
Perfluorooctanesulfonamide (FOSA)	0.94	J	1.8	0.88	ng/L		09/16/20 11:58	09/17/20 12:49	1
NEtFOSA	<1.8		1.8	0.78	ng/L		09/16/20 11:58	09/17/20 12:49	1
NMeFOSA	<1.8		1.8	0.39	ng/L		09/16/20 11:58	09/17/20 12:49	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<4.5		4.5	1.1	ng/L		09/16/20 11:58	09/17/20 12:49	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<4.5		4.5	1.2	ng/L		09/16/20 11:58	09/17/20 12:49	1
NMeFOSE	<3.6		3.6	1.3	ng/L		09/16/20 11:58	09/17/20 12:49	1
NEtFOSE	<1.8		1.8	0.76	ng/L		09/16/20 11:58	09/17/20 12:49	1
4:2 FTS	<1.8		1.8	0.22	ng/L		09/16/20 11:58	09/17/20 12:49	1
6:2 FTS	<4.5		4.5	2.2	ng/L		09/16/20 11:58	09/17/20 12:49	1
8:2 FTS	<1.8		1.8	0.41	ng/L		09/16/20 11:58	09/17/20 12:49	1
10:2 FTS	<1.8		1.8	0.60	ng/L		09/16/20 11:58	09/17/20 12:49	1
DONA	<1.8		1.8	0.36	ng/L		09/16/20 11:58	09/17/20 12:49	1
HFPO-DA (GenX)	<3.6		3.6	1.3	ng/L		09/16/20 11:58	09/17/20 12:49	1
F-53B Major	<1.8		1.8	0.22	ng/L		09/16/20 11:58	09/17/20 12:49	1
F-53B Minor	<1.8		1.8	0.29	ng/L		09/16/20 11:58	09/17/20 12:49	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	72		25 - 150	09/16/20 11:58	09/17/20 12:49	1
13C5 PFPeA	86		25 - 150	09/16/20 11:58	09/17/20 12:49	1
13C2 PFHxA	89		25 - 150	09/16/20 11:58	09/17/20 12:49	1
13C4 PFHpA	87		25 - 150	09/16/20 11:58	09/17/20 12:49	1
13C4 PFOA	84		25 - 150	09/16/20 11:58	09/17/20 12:49	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Marinette, WI 30015294

Job ID: 320-64589-1

Client Sample ID: SW-GB4 (091420)

Lab Sample ID: 320-64589-1

Date Collected: 09/14/20 10:45

Matrix: Water

Date Received: 09/15/20 10:30

Method: 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	89		25 - 150	09/16/20 11:58	09/17/20 12:49	1
13C2 PFDA	90		25 - 150	09/16/20 11:58	09/17/20 12:49	1
13C2 PFUnA	82		25 - 150	09/16/20 11:58	09/17/20 12:49	1
13C2 PFDoA	91		25 - 150	09/16/20 11:58	09/17/20 12:49	1
13C2 PFTeDA	75		25 - 150	09/16/20 11:58	09/17/20 12:49	1
13C2 PFHxDA	56		25 - 150	09/16/20 11:58	09/17/20 12:49	1
13C3 PFBS	90		25 - 150	09/16/20 11:58	09/17/20 12:49	1
18O2 PFHxS	91		25 - 150	09/16/20 11:58	09/17/20 12:49	1
13C4 PFOS	90		25 - 150	09/16/20 11:58	09/17/20 12:49	1
13C8 FOSA	94		25 - 150	09/16/20 11:58	09/17/20 12:49	1
d3-NMeFOSAA	93		25 - 150	09/16/20 11:58	09/17/20 12:49	1
d5-NEtFOSAA	95		25 - 150	09/16/20 11:58	09/17/20 12:49	1
d-N-MeFOSA-M	64		20 - 150	09/16/20 11:58	09/17/20 12:49	1
d-N-EtFOSA-M	52		20 - 150	09/16/20 11:58	09/17/20 12:49	1
d7-N-MeFOSE-M	38		10 - 120	09/16/20 11:58	09/17/20 12:49	1
d9-N-EtFOSE-M	37		10 - 120	09/16/20 11:58	09/17/20 12:49	1
M2-4:2 FTS	109		25 - 150	09/16/20 11:58	09/17/20 12:49	1
M2-6:2 FTS	116		25 - 150	09/16/20 11:58	09/17/20 12:49	1
M2-8:2 FTS	112		25 - 150	09/16/20 11:58	09/17/20 12:49	1
13C3 HFPO-DA	85		25 - 150	09/16/20 11:58	09/17/20 12:49	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30015294

Job ID: 320-64589-1

Client Sample ID: SW-B1 (091420)

Lab Sample ID: 320-64589-2

Date Collected: 09/14/20 11:05

Matrix: Water

Date Received: 09/15/20 10:30

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	8.5		4.5	2.1	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluoropentanoic acid (PFPeA)	19		1.8	0.44	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluorohexanoic acid (PFHxA)	22		1.8	0.52	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluoroheptanoic acid (PFHpA)	9.2		1.8	0.22	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluorooctanoic acid (PFOA)	120	F1 J-	1.8	0.76	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluorononanoic acid (PFNA)	4.1		1.8	0.24	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.28	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	0.98	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.49	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluorotridecanoic acid (PFTriA)	<1.8		1.8	1.2	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.65	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.79	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.84	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluorobutanesulfonic acid (PFBS)	0.40	J	1.8	0.18	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluoropentanesulfonic acid (PFPeS)	0.33	J	1.8	0.27	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluorohexanesulfonic acid (PFHxS)	4.1		1.8	0.51	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluoroheptanesulfonic Acid (PFHpS)	<1.8		1.8	0.17	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluorooctanesulfonic acid (PFOS)	8.6		1.8	0.48	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.33	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.29	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.87	ng/L		09/16/20 11:58	09/17/20 13:00	1
Perfluorooctanesulfonamide (FOSA)	1.3	J	1.8	0.88	ng/L		09/16/20 11:58	09/17/20 13:00	1
NEtFOSA	<1.8		1.8	0.78	ng/L		09/16/20 11:58	09/17/20 13:00	1
NMeFOSA	<1.8		1.8	0.38	ng/L		09/16/20 11:58	09/17/20 13:00	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<4.5		4.5	1.1	ng/L		09/16/20 11:58	09/17/20 13:00	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<4.5		4.5	1.2	ng/L		09/16/20 11:58	09/17/20 13:00	1
NMeFOSE	<3.6		3.6	1.3	ng/L		09/16/20 11:58	09/17/20 13:00	1
NEtFOSE	<1.8		1.8	0.76	ng/L		09/16/20 11:58	09/17/20 13:00	1
4:2 FTS	1.5	J	1.8	0.21	ng/L		09/16/20 11:58	09/17/20 13:00	1
6:2 FTS	93		4.5	2.2	ng/L		09/16/20 11:58	09/17/20 13:00	1
8:2 FTS	2.7		1.8	0.41	ng/L		09/16/20 11:58	09/17/20 13:00	1
10:2 FTS	<1.8		1.8	0.60	ng/L		09/16/20 11:58	09/17/20 13:00	1
DONA	<1.8		1.8	0.36	ng/L		09/16/20 11:58	09/17/20 13:00	1
HFPO-DA (GenX)	<3.6		3.6	1.3	ng/L		09/16/20 11:58	09/17/20 13:00	1
F-53B Major	<1.8		1.8	0.21	ng/L		09/16/20 11:58	09/17/20 13:00	1
F-53B Minor	<1.8		1.8	0.29	ng/L		09/16/20 11:58	09/17/20 13:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	65		25 - 150				09/16/20 11:58	09/17/20 13:00	1
13C5 PFPeA	75		25 - 150				09/16/20 11:58	09/17/20 13:00	1
13C2 PFHxA	78		25 - 150				09/16/20 11:58	09/17/20 13:00	1
13C4 PFHpA	80		25 - 150				09/16/20 11:58	09/17/20 13:00	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Marinette, WI 30015294

Job ID: 320-64589-1

Client Sample ID: SW-B1 (091420)

Lab Sample ID: 320-64589-2

Date Collected: 09/14/20 11:05

Matrix: Water

Date Received: 09/15/20 10:30

Method: 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>
13C4 PFOA	74		25 - 150	09/16/20 11:58	09/17/20 13:00	1
13C5 PFNA	86		25 - 150	09/16/20 11:58	09/17/20 13:00	1
13C2 PFDA	83		25 - 150	09/16/20 11:58	09/17/20 13:00	1
13C2 PFUnA	74		25 - 150	09/16/20 11:58	09/17/20 13:00	1
13C2 PFDoA	81		25 - 150	09/16/20 11:58	09/17/20 13:00	1
13C2 PFTeDA	60		25 - 150	09/16/20 11:58	09/17/20 13:00	1
13C2 PFHxDA	55		25 - 150	09/16/20 11:58	09/17/20 13:00	1
13C3 PFBS	83		25 - 150	09/16/20 11:58	09/17/20 13:00	1
18O2 PFHxS	85		25 - 150	09/16/20 11:58	09/17/20 13:00	1
13C4 PFOS	82		25 - 150	09/16/20 11:58	09/17/20 13:00	1
13C8 FOSA	85		25 - 150	09/16/20 11:58	09/17/20 13:00	1
d3-NMeFOSAA	80		25 - 150	09/16/20 11:58	09/17/20 13:00	1
d5-NEtFOSAA	87		25 - 150	09/16/20 11:58	09/17/20 13:00	1
d-N-MeFOSA-M	53		20 - 150	09/16/20 11:58	09/17/20 13:00	1
d-N-EtFOSA-M	49		20 - 150	09/16/20 11:58	09/17/20 13:00	1
d7-N-MeFOSE-M	36		10 - 120	09/16/20 11:58	09/17/20 13:00	1
d9-N-EtFOSE-M	36		10 - 120	09/16/20 11:58	09/17/20 13:00	1
M2-4:2 FTS	93		25 - 150	09/16/20 11:58	09/17/20 13:00	1
M2-6:2 FTS	101		25 - 150	09/16/20 11:58	09/17/20 13:00	1
M2-8:2 FTS	101		25 - 150	09/16/20 11:58	09/17/20 13:00	1
13C3 HFPO-DA	76		25 - 150	09/16/20 11:58	09/17/20 13:00	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30015294

Job ID: 320-64589-1

Client Sample ID: SW-GB2 (091420)

Lab Sample ID: 320-64589-3

Date Collected: 09/14/20 11:35

Matrix: Water

Date Received: 09/15/20 10:30

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	2.7	J	4.4	2.1	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluoropentanoic acid (PFPeA)	1.6	J	1.8	0.43	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluorohexanoic acid (PFHxA)	1.9		1.8	0.51	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluoroheptanoic acid (PFHpA)	0.96	J	1.8	0.22	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluorooctanoic acid (PFOA)	2.1		1.8	0.75	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluorononanoic acid (PFNA)	<1.8		1.8	0.24	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.27	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	0.97	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.49	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluorotridecanoic acid (PFTriA)	<1.8		1.8	1.1	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.64	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.79	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.83	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluorobutanesulfonic acid (PFBS)	0.20	J	1.8	0.18	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.26	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluorohexanesulfonic acid (PFHxS)	0.83	J	1.8	0.50	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluoroheptanesulfonic Acid (PFHpS)	<1.8		1.8	0.17	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluorooctanesulfonic acid (PFOS)	2.2		1.8	0.48	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.33	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.28	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.86	ng/L		09/16/20 11:58	09/17/20 13:28	1
Perfluorooctanesulfonamide (FOSA)	<1.8		1.8	0.86	ng/L		09/16/20 11:58	09/17/20 13:28	1
NEtFOSA	<1.8		1.8	0.77	ng/L		09/16/20 11:58	09/17/20 13:28	1
NMeFOSA	<1.8		1.8	0.38	ng/L		09/16/20 11:58	09/17/20 13:28	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<4.4		4.4	1.1	ng/L		09/16/20 11:58	09/17/20 13:28	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<4.4		4.4	1.1	ng/L		09/16/20 11:58	09/17/20 13:28	1
NMeFOSE	<3.5		3.5	1.2	ng/L		09/16/20 11:58	09/17/20 13:28	1
NEtFOSE	<1.8		1.8	0.75	ng/L		09/16/20 11:58	09/17/20 13:28	1
4:2 FTS	<1.8		1.8	0.21	ng/L		09/16/20 11:58	09/17/20 13:28	1
6:2 FTS	<4.4		4.4	2.2	ng/L		09/16/20 11:58	09/17/20 13:28	1
8:2 FTS	<1.8		1.8	0.41	ng/L		09/16/20 11:58	09/17/20 13:28	1
10:2 FTS	<1.8		1.8	0.59	ng/L		09/16/20 11:58	09/17/20 13:28	1
DONA	<1.8		1.8	0.35	ng/L		09/16/20 11:58	09/17/20 13:28	1
HFPO-DA (GenX)	<3.5		3.5	1.3	ng/L		09/16/20 11:58	09/17/20 13:28	1
F-53B Major	<1.8		1.8	0.21	ng/L		09/16/20 11:58	09/17/20 13:28	1
F-53B Minor	<1.8		1.8	0.28	ng/L		09/16/20 11:58	09/17/20 13:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	67		25 - 150				09/16/20 11:58	09/17/20 13:28	1
13C5 PFPeA	79		25 - 150				09/16/20 11:58	09/17/20 13:28	1
13C2 PFHxA	81		25 - 150				09/16/20 11:58	09/17/20 13:28	1
13C4 PFHpA	83		25 - 150				09/16/20 11:58	09/17/20 13:28	1
13C4 PFOA	82		25 - 150				09/16/20 11:58	09/17/20 13:28	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Marinette, WI 30015294

Job ID: 320-64589-1

Client Sample ID: SW-GB2 (091420)

Lab Sample ID: 320-64589-3

Date Collected: 09/14/20 11:35

Matrix: Water

Date Received: 09/15/20 10:30

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

<u>Isotope Dilution</u>	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Dil Fac</u>
13C5 PFNA	88		25 - 150	09/16/20 11:58	09/17/20 13:28	1
13C2 PFDA	85		25 - 150	09/16/20 11:58	09/17/20 13:28	1
13C2 PFUnA	85		25 - 150	09/16/20 11:58	09/17/20 13:28	1
13C2 PFDoA	83		25 - 150	09/16/20 11:58	09/17/20 13:28	1
13C2 PFTeDA	71		25 - 150	09/16/20 11:58	09/17/20 13:28	1
13C2 PFHxDA	72		25 - 150	09/16/20 11:58	09/17/20 13:28	1
13C3 PFBS	79		25 - 150	09/16/20 11:58	09/17/20 13:28	1
18O2 PFHxS	82		25 - 150	09/16/20 11:58	09/17/20 13:28	1
13C4 PFOS	78		25 - 150	09/16/20 11:58	09/17/20 13:28	1
13C8 FOSA	84		25 - 150	09/16/20 11:58	09/17/20 13:28	1
d3-NMeFOSAA	77		25 - 150	09/16/20 11:58	09/17/20 13:28	1
d5-NEtFOSAA	84		25 - 150	09/16/20 11:58	09/17/20 13:28	1
d-N-MeFOSA-M	60		20 - 150	09/16/20 11:58	09/17/20 13:28	1
d-N-EtFOSA-M	46		20 - 150	09/16/20 11:58	09/17/20 13:28	1
d7-N-MeFOSE-M	32		10 - 120	09/16/20 11:58	09/17/20 13:28	1
d9-N-EtFOSE-M	28		10 - 120	09/16/20 11:58	09/17/20 13:28	1
M2-4:2 FTS	102		25 - 150	09/16/20 11:58	09/17/20 13:28	1
M2-6:2 FTS	110		25 - 150	09/16/20 11:58	09/17/20 13:28	1
M2-8:2 FTS	105		25 - 150	09/16/20 11:58	09/17/20 13:28	1
13C3 HFPO-DA	79		25 - 150	09/16/20 11:58	09/17/20 13:28	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30015294

Job ID: 320-64589-1

Client Sample ID: SW-GB1 (091420)

Lab Sample ID: 320-64589-4

Date Collected: 09/14/20 12:00

Matrix: Water

Date Received: 09/15/20 10:30

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	2.7	J	4.4	2.1	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluoropentanoic acid (PFPeA)	1.6	J	1.8	0.43	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluorohexanoic acid (PFHxA)	1.9		1.8	0.51	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluoroheptanoic acid (PFHpA)	1.0	J	1.8	0.22	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluorooctanoic acid (PFOA)	2.6		1.8	0.75	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluorononanoic acid (PFNA)	0.28	J	1.8	0.24	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.27	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	0.97	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.48	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluorotridecanoic acid (PFTriA)	<1.8		1.8	1.1	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.64	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.78	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.83	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluorobutanesulfonic acid (PFBS)	0.18	J	1.8	0.18	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.26	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluorohexanesulfonic acid (PFHxS)	0.96	J	1.8	0.50	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluoroheptanesulfonic Acid (PFHpS)	<1.8		1.8	0.17	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluorooctanesulfonic acid (PFOS)	2.8		1.8	0.48	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.33	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.28	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.85	ng/L		09/16/20 11:58	09/17/20 13:37	1
Perfluorooctanesulfonamide (FOSA)	0.93	J	1.8	0.86	ng/L		09/16/20 11:58	09/17/20 13:37	1
NEtFOSA	<1.8		1.8	0.77	ng/L		09/16/20 11:58	09/17/20 13:37	1
NMeFOSA	<1.8		1.8	0.38	ng/L		09/16/20 11:58	09/17/20 13:37	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<4.4		4.4	1.1	ng/L		09/16/20 11:58	09/17/20 13:37	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<4.4		4.4	1.1	ng/L		09/16/20 11:58	09/17/20 13:37	1
NMeFOSE	<3.5		3.5	1.2	ng/L		09/16/20 11:58	09/17/20 13:37	1
NEtFOSE	<1.8		1.8	0.75	ng/L		09/16/20 11:58	09/17/20 13:37	1
4:2 FTS	<1.8		1.8	0.21	ng/L		09/16/20 11:58	09/17/20 13:37	1
6:2 FTS	<4.4		4.4	2.2	ng/L		09/16/20 11:58	09/17/20 13:37	1
8:2 FTS	<1.8		1.8	0.41	ng/L		09/16/20 11:58	09/17/20 13:37	1
10:2 FTS	<1.8		1.8	0.59	ng/L		09/16/20 11:58	09/17/20 13:37	1
DONA	<1.8		1.8	0.35	ng/L		09/16/20 11:58	09/17/20 13:37	1
HFPO-DA (GenX)	<3.5		3.5	1.3	ng/L		09/16/20 11:58	09/17/20 13:37	1
F-53B Major	<1.8		1.8	0.21	ng/L		09/16/20 11:58	09/17/20 13:37	1
F-53B Minor	<1.8		1.8	0.28	ng/L		09/16/20 11:58	09/17/20 13:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFBA	60		25 - 150				09/16/20 11:58	09/17/20 13:37	1
13C5 PFPeA	72		25 - 150				09/16/20 11:58	09/17/20 13:37	1
13C2 PFHxA	73		25 - 150				09/16/20 11:58	09/17/20 13:37	1
13C4 PFHpA	75		25 - 150				09/16/20 11:58	09/17/20 13:37	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Marinette, WI 30015294

Job ID: 320-64589-1

Client Sample ID: SW-GB1 (091420)

Lab Sample ID: 320-64589-4

Date Collected: 09/14/20 12:00

Matrix: Water

Date Received: 09/15/20 10:30

Method: 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>
13C4 PFOA	72		25 - 150	09/16/20 11:58	09/17/20 13:37	1
13C5 PFNA	81		25 - 150	09/16/20 11:58	09/17/20 13:37	1
13C2 PFDA	80		25 - 150	09/16/20 11:58	09/17/20 13:37	1
13C2 PFUnA	80		25 - 150	09/16/20 11:58	09/17/20 13:37	1
13C2 PFDoA	70		25 - 150	09/16/20 11:58	09/17/20 13:37	1
13C2 PFTeDA	62		25 - 150	09/16/20 11:58	09/17/20 13:37	1
13C2 PFHxDA	56		25 - 150	09/16/20 11:58	09/17/20 13:37	1
13C3 PFBS	77		25 - 150	09/16/20 11:58	09/17/20 13:37	1
18O2 PFHxS	76		25 - 150	09/16/20 11:58	09/17/20 13:37	1
13C4 PFOS	75		25 - 150	09/16/20 11:58	09/17/20 13:37	1
13C8 FOSA	79		25 - 150	09/16/20 11:58	09/17/20 13:37	1
d3-NMeFOSAA	76		25 - 150	09/16/20 11:58	09/17/20 13:37	1
d5-NEtFOSAA	79		25 - 150	09/16/20 11:58	09/17/20 13:37	1
d-N-MeFOSA-M	53		20 - 150	09/16/20 11:58	09/17/20 13:37	1
d-N-EtFOSA-M	48		20 - 150	09/16/20 11:58	09/17/20 13:37	1
d7-N-MeFOSE-M	31		10 - 120	09/16/20 11:58	09/17/20 13:37	1
d9-N-EtFOSE-M	33		10 - 120	09/16/20 11:58	09/17/20 13:37	1
M2-4:2 FTS	89		25 - 150	09/16/20 11:58	09/17/20 13:37	1
M2-6:2 FTS	93		25 - 150	09/16/20 11:58	09/17/20 13:37	1
M2-8:2 FTS	97		25 - 150	09/16/20 11:58	09/17/20 13:37	1
13C3 HFPO-DA	70		25 - 150	09/16/20 11:58	09/17/20 13:37	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30015294

Job ID: 320-64589-1

Client Sample ID: DUP-01

Lab Sample ID: 320-64589-5

Date Collected: 09/14/20 00:00

Matrix: Water

Date Received: 09/15/20 10:30

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	2.7	J	5.3	2.5	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluoropentanoic acid (PFPeA)	1.9	J	2.1	0.52	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluorohexanoic acid (PFHxA)	2.2		2.1	0.62	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluoroheptanoic acid (PFHpA)	1.2	J	2.1	0.27	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluorooctanoic acid (PFOA)	3.1		2.1	0.90	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluorononanoic acid (PFNA)	<2.1		2.1	0.29	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluorodecanoic acid (PFDA)	<2.1		2.1	0.33	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluoroundecanoic acid (PFUnA)	<2.1		2.1	1.2	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluorododecanoic acid (PFDoA)	<2.1		2.1	0.58	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluorotridecanoic acid (PFTriA)	<2.1		2.1	1.4	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluorotetradecanoic acid (PFTeA)	<2.1		2.1	0.77	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<2.1		2.1	0.94	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluoro-n-octadecanoic acid (PFODA)	<2.1		2.1	1.0	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluorobutanesulfonic acid (PFBS)	<2.1		2.1	0.21	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluoropentanesulfonic acid (PFPeS)	<2.1		2.1	0.32	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluorohexanesulfonic acid (PFHxS)	0.71	J	2.1	0.60	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluoroheptanesulfonic Acid (PFHpS)	<2.1		2.1	0.20	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluorooctanesulfonic acid (PFOS)	2.3		2.1	0.57	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluorononanesulfonic acid (PFNS)	<2.1		2.1	0.39	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluorodecanesulfonic acid (PFDS)	<2.1		2.1	0.34	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluorododecanesulfonic acid (PFDoS)	<2.1		2.1	1.0	ng/L		09/16/20 11:58	09/17/20 13:46	1
Perfluorooctanesulfonamide (FOSA)	<2.1		2.1	1.0	ng/L		09/16/20 11:58	09/17/20 13:46	1
NEtFOSA	<2.1		2.1	0.92	ng/L		09/16/20 11:58	09/17/20 13:46	1
NMeFOSA	<2.1		2.1	0.46	ng/L		09/16/20 11:58	09/17/20 13:46	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<5.3		5.3	1.3	ng/L		09/16/20 11:58	09/17/20 13:46	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<5.3		5.3	1.4	ng/L		09/16/20 11:58	09/17/20 13:46	1
NMeFOSE	<4.2		4.2	1.5	ng/L		09/16/20 11:58	09/17/20 13:46	1
NEtFOSE	<2.1		2.1	0.90	ng/L		09/16/20 11:58	09/17/20 13:46	1
4:2 FTS	<2.1		2.1	0.25	ng/L		09/16/20 11:58	09/17/20 13:46	1
6:2 FTS	<5.3		5.3	2.7	ng/L		09/16/20 11:58	09/17/20 13:46	1
8:2 FTS	<2.1		2.1	0.49	ng/L		09/16/20 11:58	09/17/20 13:46	1
10:2 FTS	<2.1		2.1	0.71	ng/L		09/16/20 11:58	09/17/20 13:46	1
DONA	<2.1		2.1	0.42	ng/L		09/16/20 11:58	09/17/20 13:46	1
HFPO-DA (GenX)	<4.2		4.2	1.6	ng/L		09/16/20 11:58	09/17/20 13:46	1
F-53B Major	<2.1		2.1	0.25	ng/L		09/16/20 11:58	09/17/20 13:46	1
F-53B Minor	<2.1		2.1	0.34	ng/L		09/16/20 11:58	09/17/20 13:46	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	72		25 - 150	09/16/20 11:58	09/17/20 13:46	1
13C5 PFPeA	83		25 - 150	09/16/20 11:58	09/17/20 13:46	1
13C2 PFHxA	86		25 - 150	09/16/20 11:58	09/17/20 13:46	1
13C4 PFHpA	86		25 - 150	09/16/20 11:58	09/17/20 13:46	1
13C4 PFOA	82		25 - 150	09/16/20 11:58	09/17/20 13:46	1

Euofins TestAmerica, Sacramento

Client Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Marinette, WI 30015294

Job ID: 320-64589-1

Client Sample ID: DUP-01

Lab Sample ID: 320-64589-5

Date Collected: 09/14/20 00:00

Matrix: Water

Date Received: 09/15/20 10:30

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

<u>Isotope Dilution</u>	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Dil Fac</u>
13C5 PFNA	91		25 - 150	09/16/20 11:58	09/17/20 13:46	1
13C2 PFDA	92		25 - 150	09/16/20 11:58	09/17/20 13:46	1
13C2 PFUnA	89		25 - 150	09/16/20 11:58	09/17/20 13:46	1
13C2 PFDoA	86		25 - 150	09/16/20 11:58	09/17/20 13:46	1
13C2 PFTeDA	70		25 - 150	09/16/20 11:58	09/17/20 13:46	1
13C2 PFHxDA	69		25 - 150	09/16/20 11:58	09/17/20 13:46	1
13C3 PFBS	89		25 - 150	09/16/20 11:58	09/17/20 13:46	1
18O2 PFHxS	90		25 - 150	09/16/20 11:58	09/17/20 13:46	1
13C4 PFOS	87		25 - 150	09/16/20 11:58	09/17/20 13:46	1
13C8 FOSA	92		25 - 150	09/16/20 11:58	09/17/20 13:46	1
d3-NMeFOSAA	78		25 - 150	09/16/20 11:58	09/17/20 13:46	1
d5-NEtFOSAA	83		25 - 150	09/16/20 11:58	09/17/20 13:46	1
d-N-MeFOSA-M	59		20 - 150	09/16/20 11:58	09/17/20 13:46	1
d-N-EtFOSA-M	49		20 - 150	09/16/20 11:58	09/17/20 13:46	1
d7-N-MeFOSE-M	33		10 - 120	09/16/20 11:58	09/17/20 13:46	1
d9-N-EtFOSE-M	33		10 - 120	09/16/20 11:58	09/17/20 13:46	1
M2-4:2 FTS	106		25 - 150	09/16/20 11:58	09/17/20 13:46	1
M2-6:2 FTS	110		25 - 150	09/16/20 11:58	09/17/20 13:46	1
M2-8:2 FTS	109		25 - 150	09/16/20 11:58	09/17/20 13:46	1
13C3 HFPO-DA	81		25 - 150	09/16/20 11:58	09/17/20 13:46	1

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30015294

Job ID: 320-64589-1

Client Sample ID: FIELD BLANK-09-14-2020

Lab Sample ID: 320-64589-6

Date Collected: 09/14/20 11:40

Matrix: Water

Date Received: 09/15/20 10:30

Method: 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		09/16/20 11:58	09/17/20 12:40	1
Perfluoropentanoic acid (PFPeA)	<1.8		1.8	0.43	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluorohexanoic acid (PFHxA)	<1.8		1.8	0.51	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluoroheptanoic acid (PFHpA)	<1.8		1.8	0.22	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluorooctanoic acid (PFOA)	<1.8		1.8	0.75	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluorononanoic acid (PFNA)	<1.8		1.8	0.24	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluorodecanoic acid (PFDA)	<1.8		1.8	0.27	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluoroundecanoic acid (PFUnA)	<1.8		1.8	0.96	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluorododecanoic acid (PFDoA)	<1.8		1.8	0.48	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluorotridecanoic acid (PFTriA)	<1.8		1.8	1.1	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluorotetradecanoic acid (PFTeA)	<1.8		1.8	0.64	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluoro-n-hexadecanoic acid (PFHxDA)	<1.8		1.8	0.78	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluoro-n-octadecanoic acid (PFODA)	<1.8		1.8	0.82	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluorobutanesulfonic acid (PFBS)	<1.8		1.8	0.18	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluoropentanesulfonic acid (PFPeS)	<1.8		1.8	0.26	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluorohexanesulfonic acid (PFHxS)	<1.8		1.8	0.50	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluoroheptanesulfonic Acid (PFHpS)	<1.8		1.8	0.17	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluorooctanesulfonic acid (PFOS)	<1.8		1.8	0.47	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluorononanesulfonic acid (PFNS)	<1.8		1.8	0.32	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluorodecanesulfonic acid (PFDS)	<1.8		1.8	0.28	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluorododecanesulfonic acid (PFDoS)	<1.8		1.8	0.85	ng/L		09/16/20 11:58	09/17/20 12:40	1
Perfluorooctanesulfonamide (FOSA)	<1.8		1.8	0.86	ng/L		09/16/20 11:58	09/17/20 12:40	1
NEtFOSA	<1.8		1.8	0.76	ng/L		09/16/20 11:58	09/17/20 12:40	1
NMeFOSA	<1.8		1.8	0.38	ng/L		09/16/20 11:58	09/17/20 12:40	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	<4.4		4.4	1.1	ng/L		09/16/20 11:58	09/17/20 12:40	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<4.4		4.4	1.1	ng/L		09/16/20 11:58	09/17/20 12:40	1
NMeFOSE	<3.5		3.5	1.2	ng/L		09/16/20 11:58	09/17/20 12:40	1
NEtFOSE	<1.8		1.8	0.75	ng/L		09/16/20 11:58	09/17/20 12:40	1
4:2 FTS	<1.8		1.8	0.21	ng/L		09/16/20 11:58	09/17/20 12:40	1
6:2 FTS	<4.4		4.4	2.2	ng/L		09/16/20 11:58	09/17/20 12:40	1
8:2 FTS	<1.8		1.8	0.40	ng/L		09/16/20 11:58	09/17/20 12:40	1
10:2 FTS	<1.8		1.8	0.59	ng/L		09/16/20 11:58	09/17/20 12:40	1
DONA	<1.8		1.8	0.35	ng/L		09/16/20 11:58	09/17/20 12:40	1
HFPO-DA (GenX)	<3.5		3.5	1.3	ng/L		09/16/20 11:58	09/17/20 12:40	1
F-53B Major	<1.8		1.8	0.21	ng/L		09/16/20 11:58	09/17/20 12:40	1
F-53B Minor	<1.8		1.8	0.28	ng/L		09/16/20 11:58	09/17/20 12:40	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFBA	86		25 - 150	09/16/20 11:58	09/17/20 12:40	1
13C5 PFPeA	86		25 - 150	09/16/20 11:58	09/17/20 12:40	1
13C2 PFHxA	85		25 - 150	09/16/20 11:58	09/17/20 12:40	1
13C4 PFHpA	86		25 - 150	09/16/20 11:58	09/17/20 12:40	1
13C4 PFOA	81		25 - 150	09/16/20 11:58	09/17/20 12:40	1
13C5 PFNA	92		25 - 150	09/16/20 11:58	09/17/20 12:40	1
13C2 PFDA	89		25 - 150	09/16/20 11:58	09/17/20 12:40	1

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: ARCADIS U.S., Inc.
 Project/Site: Marinette, WI 30015294

Job ID: 320-64589-1

Client Sample ID: FIELD BLANK-09-14-2020

Lab Sample ID: 320-64589-6

Date Collected: 09/14/20 11:40

Matrix: Water

Date Received: 09/15/20 10:30

Method: 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 PFUnA	99		25 - 150	09/16/20 11:58	09/17/20 12:40	1
13C2 PFDoA	91		25 - 150	09/16/20 11:58	09/17/20 12:40	1
13C2 PFTeDA	84		25 - 150	09/16/20 11:58	09/17/20 12:40	1
13C2 PFHxDA	91		25 - 150	09/16/20 11:58	09/17/20 12:40	1
13C3 PFBS	91		25 - 150	09/16/20 11:58	09/17/20 12:40	1
18O2 PFHxS	89		25 - 150	09/16/20 11:58	09/17/20 12:40	1
13C4 PFOS	89		25 - 150	09/16/20 11:58	09/17/20 12:40	1
13C8 FOSA	89		25 - 150	09/16/20 11:58	09/17/20 12:40	1
d3-NMeFOSAA	90		25 - 150	09/16/20 11:58	09/17/20 12:40	1
d5-NEtFOSAA	92		25 - 150	09/16/20 11:58	09/17/20 12:40	1
d-N-MeFOSA-M	59		20 - 150	09/16/20 11:58	09/17/20 12:40	1
d-N-EtFOSA-M	51		20 - 150	09/16/20 11:58	09/17/20 12:40	1
d7-N-MeFOSE-M	32		10 - 120	09/16/20 11:58	09/17/20 12:40	1
d9-N-EtFOSE-M	28		10 - 120	09/16/20 11:58	09/17/20 12:40	1
M2-4:2 FTS	102		25 - 150	09/16/20 11:58	09/17/20 12:40	1
M2-6:2 FTS	107		25 - 150	09/16/20 11:58	09/17/20 12:40	1
M2-8:2 FTS	106		25 - 150	09/16/20 11:58	09/17/20 12:40	1
13C3 HFPO-DA	82		25 - 150	09/16/20 11:58	09/17/20 12:40	1

Tyco Fire Products LLC.

DATA REVIEW

Marinette, Wisconsin

Miscellaneous Analyses

SDG #500-187812-1

Analyses Performed By:

Eurofins TestAmerica Laboratories, Inc.

Chicago, Illinois

Report #38426R

Review Level: Stage 2 Review

Project: 30015294.00001



DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #500-187812-1 for samples collected in association with the for the Tyco Fire Products, LLC., Marinette, Wisconsin Site. The review was conducted as a Stage 2 review evaluation and included review of data package completeness (USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use, EPA 540-R-08-005, January 2009). Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					PFAAS	Metals	MISC
SW-GB4 (091420)	500-187812-1	Water	9/14/2020			X	
SW-B1 (091420)	500-187812-2	Water	9/14/2020			X	
SW-GB2 (091420)	500-187812-3	Water	9/14/2020			X	
SW-GB1 (091420)	500-187812-4	Water	9/14/2020			X	
DUP-01 (091420)	500-187812-5	Water	9/14/2020	SW-GB4 (091420)		X	

Note:

Misc = miscellaneous and includes total suspended solids (TSS) analysis

1. The matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location **SW-B1 (091420)**.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) Standard Methods (SM) 2540D. Data were reviewed in accordance with USEPA National Functional Guidelines of October 2004.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
 - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The compound was quantitated above the calibration range.
 - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
 - UB Compound is considered non-detect at the listed value due to associated blank contamination.
 - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
 - J+ The result is an estimated quantity. The associated numerical value is expected to have a positive or high bias.
 - J- The result is an estimated quantity. The associated numerical value is expected to have a negative or low bias.
 - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
 - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
 - R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on

DATA REVIEW REPORT

data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

GENERAL CHEMISTRY ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Total Suspended Solids (TSS) by SM 2540D	Water	7 days from collection to analysis	Cool to < 6 °C

Notes:

SM = Standard Methods

USEPA = United States Environmental Protection Agency

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Analysis

MS/MSD and laboratory duplicate data are used to assess the precision and accuracy of the analytical method.

3.1 MS Analysis

All analytes must exhibit a percent recovery within the established acceptance limits of 75% to 125%. The MS recovery control limits do not apply for MS/MSD performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater. In instance where this is true, the data will not be qualified even if the percent recovery does not meet the control limits and the laboratory flag will be removed.

The MS/MSD analysis exhibited recoveries and RPDs within the control limits.

3.1 Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 20% for water matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of one times the RL is applied for water matrices.

The laboratory duplicate analysis was not performed on a sample location within this SDG.

DATA REVIEW REPORT

4. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/ Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
SW-GB4 (091420)/ DUP-01 (091420)	TSS	5.0	6.0	AC

Note:

AC = acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS/LCSD analysis must exhibit a percent recovery between the control limits of 80% and 120%.

The LCS analysis exhibited recoveries within the control limits. The LCSD analysis was not performed.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

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DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SM 2540D	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentations					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R	X				X
LCS/LCSD Precision (RPD)	X				X
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Total vs. Dissolved	X				X
Dilution Factor		X		X	
Moisture Content	X				X

Notes:

%R - percent recovery

RPD - relative percent difference,

%D – difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Todd Church

SIGNATURE:



DATE: September 25, 2020

PEER REVIEW: Dennis Capria

DATE: September 29, 2020

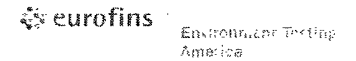
**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



Eurofins TestAmerica, Chicago

2417 Bond Street
 University Park, IL 60484
 Phone: 708-534-5200 Fax: 708-534-5211

Chain of Custody Record



Client Information		Sampler: K. KEON	Lab PM: Fredrick, Sandie	Carrier Tracking No(s):	COC No: 500-85133-35234.2								
Client Contact: Jessie Murray		Phone:	E-Mail: sandra.fredrick@eurofinset.com		Page: Page 2 of 2								
Company: ARCADIS U.S., Inc.		Analysis Requested			Job #: 500-187812								
Address: 126 North Jefferson Street Suite 400 City: Milwaukee State, Zip: WI, 53202 Phone: 500-187812 COC		Due Date Requested: TAT Requested (days): 10 day	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="writing-mode: vertical-rl; transform: rotate(180deg);">Field Filtered Sample (Yes or No)</th> <th style="writing-mode: vertical-rl; transform: rotate(180deg);">Perchloric Acid (Yes or No)</th> <th style="writing-mode: vertical-rl; transform: rotate(180deg);">PFC, IDA - PFAS</th> <th style="writing-mode: vertical-rl; transform: rotate(180deg);">2640D - TSS</th> </tr> <tr> <td></td><td></td><td></td><td></td> </tr> </table>		Field Filtered Sample (Yes or No)	Perchloric Acid (Yes or No)	PFC, IDA - PFAS	2640D - TSS					Preservation Codes: A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Z - other (specify)
Field Filtered Sample (Yes or No)	Perchloric Acid (Yes or No)	PFC, IDA - PFAS			2640D - TSS								
Project Name: Marquette, WI 30015294		PO #: 30015294			Total Number of containers		Other:						
Site: MARINETTE, WI		WO #:											
Sample Identification: MARINETTE, WI		Project #: 50016518			Special Instructions/Note:								
		SSOW#:											
Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perchloric Acid (Yes or No)	PFC, IDA - PFAS	2640D - TSS						
1 SW-18B4 (091420)	9-14-20 1049	G	Water	N	N		2						
2 SW-B1 (091420)	9-14-20 1109	G	Water	N	Y		3						
3 SW-18B2 (091420)	9-14-20 1139	G	Water	N	N		1						
4 SW-18B1 (091420)	9-14-20 1200	G	Water	N	N		1						
5 DUP-01	9-14-20 -	G	Water	N	N		1						
			Water										
Possible Hazard Identification: <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological				Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): <input checked="" type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months									
Deliverable Requested: I, II, III, IV, Other (specify)				Special Instructions/QC Requirements:									
Empty Kit Relinquished by:		Date:	Time:	Method of Shipment:									
Relinquished by:		Date/Time: 9-14-20/1530	Company: ARCADIS	Received by: Stephanie Hernandez		Date/Time: 9/15/20 1030	Company: TA-CHI						
Relinquished by:		Date/Time:	Company:	Received by:		Date/Time:	Company:						
Relinquished by:		Date/Time:	Company:	Received by:		Date/Time:	Company:						
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 1.9 -> 2.9											

Definitions/Glossary

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30015294

Job ID: 500-187812-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

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

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30015294

Job ID: 500-187812-1

Client Sample ID: SW-GB4 (091420)

Lab Sample ID: 500-187812-1

Date Collected: 09/14/20 10:45

Matrix: Water

Date Received: 09/15/20 10:30

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	5.0		5.0	1.9	mg/L			09/18/20 15:14	1

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

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30015294

Job ID: 500-187812-1

Client Sample ID: SW-B1 (091420)

Lab Sample ID: 500-187812-2

Date Collected: 09/14/20 11:05

Matrix: Water

Date Received: 09/15/20 10:30

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	11		5.0	1.9	mg/L			09/18/20 15:15	1

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

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30015294

Job ID: 500-187812-1

Client Sample ID: SW-GB2 (091420)

Lab Sample ID: 500-187812-3

Date Collected: 09/14/20 11:35

Matrix: Water

Date Received: 09/15/20 10:30

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	3.5	J	5.0	1.9	mg/L			09/18/20 15:18	1

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

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30015294

Job ID: 500-187812-1

Client Sample ID: SW-GB1 (091420)

Lab Sample ID: 500-187812-4

Date Collected: 09/14/20 12:00

Matrix: Water

Date Received: 09/15/20 10:30

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	3.5	J	5.0	1.9	mg/L			09/18/20 15:19	1

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

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Marinette, WI 30015294

Job ID: 500-187812-1

Client Sample ID: DUP-01
Date Collected: 09/14/20 00:00
Date Received: 09/15/20 10:30

Lab Sample ID: 500-187812-5
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	6.0		5.0	1.9	mg/L			09/18/20 15:20	1

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