APPENDICES

APPENDIX 1: CHAIN OF CUSTODIES

L2128737 Page 1 of 1 Serial_No:06172112:54 5/29/21

Chain-of-Custody

Project Name: 2021 Piscataway PFAS Sampling

Station No. & FTC yr./Description		Coordinates:		Collecting Agency:	Samplers Initials:
S7	2021	N	38.42201 °	MDE	CNL, CAP
Site Description: Nanjemoy Creek, NON tidal		W	77.21040 °		

Composite ID Number	Sample Matrix	Individual Fish Field ID Number	Length (cm)	Weight (g/lbs.)	Requested Contaminants	Species	Collection Date
S7-T1 -01	T	0526_S7_01	16.5	79	PFAS - 14 Compounds	Redbreast Sunfish--Lepomis auritus	
-02	T	0526_S7_02	14.0	54			
-03	T	0526_S7_03	14.5	53			
-04	T	0526_S7_04	15.0	58			
-05	T	0526_S7_05	14.5	57			
Summary Information	5		14.9	60.2	Lepomis auritus		5/26/2021
S7-T2 -07	T	0526_S7_06	24.0	209	PFAS - 14 Compounds	Yellow Bullhead Catfish--Ameiurus natalis	
-08	T	0526_S7_07	22.0	137			
-09	T	0526_S7_08	20.0	135			
-10	T	0526_S7_09	19.5	121			
-11	T	0526_S7_10	20.0	109			
Summary Information	5		21.1	142.2	Ameiurus natalis		5/26/2021
Surface Water Samples							
	RS				PFAS - 14 Compounds		
	RS				PFAS - 14 Compounds		
Blank ID							
S7-FB1 -12	RS	Site 7 Field Blank (S7-FB1)			PFAS - 14 Compounds		5/26/2021
TB-4 -14	RS	Trip Blank 4			PFAS - 14 Compounds		5/26/2021

LABORATORY INFORMATION

Client Information:	MDE	1800 Washington Blvd.	Baltimore, MD 21230	410-537-3614	Amy.Laliberte@maryland.gov
Project Information:	2021 Fish Tissue PFAS				
Report Information:	Email: Amy.Laliberte@maryland.gov				
Alpha Job #			**Billing Info:**	Same as Client Info.	

Analytical Method: LCMSMS - Isotope Dilution

Delivery Shipment Record:		Deliver/Ship to: (Name, address and phone)		Date/Time Shipped from Collecting Agency:	
Delivery Method:		Alpha Analytical		5-28-2021 1000	
☑ Hand Carried					
Relinquished by: (signature)	Date/Time 5-28 1001	Received by: (signature)	Relinquished by: (signature)	Date/Time 5/28/21 1800	Received by: (signature)
Relinquished by: (signature)	Date/Time	Received by Central Processing Laboratory by: (signature)	Date/Time	Remarks:	

Laboratory Custody:

Released Name/Date	Received Name/Date	Purpose	To Location
	5/28/21	Alpha	
	5/28/21	1800	
	5/28/21 0130	MDE	5/28/21 0200
MDE 5/29/21 0250			5/29/21 0250

5/22/21 Page _____ of 2 Serial No:06112117:30

Chain-of-Custody

Project Name: 2021 Piscataway PFAS Sampling

Station No. & FTC yr./Description		Coordinates:		Collecting Agency:	Samplers Initials:
S3	2021	N	38.74618 °	MDE	CNL, CAP, NWK
Site Description Piscataway Creek at Commo Road and upstream		W	76.84636 °		

Composite ID Number	Sample Matrix	Individual Fish Field ID Number	Length (cm)	Weight (g/lbs.)	Requested Contaminants	Species	Collection Date
S3-T1 -01	T	0517_S3_01	16.0	75	PFAS - 14 Compounds	Redbreast Sunfish--Lepomis auritus	
-02	T	0517_S3_02	15.0	70			
-03	T	0517_S3_03	15.5	70			
-04	T	0517_S3_04	16.0	80			
-05	T	0517_S3_05	14.8	69			
Summary Information	5		15.5	72.8	**Lepomis auritus**		5/17/2021
S3-T2 -07	T	0517_S3_06	19.5	99	PFAS - 14 Compounds	Yellow Bullhead Catfish--Ameiurus natalis	
-08	T	0517_S3_07	18.5	89			
-09	T	0517_S3_08	18.0	80			
-10	T	0517_S3_09	17.0	66			
-11	T	0517_S3_10	15.5	45			
Summary Information	5		17.7	75.8	**Ameiurus natalis**		5/17/2021
Surface Water Samples							
	RS						
	RS				**PFAS - 14 Compounds**		
Blank ID							
S3-FB1 -13	RS	Site 3 Field Blank (S3-FB1)			**PFAS - 14 Compounds**		5/17/2021
TB-2 - 14	RS	Trip Blank 2			**PFAS - 14 Compounds**		5/17/2021

LABORATORY INFORMATION

Client Information:	MDE	1800 Washington Blvd.	Baltimore, MD 21230	410-537-3614	Amy.Laliberte@maryland.gov
Project Information:	2021 Fish Tissue PFAS				
Report Information:	Email: Amy.Laliberte@maryland.gov				
Alpha Job #			**Billing Info:**	Same as Client Info.	

Analytical Method: LCMSMS - Isotope Dilution

Delivery Shipment Record:		Deliver/Ship to: (Name, address and phone)		Date/Time Shipped from Collecting Agency:	
Delivery Method:		Alpha Analytical			
☑ Hand Carried					
Relinquished by: (signature)	Date/Time 5/21/21	Received by: (signature) 5/21/21 11:30	Relinquished by: (signature) AAL	Date/Time 5/21/21 17:02	Received by: (signature) 5/21/21 17:02
Relinquished by: (signature)	Date/Time 5/21/21 1A	Received by Central Processing Laboratory by: (signature) 5/21/21 2300	Date/Time	Remarks: 5/22/21 0315	

Laboratory Custody:

Released Name/Date	Received Name/Date	Purpose	To Location

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Serial No:06112117:30

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Chain-of-Custody

Project Name: 2021 Piscataway PFAS Sampling

Station No. & FTC yr./Description		Coordinates:		Collecting Agency:	Samplers Initials:
S6	2021	N	38.44992 °	MDE	CNL, CAP, NWK
Site Description: Nanjemoy Creek at tidal headwaters		W	77.15417 °		

Composite ID Number	Sample Matrix	Individual Fish Field ID Number	Length (cm)	Weight (g/lbs.)	Requested Contaminants	Species	Collection Date
S6-T1	T	0520_S6_01	19.0	178	PFAS - 14 Compounds	Bluegill--Lepomis macrochirus	
	T	0520_S6_02	14.5	65			
	T	0520_S6_03	16.0	87			
	T	0520_S6_04	17.0	100			
	T	0520_S6_05	16.75	107			
Summary Information	5		16.7	107.4	Lepomis macrochirus		5/20/2021
S6-T2	T	0520_S6_06	48.0	1127	PFAS - 14 Compounds	Blue Catfish--Ictalurus furcatus	
	T	0520_S6_07	47.0	890			
	T	0520_S6_08	52.0	1292			
	T	0520_S6_09	44.0	791			
	T	0520_S6_10	51.0	1266			
Summary Information	5		48.4	1073.2	Ictalurus furcatus		5/20/2021
Surface Water Samples							
	RS				PFAS - 14 Compounds		
	RS				PFAS - 14 Compounds		
Blank ID							
S6-FB1	RS	Site 1 Field Blank (S6-FB1)			PFAS - 14 Compounds		5/20/2021
TB-3	RS	Trip Blank 3			PFAS - 14 Compounds		5/20/2021

LABORATORY INFORMATION

Client Information:	MDE	1800 Washington Blvd.	Baltimore, MD 21230	410-537-3614	Amy.Laliberte@maryland.gov
Project Information:	2021 Fish Tissue PFAS				
Report Information:	Email: Amy.Laliberte@maryland.gov				
Alpha Job #			**Billing Info:**	Same as Client Info.	

Analytical Method: LCMSMS - Isotope Dilution

Delivery Shipment Record:		Deliver/Ship to: (Name, address and phone)		Date/Time Shipped from Collecting Agency:	
Delivery Method: ☑ Hand Carried		Alpha Analytical			
Relinquished by: (signature)	Date/Time	Received by: (signature)	Relinquished by: (signature)	Date/Time	Received by: (signature)
Relinquished by: (signature)	Date/Time	Received by Central Processing Laboratory by: (signature)	Date/Time	Remarks:	

Laboratory Custody:

Released Name/Date	Received Name/Date	Purpose	To Location

5/18/21 Page ____ of ____ Serial No:06112117:30

Chain-of-Custody

Project Name: 2021 Piscataway PFAS Sampling

Station No. & FTC yr./Description		Coordinates:		Collecting Agency:	Samplers Initials:
S1	2021	N	38.69522 °	MDE	CNL, CAP, NWK
Site Description Piscataway Creek at tidal headwaters		W	77.00623 °		

Composite ID Number	Sample Matrix	Individual Fish Field ID Number	Length (cm)	863	Requested Contaminants	Species	Collection Date
-29	T	0514_S1_01	41.25	863	PFAS - 14 Compounds	Largemouth Bass--Micropterus salmoides	
-30	T	0514_S1_02	41.25	1028			
S1-T1 -31	T	0514_S1_03	39.4	884			
-32	T	0514_S1_04	39.4	956			
-37	T	0514_S1_05	38.1	823			
Summary Information	5		**39.9**	**910.8**	**Micropterus salmoides**		5/14/2021
-35	T	0514_S1_06	54.6	1772	PFAS - 14 Compounds	Blue Catfish--Ictalurus furcatus	
-36	T	0514_S1_07	49.5	1199			
S1-T2 -37	T	0514_S1_08	46.4	1055			
-38	T	0514_S1_09	45.1	827			
-39	T	0514_S1_10	41.3	552			
Summary Information	5		**47.38**	**1081**	**Ictalurus furcatus**		5/14/2021
Surface Water Samples							
S1-W1 -41	RS	Piscataway Creek - Tidal Water Sample			**PFAS - 14 Compounds**		5/14/2021
	RS				**PFAS - 14 Compounds**		5/14/2021
Blank ID							
S1-FB1 -42	RS	Site 1 Field Blank (S1-FB1)			**PFAS - 14 Compounds**		5/14/2021
TB-1 -43	RS	Trip Blank 1			**PFAS - 14 Compounds**		5/14/2021

LABORATORY INFORMATION

Client Information:	MDE	1800 Washington Blvd.	Baltimore, MD 21230	410-537-3614	Amy.Laliberte@maryland.gov
Project Information:	2021 Fish Tissue PFAS				
Report Information:	Email: Amy.Laliberte@maryland.gov				
Alpha Job #			**Billing Info:**	Same as Client Info.	

Analytical Method: LCMSMS - Isotope Dilution

Delivery Shipment Record:		Deliver/Ship to: (Name, address and phone)		Date/Time Shipped from Collecting Agency:	
Delivery Method:		Alpha Analytical			
☑ Hand Carried					
Relinquished by: (signature)	Date/ Time 5/21/21	Received by: (signature) 5/21/21 1130 AAL	Relinquished by: (signature) AAL	Date/Time 5/21/21 17:02	Received by: (signature) 5/21/21 17:02
Relinquished by: (signature)	Date/ Time 5/21/21	Received by Central Processing Laboratory by: (signature) 5/21/21 2300	Date/Time	Remarks: AAL 5/22/210315	5/22/21 0315

Laboratory Custody:			
Released Name/Date	Received Name/Date	Purpose	To Location

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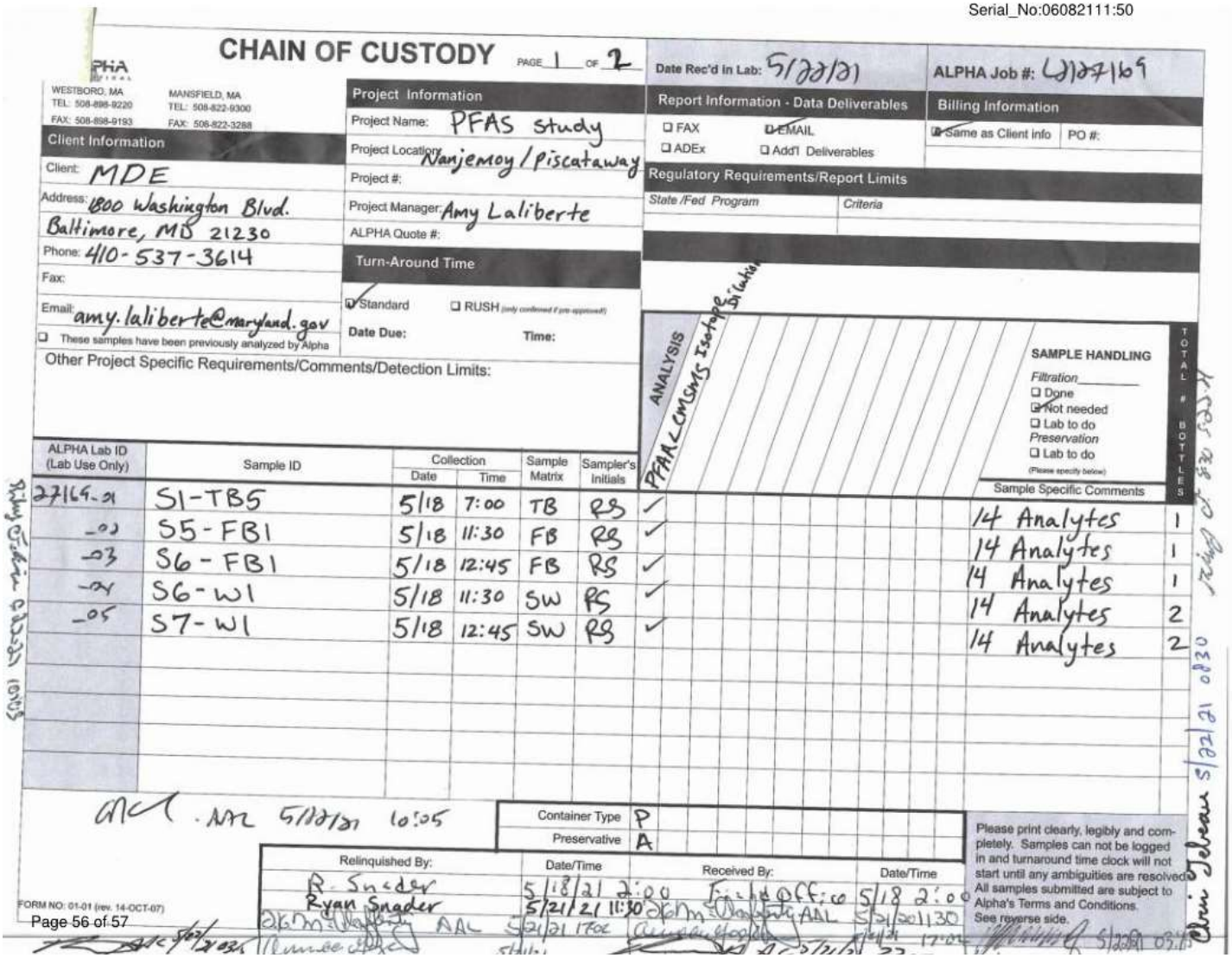

Serial_No:06082111:50

CHAIN OF CUSTODY PAGE 1 OF 2

Date Rec'd in Lab: 5/22/21

ALPHA Job #: L2127169

ALPHA
WESTBORO, MA TEL: 508-898-9220 FAX: 508-898-9193
MANSFIELD, MA TEL: 508-822-9300 FAX: 508-822-3288

Client Information
Client: MDE
Address: 1800 Washington Blvd. Baltimore, MD 21230
Phone: 410-537-3614
Fax:
Email: amy.laliberte@maryland.gov
☐ These samples have been previously analyzed by Alpha

Project Information
Project Name: PFAS study
Project Location: Nanjemoy / Piscataway
Project #:
Project Manager: Amy Laliberte
ALPHA Quote #:

Turn-Around Time
☑ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due: Time:

Report Information - Data Deliverables
☐ FAX ☑ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information
☑ Same as Client info PO #:

Regulatory Requirements/Report Limits
State /Fed Program | Criteria

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS: PFAA LCMSMS Isotope Dilution

SAMPLE HANDLING
Filtration
☐ Done
☑ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials		Sample Specific Comments	TOTAL # BOTTLES
27169-01	S1-TB5	5/18	7:00	TB	RS	✓	14 Analytes	1
-02	S5-FB1	5/18	11:30	FB	RS	✓	14 Analytes	1
-03	S6-FB1	5/18	12:45	FB	RS	✓	14 Analytes	1
-04	S6-W1	5/18	11:30	SW	RS	✓	14 Analytes	2
-05	S7-W1	5/18	12:45	SW	RS	✓	14 Analytes	2

Container Type: P
Preservative: A

Relinquished By:	Date/Time	Received By:	Date/Time
R. Snader	5/18/21 2:00		
Ryan Snader	5/21/21 11:30	AAL	5/21/21 1130

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 14-OCT-07)

Serial_No:06082111:50

CHAIN OF COUSTODY

ALPHA

PAGE 2 OF 2 | Date Rec'd in Lab: 5/22/21 | ALPHA Job #: L2127169

WESTBORO, MA TEL: 508-898-9220 FAX: 508-898-9193
MANSFIELD, MA TEL: 508-822-9300 FAX: 508-822-3288

Client Information
Client: MDE
Address: 1800 Washington Blvd Baltimore, MD 21230
Phone: 410-537-3614
Fax:
Email: amy.laliberte@maryland.gov
☐ These samples have been previously analyzed by Alpha

Project Information
Project Name: PFAS Study
Project Location: Piscataway
Project #:
Project Manager: Amy Laliberte
ALPHA Quote #:

Turn-Around Time
☑ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due: Time:

Report Information - Data Deliverables
☐ FAX ☑ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information
☑ Same as Client info PO #:

Regulatory Requirements/Report Limits
State /Fed Program Criteria

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS: PFAA LCMSMS Fst-Top/Dilution

SAMPLE HANDLING: Filtration ☐ Done ☐ Not needed ☐ Lab to do; Preservation ☐ Lab to do (Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAA LCMSMS	Sample Specific Comments	TOTAL # BOTTLES
-06	S2-W1	5/18/21	0940	SW	WNE	✓	14 Analytes	2
-07	S3-W1	5/18/21	1045	SW	WNE	✓	14 Analytes	2
-08	S4-W1	5/18/21	1125	SW	WNE	✓	14 Analytes	2
-09	S5-W1	5/18/21	1205	SW	WNE	✓	14 Analytes	2
-10	S1-TB6	5/18/21	0800	TB	WNE	✓	14 Analytes	2
-11	S7-FB1	5/18/21	0940	FB	JRM	✓	14 Analytes	1
-12	S8-FB1	5/18/21	1045	FB	JRM	✓	14 Analytes	1
-13	S9-FB1	5/18/21	1125	FB	JRM	✓	14 Analytes	1
-14	S10-FB1	5/18/21	1205	FB	JRM	✓	14 Analytes	1

AAL 5/22/21 10:05

Container Type: P
Preservative: A

Relinquished By:	Date/Time	Received By:	Date/Time
J. McKay	5/18/21	Field Office	5/18 2:30
Ryan Snader	5/21/21 11:30	[illegible] AAL	5/21/21 11:30
[illegible] AAL	5/21/21 17:02	[illegible]	5/21/21 17:02

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 14-OCT-07)

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APPENDIX 2: LABORATORY RESULTS

Serial_No:06082111:50

ANALYTICAL REPORT

Lab Number:	L2127169
Client:	Maryland Department of the Environment 1800 Washington Boulevard Baltimore, MD 21230
ATTN:	Amy Laliberte
Phone:	(410) 537-3614
Project Name:	PFAS STUDY
Project Number:	Not Specified
Report Date:	06/08/21

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Serial_No:06082111:50

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127169
Report Date: 06/08/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2127169-01	S1-TB5	WATER	NANJEMOY/PISCATAWAY	05/18/21 07:00	05/21/21
L2127169-02	S5-FB1	WATER	NANJEMOY/PISCATAWAY	05/18/21 11:30	05/21/21
L2127169-03	S6-FB1	WATER	NANJEMOY/PISCATAWAY	05/18/21 12:45	05/21/21
L2127169-04	S6-W1	WATER	NANJEMOY/PISCATAWAY	05/18/21 11:30	05/21/21
L2127169-05	S7-W1	WATER	NANJEMOY/PISCATAWAY	05/18/21 12:45	05/21/21
L2127169-06	S2-W1	WATER	NANJEMOY/PISCATAWAY	05/18/21 09:40	05/21/21
L2127169-07	S3-W1	WATER	NANJEMOY/PISCATAWAY	05/18/21 10:45	05/21/21
L2127169-08	S4-W1	WATER	NANJEMOY/PISCATAWAY	05/18/21 11:25	05/21/21
L2127169-09	S5-W1	WATER	NANJEMOY/PISCATAWAY	05/18/21 12:05	05/21/21
L2127169-10	S1-TB6	WATER	NANJEMOY/PISCATAWAY	05/18/21 08:00	05/21/21
L2127169-11	S7-FB1	WATER	NANJEMOY/PISCATAWAY	05/18/21 09:40	05/21/21
L2127169-12	S8-FB1	WATER	NANJEMOY/PISCATAWAY	05/18/21 10:45	05/21/21
L2127169-13	S9-FB1	WATER	NANJEMOY/PISCATAWAY	05/18/21 11:25	05/21/21
L2127169-14	S10-FB1	WATER	NANJEMOY/PISCATAWAY	05/18/21 12:05	05/21/21

Serial_No:06082111:50

Project Name:	PFAS STUDY	**Lab Number:**	L2127169
Project Number:	Not Specified	**Report Date:**	06/08/21

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Serial_No:06082111:50

Project Name:	PFAS STUDY	**Lab Number:**	L2127169
Project Number:	Not Specified	**Report Date:**	06/08/21

Case Narrative (continued)

Perfluorinated Alkyl Acids by Isotope Dilution

L2127169-04, -08 and -09: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

L2127169-08 and -09: The sample was re-extracted on dilution with the method required holding time exceeded in order to quantitate the results within the calibration range. The result(s) should be considered estimated, and are qualified with an E flag, for any compound(s) that exceeded the calibration range in the initial analysis. The re-extraction was performed only for the compound(s) that exceeded the calibration range.

WG1504631-3: The MS recovery, performed on L2127169-07, is outside the acceptance criteria for perfluorooctanesulfonic acid (pfos) (371%).

WG1504631-4: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Alycia Mogayzel

Title: Technical Director/Representative Date: 06/08/21

Serial_No:06082111:50

ORGANICS

Serial_No:06082111:50

SEMIVOLATILES

Serial_No:06082111:50

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127169
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-01
Client ID: S1-TB5
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/18/21 07:00
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 16:03
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.78	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.78	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.78	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.78	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.78	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.78	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.78	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.78	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.78	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.78	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.78	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.78	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.78	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.78	--	1

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-01 Date Collected: 05/18/21 07:00

Client ID: S1-TB5 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	103		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	106		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	90		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	84		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	96		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	86		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	91		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	83		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	75		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	85		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	86		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	72		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	83		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	85		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127169
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-02
Client ID: S5-FB1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/18/21 11:30
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 16:19
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.82	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.82	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.82	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.82	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.82	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.82	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.82	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.82	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.82	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.82	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.82	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.82	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.82	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.82	--	1

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-02 Date Collected: 05/18/21 11:30

Client ID: S5-FB1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	103		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	90		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	86		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	93		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	85		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	99		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	86		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	96		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	96		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	77		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	97		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	92		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127169
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-03
Client ID: S6-FB1
Sample Location: NANJEMOY/PISCATAWAY

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 16:36
Analyst: MP

Date Collected: 05/18/21 12:45
Date Received: 05/21/21
Field Prep: Not Specified

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.83	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.83	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.83	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.83	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.83	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.83	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.83	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.83	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.83	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.83	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.83	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.83	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.83	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.83	--	1

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-03 Date Collected: 05/18/21 12:45

Client ID: S6-FB1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	104		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	108		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	94		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	88		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	99		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	91		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	101		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	97		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	86		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	93		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	105		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	83		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	98		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	96		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY
Lab Number: L2127169
Project Number: Not Specified
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-04
Client ID: S6-W1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/18/21 11:30
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 16:52
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.83	--	1
Perfluorohexanoic Acid (PFHxA)	2.24		ng/l	1.83	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.83	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.83	--	1
Perfluorooctanoic Acid (PFOA)	1.97		ng/l	1.83	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.83	--	1
Perfluorooctanesulfonic Acid (PFOS)	2.56	F	ng/l	1.83	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.83	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.83	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.83	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.83	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.83	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.83	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.83	--	1

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-04 Date Collected: 05/18/21 11:30

Client ID: S6-W1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**143**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	83		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	80		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	100		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	86		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	96		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	83		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	85		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	94		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	69		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	93		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	91		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY
Lab Number: L2127169
Project Number: Not Specified
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-05
Client ID: S7-W1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/18/21 12:45
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 17:09
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.83	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.83	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.83	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.83	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.83	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.83	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.83	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.83	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.83	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.83	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.83	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.83	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.83	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.83	--	1

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-05 Date Collected: 05/18/21 12:45

Client ID: S7-W1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	84		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	139		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	78		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	74		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	86		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	82		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	92		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	89		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	79		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	76		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	93		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	59		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	85		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	89		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127169
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-06
Client ID: S2-W1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/18/21 09:40
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 17:42
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	10.6		ng/l	1.96	--	1
Perfluorohexanoic Acid (PFHxA)	38.4		ng/l	1.96	--	1
Perfluoroheptanoic Acid (PFHpA)	17.3		ng/l	1.96	--	1
Perfluorohexanesulfonic Acid (PFHxS)	93.9		ng/l	1.96	--	1
Perfluorooctanoic Acid (PFOA)	50.8		ng/l	1.96	--	1
Perfluorononanoic Acid (PFNA)	3.39		ng/l	1.96	--	1
Perfluorooctanesulfonic Acid (PFOS)	96.1		ng/l	1.96	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.96	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.96	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.96	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.96	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.96	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.96	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.96	--	1

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-06 Date Collected: 05/18/21 09:40

Client ID: S2-W1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	97		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	117		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	76		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	72		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	93		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	75		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	89		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	81		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	75		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	90		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	59		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	89		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	81		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127169
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-07
Client ID: S3-W1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/18/21 10:45
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 17:59
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	39.4		ng/l	2.03	--	1
Perfluorohexanoic Acid (PFHxA)	133		ng/l	2.03	--	1
Perfluoroheptanoic Acid (PFHpA)	40.2		ng/l	2.03	--	1
Perfluorohexanesulfonic Acid (PFHxS)	424		ng/l	2.03	--	1
Perfluorooctanoic Acid (PFOA)	147		ng/l	2.03	--	1
Perfluorononanoic Acid (PFNA)	10.1		ng/l	2.03	--	1
Perfluorooctanesulfonic Acid (PFOS)	478		ng/l	2.03	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.03	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.03	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.03	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.03	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.03	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.03	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.03	--	1

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-07 Date Collected: 05/18/21 10:45

Client ID: S3-W1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	108		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	138		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	74		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	71		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	95		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	73		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	85		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	78		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	69		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	90		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	59		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	93		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	86		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY
Lab Number: L2127169
Project Number: Not Specified
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-08
Client ID: S4-W1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/18/21 11:25
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 18:32
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	80.8		ng/l	2.01	--	1
Perfluorohexanoic Acid (PFHxA)	276		ng/l	2.01	--	1
Perfluoroheptanoic Acid (PFHpA)	75.5		ng/l	2.01	--	1
Perfluorohexanesulfonic Acid (PFHxS)	889	E	ng/l	2.01	--	1
Perfluorooctanoic Acid (PFOA)	298		ng/l	2.01	--	1
Perfluorononanoic Acid (PFNA)	20.4		ng/l	2.01	--	1
Perfluorooctanesulfonic Acid (PFOS)	1120	E	ng/l	2.01	--	1
Perfluorodecanoic Acid (PFDA)	2.67		ng/l	2.01	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.01	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.01	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.01	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.01	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.01	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.01	--	1

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-08 Date Collected: 05/18/21 11:25

Client ID: S4-W1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	111		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**143**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	70		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	70		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	87		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	66		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	73		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	74		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**60**	Q	62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	45		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	68		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	37		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	57		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	67		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-08 RE
Client ID: S4-W1
Sample Location: NANJEMOY/PISCATAWAY

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/08/21 02:16
Analyst: HT

Date Collected: 05/18/21 11:25
Date Received: 05/21/21
Field Prep: Not Specified

Extraction Method: ALPHA 23528
Extraction Date: 06/07/21 05:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorohexanesulfonic Acid (PFHxS)	827		ng/l	50.0	--	1
Perfluorooctanesulfonic Acid (PFOS)	988		ng/l	50.0	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	102		71-134
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	107		69-131

Serial_No:06082111:50

Project Name: PFAS STUDY
Lab Number: L2127169
Project Number: Not Specified
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-09
Client ID: S5-W1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/18/21 12:05
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 19:05
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	108		ng/l	2.05	--	1
Perfluorohexanoic Acid (PFHxA)	353		ng/l	2.05	--	1
Perfluoroheptanoic Acid (PFHpA)	89.7		ng/l	2.05	--	1
Perfluorohexanesulfonic Acid (PFHxS)	1200	E	ng/l	2.05	--	1
Perfluorooctanoic Acid (PFOA)	404		ng/l	2.05	--	1
Perfluorononanoic Acid (PFNA)	17.8		ng/l	2.05	--	1
Perfluorooctanesulfonic Acid (PFOS)	1280	E	ng/l	2.05	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.05	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.05	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.05	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.05	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.05	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.05	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.05	--	1

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-09 Date Collected: 05/18/21 12:05

Client ID: S5-W1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	111		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	140		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	72		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	76		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	84		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	71		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	82		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	76		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**59**	Q	62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	46		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	57		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	39		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	58		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	75		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY
Lab Number: L2127169
Project Number: Not Specified
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-09 RE
Client ID: S5-W1
Sample Location: NANJEMOY/PISCATAWAY

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/08/21 02:33
Analyst: HT

Date Collected: 05/18/21 12:05
Date Received: 05/21/21
Field Prep: Not Specified

Extraction Method: ALPHA 23528
Extraction Date: 06/07/21 05:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorohexanesulfonic Acid (PFHxS)	1120		ng/l	10.0	--	1
Perfluorooctanesulfonic Acid (PFOS)	1100		ng/l	10.0	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	99		71-134
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98		69-131

Serial_No:06082111:50

Project Name: PFAS STUDY
Lab Number: L2127169
Project Number: Not Specified
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-10
Client ID: S1-TB6
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/18/21 08:00
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 19:21
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.77	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.77	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.77	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.77	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.77	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.77	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.77	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.77	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.77	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.77	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.77	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.77	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.77	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.77	--	1

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-10 Date Collected: 05/18/21 08:00

Client ID: S1-TB6 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	96		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	87		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	88		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	85		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	77		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	70		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	67		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	76		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	82		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	63		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	76		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	80		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY
Lab Number: L2127169
Project Number: Not Specified
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-11
Client ID: S7-FB1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/18/21 09:40
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 19:38
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.86	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.86	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.86	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.86	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.86	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.86	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.86	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.86	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.86	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.86	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.86	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.86	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.86	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.86	--	1

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-11 Date Collected: 05/18/21 09:40

Client ID: S7-FB1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	94		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	96		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	86		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	83		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	93		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	84		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	96		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	92		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	87		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	93		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	102		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	74		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	90		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	95		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY
Lab Number: L2127169
Project Number: Not Specified
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-12
Client ID: S8-FB1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/18/21 10:45
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 19:55
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.86	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.86	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.86	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.86	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.86	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.86	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.86	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.86	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.86	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.86	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.86	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.86	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.86	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.86	--	1

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-12 Date Collected: 05/18/21 10:45

Client ID: S8-FB1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	101		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	85		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	96		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	89		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	100		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	85		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	90		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	104		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	78		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	97		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	102		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY
Lab Number: L2127169
Project Number: Not Specified
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-13
Client ID: S9-FB1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/18/21 11:25
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 20:11
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.79	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.79	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.79	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.79	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.79	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.79	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.79	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.79	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.79	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.79	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.79	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.79	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.79	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.79	--	1

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-13 Date Collected: 05/18/21 11:25

Client ID: S9-FB1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	97		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	101		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	90		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	84		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	94		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	87		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	100		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	91		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	89		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	109		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	76		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	97		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	94		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY
Lab Number: L2127169
Project Number: Not Specified
Report Date: 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-14
Client ID: S10-FB1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/18/21 12:05
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 20:28
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.86	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.86	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.86	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.86	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.86	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.86	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.86	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.86	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.86	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.86	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.86	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.86	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.86	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.86	--	1

Serial_No:06082111:50

Project Name: PFAS STUDY **Lab Number:** L2127169

Project Number: Not Specified **Report Date:** 06/08/21

SAMPLE RESULTS

Lab ID: L2127169-14 Date Collected: 05/18/21 12:05

Client ID: S10-FB1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	99		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	102		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	87		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	83		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	97		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	83		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	90		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	87		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	96		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	107		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	80		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	104		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	104		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127169
Report Date: 06/08/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 15:29
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:13

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-14 Batch: WG1504631-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	--
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	--
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	--
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	--
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	--

Serial_No:06082111:50

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127169
Report Date: 06/08/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 15:29
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 16:13

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-14 Batch: WG1504631-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	93		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	97		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	86		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	81		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	90		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	95		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	93		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	87		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	98		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	108		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	84		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	101		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	95		22-136

Serial_No:06082111:50

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127169
Report Date: 06/08/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/08/21 00:54
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 06/07/21 05:40

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 08-09 Batch: WG1508311-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	--
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	--
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	--
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	--
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	--

Serial_No:06082111:50

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127169
Report Date: 06/08/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/08/21 00:54
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 06/07/21 05:40

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 08-09 Batch: WG1508311-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	101		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	135		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	87		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	99		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	93		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	100		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	96		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	99		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	99		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	105		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	98		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	121		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	107		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	119		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	18		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	89		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	114		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	112		22-136

Serial_No:06082111:50

Lab Control Sample Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127169
Report Date: 06/08/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-14 Batch: WG1504631-2								
Perfluorobutanesulfonic Acid (PFBS)	102		-		65-157	-		30
Perfluorohexanoic Acid (PFHxA)	100		-		69-168	-		30
Perfluoroheptanoic Acid (PFHpA)	99		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	103		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	106		-		63-159	-		30
Perfluorononanoic Acid (PFNA)	104		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	101		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	95		-		63-171	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	94		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	111		-		60-153	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	98		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	103		-		67-153	-		30
Perfluorotridecanoic Acid (PFTrDA)	127		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	111		-		59-182	-		30

Serial_No:06082111:50

Lab Control Sample Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127169
Report Date: 06/08/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-14 Batch: WG1504631-2								

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	101				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	113				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	85				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	95				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	87				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	102				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	99				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	94				62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	109				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	112				55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	92				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	113				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	104				22-136

Serial_No:06082111:50

Lab Control Sample Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127169
Report Date: 06/08/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 08-09 Batch: WG1508311-2								
Perfluorobutanesulfonic Acid (PFBS)	102		-		65-157	-		30
Perfluorohexanoic Acid (PFHxA)	99		-		69-168	-		30
Perfluoroheptanoic Acid (PFHpA)	100		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	102		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	108		-		63-159	-		30
Perfluorononanoic Acid (PFNA)	108		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	100		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	97		-		63-171	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	93		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	101		-		60-153	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	96		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	99		-		67-153	-		30
Perfluorotridecanoic Acid (PFTrDA)	118		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	118		-		59-182	-		30

Serial_No:06082111:50

Lab Control Sample Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127169
Report Date: 06/08/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 08-09 Batch: WG1508311-2								

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	105				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	140				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	110				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	96				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	103				57-129
Perfluoro[1,2,3,4 13C4]Heptanoic Acid (M4PFHpA)	97				60 129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	104				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	96				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	113				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	107				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	111				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	103				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	127				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	112				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	123				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	18				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	104				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	127				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	108				22-136

Serial_No:06082111:50

Matrix Spike Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127169
Report Date: 06/08/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-14 QC Batch ID: WG1504631-3 QC Sample: L2127169-07 Client ID: S3-W1												
Perfluorobutanesulfonic Acid (PFBS)	39.4	36.1	74.5	97		-	-		65-157	-		30
Perfluorohexanoic Acid (PFHxA)	133	40.6	172	96		-	-		69-168	-		30
Perfluoroheptanoic Acid (PFHpA)	40.2	40.6	78.2	94		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	424	37.2	462	102		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	147	40.6	190	106		-	-		63-159	-		30
Perfluorononanoic Acid (PFNA)	10.1	40.6	52.5	104		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	478	37.7	618	**371**	Q	-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	ND	40.6	39.1	93		-	-		63-171	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	40.6	35.5	87		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	40.6	44.8	110		-	-		60-153	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	40.6	43.1	106		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	40.6	40.0	98		-	-		67-153	-		30
Perfluorotridecanoic Acid (PFTrDA)	ND	40.6	48.1	118		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	40.6	46.7	115		-	-		59-182	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	135				12-142
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	44				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	58				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	76				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	64				62-124

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Matrix Spike Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127169
Report Date: 06/08/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-14 QC Batch ID: WG1504631-3 QC Sample: L2127169-07 Client ID: S3-W1												

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	68				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	67				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	90				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	72				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	71				22-136
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	85				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	65				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	73				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	102				70-131

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Lab Duplicate Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127169
Report Date: 06/08/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-14 QC Batch ID: WG1504631-4 QC Sample: L2127169-08 Client ID: S4-W1						
Perfluorobutanesulfonic Acid (PFBS)	80.8	81.2	ng/l	0		30
Perfluorohexanoic Acid (PFHxA)	276	286	ng/l	4		30
Perfluoroheptanoic Acid (PFHpA)	75.5	78.0	ng/l	3		30
Perfluorohexanesulfonic Acid (PFHxS)	889	903	ng/l	2		30
Perfluorooctanoic Acid (PFOA)	298	307	ng/l	3		30
Perfluorononanoic Acid (PFNA)	20.4	22.5	ng/l	10		30
Perfluorooctanesulfonic Acid (PFOS)	1120E	1210E	ng/l	8		30
Perfluorodecanoic Acid (PFDA)	2.67	3.19	ng/l	18		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	111		113		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	143	Q	137		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	70		68		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	70		67		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	87		90		71-134

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Lab Duplicate Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127169
Report Date: 06/08/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-14 QC Batch ID: WG1504631-4 QC Sample: L2127169-08 Client ID: S4-W1

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanoic Acid (M8PFOA)	66		67		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	73		75		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	74		80		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**60**	Q	**60**	Q	62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	45		45		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	68		67		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	37		32		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	57		56		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	67		62		22-136

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Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127169
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Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	***Custody Seal***
B	Absent

Container Information

Container ID	***Container Type***	***Cooler***	***Initial pH***	***Final pH***	***Temp deg C***	***Pres***	***Seal***	***Frozen Date/Time***	***Analysis(*)***
L2127169-01A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-02A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-03A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-04A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-04B	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-05A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-05B	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-06A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-06B	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-07A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-07B	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-08A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-08B	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-09A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-09B	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-10A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-11A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-12A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-13A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127169-14A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

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Project Number:
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PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

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GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

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Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. (Note: 'PFAS, Total (6)' is applicable to MassDEP DW compliance analysis only.). If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

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Data Qualifiers

the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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REFERENCES

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

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

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Serial_No:06082111:50

CHAIN OF COUSTODY

PAGE 1 OF 2

Date Rec'd in Lab: 5/22/21

ALPHA Job #: L2127169

WESTBORO, MA TEL: 508-898-9220 FAX: 508-898-9193
MANSFIELD, MA TEL: 508-822-9300 FAX: 508-822-3288

Client Information

Client: MDE
Address: 1800 Washington Blvd. Baltimore, MD 21230
Phone: 410-537-3614
Fax:
Email: amy.laliberte@maryland.gov

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: PFAS study
Project Location: Nanjemoy / piscataway
Project #:
Project Manager: Amy Laliberte
ALPHA Quote #:

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due: Time:

Report Information - Data Deliverables

☐ FAX ☑ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☑ Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program | Criteria

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS: PFAA LCMSMS Isotope Dilution

SAMPLE HANDLING
Filtration
☐ Done
☑ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAA LCMSMS Isotope Dilution	Sample Specific Comments	Total # Bottles
27169-01	S1-TB5	5/18	7:00	TB	RS	✓	14 Analytes	1
-02	S5-FB1	5/18	11:30	FB	RS	✓	14 Analytes	1
-03	S6-FB1	5/18	12:45	FB	RS	✓	14 Analytes	1
-04	S6-W1	5/18	11:30	SW	RS	✓	14 Analytes	2
-05	S7-W1	5/18	12:45	SW	RS	✓	14 Analytes	2

Container Type: P
Preservative: A

Relinquished By:	Date/Time	Received By:	Date/Time
R. Snyder / Ryan Snyder	5/18/21 2:00	Field office	5/18 2:00
	5/21/21 11:30	AAL	5/21/21 11:30
AAL	5/21/21 17:00		5/21/21 17:00
	5/22/21 03:35		5/22/21 03:35

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

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CHAIN OF CUSTODY

PAGE 2 OF 2

Date Rec'd in Lab: 5/22/21

ALPHA Job #: L2127169

ALPHA ANALYTICAL
WESTBORO, MA TEL: 508-898-9220 FAX: 508-898-9193
MANSFIELD, MA TEL: 508-822-9300 FAX: 508-822-3288

Client Information

Client: MDE

Address: 1800 Washington Blvd Baltimore, MD 21230

Phone: 410-537-3614

Fax:

Email: amy.laliberte@maryland.gov

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: PFAS Study

Project Location: Piscataway

Project #:

Project Manager: Amy Laliberte

ALPHA Quote #:

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due: Time:

Report Information - Data Deliverables

☐ FAX ☑ EMAIL

☐ ADEx ☐ Add'l Deliverables

Billing Information

☑ Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program Criteria

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS: PFAA LC-MS/MS Isotope Dilution

SAMPLE HANDLING

Filtration
☐ Done
☐ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAA LC-MS/MS	Sample Specific Comments	TOTAL # BOTTLES
-06	S2-W1	5/18/21	0940	SW	WNE	✓	14 Analytes	2
-07	S3-W1	5/18/21	1045	SW	WNE	✓	14 Analytes	2
-08	S4-W1	5/18/21	1125	SW	WNE	✓	14 Analytes	2
-09	S5-W1	5/18/21	1205	SW	WNE	✓	14 Analytes	2
-10	S1-TB6	5/18/21	0800	TB	WNE	✓	14 Analytes	2
-11	S7-FB1	5/18/21	0940	FB	JRM	✓	14 Analytes	1
-12	S8-FB1	5/18/21	1045	FB	JRM	✓	14 Analytes	1
-13	S9-FB1	5/18/21	1125	FB	JRM	✓	14 Analytes	1
-14	S10-FB1	5/18/21	1205	FB	JRM	✓	14 Analytes	1

AAL 5/22/21 10:05

Container Type: P

Preservative: A

Relinquished By:	Date/Time	Received By:	Date/Time
J. McKay	5/18/21	Field Office	5/18 2330
Ryan Snader	5/21/21 11:30	[illegible] AAL	5/21/20 11:30
[illegible] AAL	5/21/21 17:02	[illegible]	5/21/21 17:02

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

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ANALYTICAL REPORT

Lab Number:	L2127213
Client:	Maryland Department of the Environment 1800 Washington Boulevard Baltimore, MD 21230
ATTN:	Amy Laliberte
Phone:	(410) 537-3614
Project Name:	PFAS STUDY
Project Number:	Not Specified
Report Date:	06/11/21

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127213
Report Date: 06/11/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2127213-01	0517_S3_01		NANJEMOY/PISCATAWAY	05/17/21 00:00	05/21/21
L2127213-02	0517_S3_02		NANJEMOY/PISCATAWAY	05/17/21 00:00	05/21/21
L2127213-03	0517_S3_03		NANJEMOY/PISCATAWAY	05/17/21 00:00	05/21/21
L2127213-04	0517_S3_04		NANJEMOY/PISCATAWAY	05/17/21 00:00	05/21/21
L2127213-05	0517_S3_05		NANJEMOY/PISCATAWAY	05/17/21 00:00	05/21/21
L2127213-06	S3-T1	TISSUE	NANJEMOY/PISCATAWAY	05/17/21 00:00	05/21/21
L2127213-07	0517_S3_06		NANJEMOY/PISCATAWAY	05/17/21 00:00	05/21/21
L2127213-08	0517_S3_07		NANJEMOY/PISCATAWAY	05/17/21 00:00	05/21/21
L2127213-09	0517_S3_08		NANJEMOY/PISCATAWAY	05/17/21 00:00	05/21/21
L2127213-10	0517_S3_09		NANJEMOY/PISCATAWAY	05/17/21 00:00	05/21/21
L2127213-11	0517_S3_10		NANJEMOY/PISCATAWAY	05/17/21 00:00	05/21/21
L2127213-12	S3-T2	TISSUE	NANJEMOY/PISCATAWAY	05/17/21 00:00	05/21/21
L2127213-13	S3-FB1	WATER	NANJEMOY/PISCATAWAY	05/17/21 00:00	05/21/21
L2127213-14	TB-2	WATER	NANJEMOY/PISCATAWAY	05/17/21 00:00	05/21/21
L2127213-15	0520_S6_01		NANJEMOY/PISCATAWAY	05/20/21 00:00	05/21/21
L2127213-16	0520_S6_02		NANJEMOY/PISCATAWAY	05/20/21 00:00	05/21/21
L2127213-17	0520_S6_03		NANJEMOY/PISCATAWAY	05/20/21 00:00	05/21/21
L2127213-18	0520_S6_04		NANJEMOY/PISCATAWAY	05/20/21 00:00	05/21/21
L2127213-19	0520_S6_05		NANJEMOY/PISCATAWAY	05/20/21 00:00	05/21/21
L2127213-20	S6-T1	TISSUE	NANJEMOY/PISCATAWAY	05/20/21 00:00	05/21/21
L2127213-21	0520_S6_06		NANJEMOY/PISCATAWAY	05/20/21 00:00	05/21/21
L2127213-22	0520_S6_07		NANJEMOY/PISCATAWAY	05/20/21 00:00	05/21/21
L2127213-23	0520_S6_08		NANJEMOY/PISCATAWAY	05/20/21 00:00	05/21/21
L2127213-24	0520_S6_09		NANJEMOY/PISCATAWAY	05/20/21 00:00	05/21/21

Serial_No:06112117:30

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2127213-25	0520_S6_010		NANJEMOY/PISCATAWAY	05/20/21 00:00	05/21/21
L2127213-26	S6-T2	TISSUE	NANJEMOY/PISCATAWAY	05/20/21 00:00	05/21/21
L2127213-27	S6-FB1	WATER	NANJEMOY/PISCATAWAY	05/20/21 00:00	05/21/21
L2127213-28	TB-3	WATER	NANJEMOY/PISCATAWAY	05/20/21 00:00	05/21/21
L2127213-29	0514_S1_01		NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21
L2127213-30	0514_S1_02		NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21
L2127213-31	0514_S1_03		NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21
L2127213-32	0514_S1_04		NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21
L2127213-33	0514_S1_05		NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21
L2127213-34	S1-T1	TISSUE	NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21
L2127213-35	0514_S1_06		NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21
L2127213-36	0514_S1_07		NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21
L2127213-37	0514_S1_08		NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21
L2127213-38	0514_S1_09		NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21
L2127213-39	0514_S1_10		NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21
L2127213-40	S1-T2	TISSUE	NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21
L2127213-41	S1-W1	WATER	NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21
L2127213-42	S1-FB1	WATER	NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21
L2127213-43	TB-1	WATER	NANJEMOY/PISCATAWAY	05/14/21 00:00	05/21/21

Serial_No:06112117:30

Project Name:	PFAS STUDY	**Lab Number:**	L2127213
Project Number:	Not Specified	**Report Date:**	06/11/21

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Serial_No:06112117:30

Project Name: PFAS STUDY **Lab Number:** L2127213
Project Number: Not Specified **Report Date:** 06/11/21

Case Narrative (continued)

Sample Receipt

L2127213-14 and -28: The sample was received in an inappropriate container.

Perfluorinated Alkyl Acids by Isotope Dilution

L2127213-06: The sample was re-analyzed on dilution in order to quantiitate the results within the calibration range. The result(s) should be considered estimated, and are qualified with an E flag, for any compound(s) that exceeded the calibration range in the initial analysis. The re-analysis was performed only for the compound(s) that exceeded the calibration range.

L2127213-06: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

WG1503141-1R: The sample was re-analyzed due to QC failures in the original analysis. The results of the re-analysis are reported.

WG1504298-1 and WG1504298-2: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Alycia Mogayzel

Title: Technical Director/Representative Date: 06/11/21

Serial_No:06112117:30

ORGANICS

Serial_No:06112117:30

SEMIVOLATILES

Serial_No:06112117:30

Project Name: PFAS STUDY
Lab Number: L2127213
Project Number: Not Specified
Report Date: 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-06
Client ID: S3-T1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/17/21 00:00
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Tissue
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/04/21 02:36
Analyst: HT
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 08:11

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.221	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.442	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.221	--	1
Perfluorohexanesulfonic Acid (PFHxS)	0.822		ng/g	0.221	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.221	--	1
Perfluorononanoic Acid (PFNA)	0.374		ng/g	0.221	--	1
Perfluorooctanesulfonic Acid (PFOS)	359	E	ng/g	0.221	--	1
Perfluorodecanoic Acid (PFDA)	1.57		ng/g	0.221	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.442	--	1
Perfluoroundecanoic Acid (PFUnA)	2.58		ng/g	0.442	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.442	--	1
Perfluorododecanoic Acid (PFDoA)	3.97		ng/g	0.442	--	1
Perfluorotridecanoic Acid (PFTrDA)	3.45		ng/g	0.442	--	1
Perfluorotetradecanoic Acid (PFTA)	3.08		ng/g	0.442	--	1

Serial_No:06112117:30

Project Name: PFAS STUDY **Lab Number:** L2127213

Project Number: Not Specified **Report Date:** 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-06 Date Collected: 05/17/21 00:00

Client ID: S3-T1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	84		61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	90		58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	**148**	Q	74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	161		14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	77		66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	74		71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	**145**	Q	78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	82		75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**192**	Q	20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	83		72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	88		79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	85		75-130
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	82		31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	92		61-155
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	81		34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	81		54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	95		24-159

Serial_No:06112117:30

Project Name: PFAS STUDY
Lab Number: L2127213
Project Number: Not Specified
Report Date: 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-06 D
Client ID: S3-T1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/17/21 00:00
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Tissue
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/06/21 10:26
Analyst: SG
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 08:11

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorooctanesulfonic Acid (PFOS)	231		ng/g	2.21	--	10

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	106		79-136

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-12
Client ID: S3-T2
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/17/21 00:00
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Tissue
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/04/21 02:52
Analyst: HT
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 08:11

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.226	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.452	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.226	--	1
Perfluorohexanesulfonic Acid (PFHxS)	0.762		ng/g	0.226	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.226	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.226	--	1
Perfluorooctanesulfonic Acid (PFOS)	24.7	F	ng/g	0.226	--	1
Perfluorodecanoic Acid (PFDA)	0.282		ng/g	0.226	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.452	--	1
Perfluoroundecanoic Acid (PFUnA)	0.509		ng/g	0.452	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.452	--	1
Perfluorododecanoic Acid (PFDoA)	0.898		ng/g	0.452	--	1
Perfluorotridecanoic Acid (PFTrDA)	1.04		ng/g	0.452	--	1
Perfluorotetradecanoic Acid (PFTA)	0.987		ng/g	0.452	--	1

Serial_No:06112117:30

Project Name: PFAS STUDY **Lab Number:** L2127213

Project Number: Not Specified **Report Date:** 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-12 Date Collected: 05/17/21 00:00

Client ID: S3-T2 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	87		61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	95		58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	97		74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	106		14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	80		66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	78		71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	92		78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	82		75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	117		20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	86		72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	92		79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	87		75-130
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	88		31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	103		61-155
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	79		34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	98		54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	97		24-159

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-13
Client ID: S3-FB1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/17/21 00:00
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/02/21 12:45
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 04:35

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.82	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.82	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.82	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.82	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.82	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.82	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.82	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.82	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.82	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.82	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.82	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.82	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.82	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.82	--	1

Serial_No:06112117:30

Project Name: PFAS STUDY **Lab Number:** L2127213

Project Number: Not Specified **Report Date:** 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-13 Date Collected: 05/17/21 00:00

Client ID: S3-FB1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	66		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	90		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	90		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	92		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	88		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	84		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	65		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	88		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	60		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	82		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	62		22-136

Serial_No:06112117:30

Project Name: PFAS STUDY
Lab Number: L2127213
Project Number: Not Specified
Report Date: 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-20
Client ID: S6-T1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/20/21 00:00
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Tissue
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/04/21 03:09
Analyst: HT
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 08:11

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.244	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.488	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.244	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.244	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.244	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.244	--	1
Perfluorooctanesulfonic Acid (PFOS)	5.21		ng/g	0.244	--	1
Perfluorodecanoic Acid (PFDA)	0.360		ng/g	0.244	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.488	--	1
Perfluoroundecanoic Acid (PFUnA)	0.604		ng/g	0.488	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.488	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/g	0.488	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/g	0.488	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/g	0.488	--	1

Serial_No:06112117:30

Project Name: PFAS STUDY **Lab Number:** L2127213

Project Number: Not Specified **Report Date:** 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-20 Date Collected: 05/20/21 00:00

Client ID: S6-T1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	89		61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	97		58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	97		74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	109		14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	86		66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82		71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	94		78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	84		75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	108		20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	91		72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98		79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	93		75-130
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	89		31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	109		61-155
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	78		34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	114		54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	129		24-159

Serial_No:06112117:30

Project Name: PFAS STUDY
Lab Number: L2127213
Project Number: Not Specified
Report Date: 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-26
Client ID: S6-T2
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/20/21 00:00
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Tissue
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/04/21 03:42
Analyst: HT
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 08:11

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.240	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.481	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.240	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.240	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.240	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.240	--	1
Perfluorooctanesulfonic Acid (PFOS)	1.35	F	ng/g	0.240	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/g	0.240	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.481	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/g	0.481	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.481	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/g	0.481	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/g	0.481	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/g	0.481	--	1

Serial_No:06112117:30

Project Name: PFAS STUDY **Lab Number:** L2127213

Project Number: Not Specified **Report Date:** 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-26 Date Collected: 05/20/21 00:00

Client ID: S6-T2 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	93		61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	98		58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	99		74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	101		14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	90		66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	84		71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	92		78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	89		75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	99		20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	92		72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98		79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	93		75-130
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	97		31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	118		61-155
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	81		34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	130		54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	123		24-159

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-27
Client ID: S6-FB1
Sample Location: NANJEMOY/PISCATAWAY

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/02/21 13:18
Analyst: HT

Date Collected: 05/20/21 00:00
Date Received: 05/21/21
Field Prep: Not Specified

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 04:35

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.84	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.84	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.84	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.84	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.84	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.84	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.84	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.84	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.84	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.84	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.84	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.84	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.84	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.84	--	1

Serial_No:06112117:30

Project Name: PFAS STUDY **Lab Number:** L2127213

Project Number: Not Specified **Report Date:** 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-27 Date Collected: 05/20/21 00:00

Client ID: S6-FB1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	71		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	93		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	92		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	87		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	93		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	93		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	92		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	87		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	69		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	91		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	69		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	93		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	63		22-136

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-34
Client ID: S1-T1
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/14/21 00:00
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Tissue
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/04/21 04:15
Analyst: HT
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 08:11

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.240	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.480	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.240	--	1
Perfluorohexanesulfonic Acid (PFHxS)	0.512	F	ng/g	0.240	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.240	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.240	--	1
Perfluorooctanesulfonic Acid (PFOS)	94.2		ng/g	0.240	--	1
Perfluorodecanoic Acid (PFDA)	1.75		ng/g	0.240	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.480	--	1
Perfluoroundecanoic Acid (PFUnA)	1.69		ng/g	0.480	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.480	--	1
Perfluorododecanoic Acid (PFDoA)	1.26		ng/g	0.480	--	1
Perfluorotridecanoic Acid (PFTrDA)	0.774		ng/g	0.480	--	1
Perfluorotetradecanoic Acid (PFTA)	0.502		ng/g	0.480	--	1

Serial_No:06112117:30

Project Name: PFAS STUDY **Lab Number:** L2127213

Project Number: Not Specified **Report Date:** 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-34 Date Collected: 05/14/21 00:00

Client ID: S1-T1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	93		61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	99		58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	124		74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	123		14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	86		66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	81		71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	118		78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	90		75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	143		20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	93		72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	100		79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	95		75-130
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	95		31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	114		61-155
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	79		34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	105		54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	121		24-159

Serial_No:06112117:30

Project Name: PFAS STUDY
Lab Number: L2127213
Project Number: Not Specified
Report Date: 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-40
Client ID: S1-T2
Sample Location: NANJEMOY/PISCATAWAY

Date Collected: 05/14/21 00:00
Date Received: 05/21/21
Field Prep: Not Specified

Sample Depth:
Matrix: Tissue
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/04/21 04:31
Analyst: HT
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 08:11

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.229	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.458	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.229	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.229	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.229	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.229	--	1
Perfluorooctanesulfonic Acid (PFOS)	2.52	F	ng/g	0.229	--	1
Perfluorodecanoic Acid (PFDA)	0.403		ng/g	0.229	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.458	--	1
Perfluoroundecanoic Acid (PFUnA)	0.590		ng/g	0.458	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.458	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/g	0.458	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/g	0.458	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/g	0.458	--	1

Serial_No:06112117:30

Project Name: PFAS STUDY **Lab Number:** L2127213

Project Number: Not Specified **Report Date:** 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-40 Date Collected: 05/14/21 00:00

Client ID: S1-T2 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	88		61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	91		58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	93		74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	87		14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	83		66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	80		71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	88		78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81		75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	91		20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	86		72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	90		79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	84		75-130
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	85		31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	106		61-155
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	71		34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	112		54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	106		24-159

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-41
Client ID: S1-W1
Sample Location: NANJEMOY/PISCATAWAY

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/29/21 03:33
Analyst: RS

Date Collected: 05/14/21 00:00
Date Received: 05/21/21
Field Prep: Not Specified

Extraction Method: ALPHA 23528
Extraction Date: 05/25/21 03:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	6.89		ng/l	1.84	--	1
Perfluorohexanoic Acid (PFHxA)	24.0		ng/l	1.84	--	1
Perfluoroheptanoic Acid (PFHpA)	10.4		ng/l	1.84	--	1
Perfluorohexanesulfonic Acid (PFHxS)	62.4		ng/l	1.84	--	1
Perfluorooctanoic Acid (PFOA)	27.1		ng/l	1.84	--	1
Perfluorononanoic Acid (PFNA)	2.70		ng/l	1.84	--	1
Perfluorooctanesulfonic Acid (PFOS)	73.6		ng/l	1.84	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.84	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.84	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.84	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.84	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.84	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.84	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.84	--	1

Serial_No:06112117:30

Project Name: PFAS STUDY **Lab Number:** L2127213

Project Number: Not Specified **Report Date:** 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-41 Date Collected: 05/14/21 00:00

Client ID: S1-W1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	109		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	95		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	95		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	91		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	95		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	93		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	86		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	99		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	88		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	48		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	90		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	50		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	82		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	78		22-136

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-42
Client ID: S1-FB1
Sample Location: NANJEMOY/PISCATAWAY

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/29/21 03:50
Analyst: RS

Date Collected: 05/14/21 00:00
Date Received: 05/21/21
Field Prep: Not Specified

Extraction Method: ALPHA 23528
Extraction Date: 05/25/21 03:46

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.88	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.88	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.88	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.88	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.88	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.88	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.88	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.88	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.88	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.88	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.88	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.88	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.88	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.88	--	1

Serial_No:06112117:30

Project Name: PFAS STUDY **Lab Number:** L2127213

Project Number: Not Specified **Report Date:** 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-42 Date Collected: 05/14/21 00:00

Client ID: S1-FB1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	107		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	49		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	105		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	98		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	95		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	100		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	96		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	91		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	61		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	90		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	55		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	84		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	79		22-136

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-43
Client ID: TB-1
Sample Location: NANJEMOY/PISCATAWAY

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/29/21 04:06
Analyst: RS

Date Collected: 05/14/21 00:00
Date Received: 05/21/21
Field Prep: Not Specified

Extraction Method: ALPHA 23528
Extraction Date: 05/25/21 03:46

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.83	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.83	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.83	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.83	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.83	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.83	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.83	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.83	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.83	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.83	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.83	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.83	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.83	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.83	--	1

Serial_No:06112117:30

Project Name: PFAS STUDY **Lab Number:** L2127213

Project Number: Not Specified **Report Date:** 06/11/21

SAMPLE RESULTS

Lab ID: L2127213-43 Date Collected: 05/14/21 00:00

Client ID: TB-1 Date Received: 05/21/21

Sample Location: NANJEMOY/PISCATAWAY Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	110		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	48		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	104		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	98		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	89		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	93		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	83		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	80		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	74		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	48		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	76		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	47		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	73		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	69		22-136

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/29/21 12:12
Analyst: RS

Extraction Method: ALPHA 23528
Extraction Date: 05/25/21 03:43

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 41-43 Batch: WG1503141-1 R					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	--
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	--
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	--
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	--
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	--

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 05/29/21 12:12
Analyst: RS

Extraction Method: ALPHA 23528
Extraction Date: 05/25/21 03:43

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 41-43 Batch: WG1503141-1 R					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	98		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	126		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	80		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	101		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	99		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	100		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	96		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	92		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	92		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	92		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	90		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	71		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	94		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	36		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	63		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	77		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	62		22-136

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127213
Report Date: 06/11/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/02/21 09:10
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 04:35

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 13,27 Batch: WG1504262-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	--
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	--
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	--
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	--
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	--

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/02/21 09:10
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 04:35

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 13,27 Batch: WG1504262-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	91		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	118		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	84		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	93		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	91		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	95		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	91		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	110		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	86		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	111		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	74		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	95		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	35		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	69		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	83		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	68		22-136

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/04/21 02:03
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 08:11

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 06,12,20,26,34,40 Batch: WG1504298-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.250	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.500	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.250	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.250	--
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.250	--
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.250	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/g	0.250	--
Perfluorodecanoic Acid (PFDA)	ND		ng/g	0.250	--
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.500	--
Perfluoroundecanoic Acid (PFUnA)	ND		ng/g	0.500	--
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.500	--
Perfluorododecanoic Acid (PFDoA)	ND		ng/g	0.500	--
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/g	0.500	--
Perfluorotetradecanoic Acid (PFTA)	ND		ng/g	0.500	--

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/04/21 02:03
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 05/27/21 08:11

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 06,12,20,26,34,40 Batch: WG1504298-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	100		61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	116		58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106		74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**175**	Q	14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	98		66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	95		71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	103		78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	98		75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	144		20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	106		72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	107		79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	103		75-130
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	109		31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	123		61-155
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	116		34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	102		54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	157		24-159

Serial_No:06112117:30

Lab Control Sample Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 41-43 Batch: WG1503141-2								
Perfluorobutanesulfonic Acid (PFBS)	95		-		65-157	-		30
Perfluorohexanoic Acid (PFHxA)	96		-		69-168	-		30
Perfluoroheptanoic Acid (PFHpA)	96		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	95		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	94		-		63-159	-		30
Perfluorononanoic Acid (PFNA)	93		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	96		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	99		-		63-171	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	100		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	96		-		60-153	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	111		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	104		-		67-153	-		30
Perfluorotridecanoic Acid (PFTrDA)	92		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	104		-		59-182	-		30

Serial_No:06112117:30

Lab Control Sample Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 41-43 Batch: WG1503141-2								

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	99				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	127				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	113				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	96				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	105				57-129
Perfluoro[1,2,3,4 13C4]Heptanoic Acid (M4PFHpA)	100				60 129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	104				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	101				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	118				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	97				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	104				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	94				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	115				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	77				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	99				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	37				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	72				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	90				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	84				22-136

Serial_No:06112117:30

Lab Control Sample Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab	Associated sample(s): 13,27		Batch: WG1504262-2					
Perfluorobutanesulfonic Acid (PFBS)	90		-		65-157	-		30
Perfluorohexanoic Acid (PFHxA)	91		-		69-168	-		30
Perfluoroheptanoic Acid (PFHpA)	91		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	89		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	90		-		63-159	-		30
Perfluorononanoic Acid (PFNA)	95		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	93		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	92		-		63-171	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	86		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	93		-		60-153	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	102		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	98		-		67-153	-		30
Perfluorotridecanoic Acid (PFTrDA)	91		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	94		-		59-182	-		30

Serial_No:06112117:30

Lab Control Sample Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 13,27 Batch: WG1504262-2								

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	89				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	117				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	84				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	92				57-129
Perfluoro[1,2,3,4 13C4]Heptanoic Acid (M4PFHpA)	90				60 129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	93				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	89				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	112				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	84				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	110				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	77				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	88				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	40				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	63				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	80				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	66				22-136

Serial_No:06112117:30

Lab Control Sample Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab	Associated sample(s): 06,12,20,26,34,40				Batch: WG1504298-2			
Perfluorobutanesulfonic Acid (PFBS)	102		-		72-128	-		30
Perfluorohexanoic Acid (PFHxA)	99		-		70-132	-		30
Perfluoroheptanoic Acid (PFHpA)	100		-		71-131	-		30
Perfluorohexanesulfonic Acid (PFHxS)	100		-		67-130	-		30
Perfluorooctanoic Acid (PFOA)	99		-		69-133	-		30
Perfluorononanoic Acid (PFNA)	104		-		72-129	-		30
Perfluorooctanesulfonic Acid (PFOS)	100		-		68-136	-		30
Perfluorodecanoic Acid (PFDA)	96		-		69-133	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	91		-		63-144	-		30
Perfluoroundecanoic Acid (PFUnA)	103		-		64-136	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	99		-		61-139	-		30
Perfluorododecanoic Acid (PFDoA)	101		-		69-135	-		30
Perfluorotridecanoic Acid (PFTrDA)	112		-		66-139	-		30
Perfluorotetradecanoic Acid (PFTA)	114		-		69-133	-		30

Serial_No:06112117:30

Lab Control Sample Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 06,12,20,26,34,40 Batch: WG1504298-2								

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	99				61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	113				58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106				74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	163				14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	94				66-128
Perfluoro[1,2,3,4 13C4]Heptanoic Acid (M4PFHpA)	92				71 129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	105				78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97				75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**155**	Q			20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	104				72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	105				79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	99				75-130
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	111				31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	123				61-155
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	114				34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	103				54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	139				24-159

Serial_No:06112117:30

Matrix Spike Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 41-43 QC Batch ID: WG1503141-3 QC Sample: L2126326-01 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	ND	35.9	36.1	99		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	ND	35.9	37.1	100		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	ND	31.9	32.2	98		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	33.6	33.8	101		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	2.47	35.9	38.5	100		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	33.7	37.7	111		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	ND	35.9	36.7	100		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	32.0	36.6	109		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	ND	35.9	36.1	97		-	-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	39.4	34.2	70.3	90		-	-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	34.2	33.2	97		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	ND	35.9	35.7	100		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	ND	33.3	33.6	98		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	ND	35.9	36.0	100		-	-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	34.4	37.4	109		-	-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	34.5	33.1	96		-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	35.9	39.3	110		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	35.9	36.0	100		-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	34.6	31.3	90		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	ND	35.9	37.0F	103		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	35.9	49.8	136		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	35.9	39.6	110		-	-		67-153	-		30

Serial_No:06112117:30

Matrix Spike Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Sample	Associated sample(s): 41-43	QC Batch ID: WG1503141-3		QC Sample: L2126326-01		Client ID: MS						
Perfluorotridecanoic Acid (PFTrDA)	ND	35.9	33.9	94		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	35.9	39.6	110		-	-		59-182	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	73				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	66				12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	78				14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	37				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	48				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	78				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	79				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	103				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	94				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	99				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	77				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	74				22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	94				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	138				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	25				10-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	109				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	89				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	86				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	117				70-131

Serial_No:06112117:30

Matrix Spike Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 13,27 QC Batch ID: WG1504262-3 QC Sample: L2126829-03 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	7.57	35.8	39.2	88		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	3.28	35.8	35.6	90		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	4.16	31.8	33.6	92		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	33.6	31.9	95		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	4.59	35.8	37.9	93		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	33.7	31.0	88		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	2.91	35.8	36.4	93		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	0.31	32.0	37.6	09		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	12.0	35.8	46.2	95		-	-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	34.1	34.8	102		-	-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	34.1	31.8	93		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	1.86	35.8	36.9	98		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	34.6	33.3	64.9	91		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	ND	35.8	35.4	97		-	-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	34.4	37.6	109		-	-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	34.5	33.2	96		-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	35.8	37.2	104		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	35.8	36.3	101		-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	34.6	29.7	86		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	ND	35.8	35.1F	98		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	35.8	39.1	109		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	35.8	39.1	109		-	-		67-153	-		30

Serial_No:06112117:30

Matrix Spike Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Sample	Associated sample(s): 13,27	QC Batch ID: WG1504262-3				QC Sample: L2126829-03			Client ID: MS			
Perfluorotridecanoic Acid (PFTrDA)	ND	35.8	34.5	96		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	35.8	37.2	104		-	-		59-182	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	92				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	135				12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	105				14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	51				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	54				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	83				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	81				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	90				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	93				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	96				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	75				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	57				22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	94				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	107				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	14				10-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	92				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	89				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	97				70-131

Serial_No:06112117:30

Matrix Spike Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 06,12,20,26,34,40 QC Batch ID: WG1504298-3 QC Sample: L2127213-20 Client ID: S6-T1												
Perfluorobutanesulfonic Acid (PFBS)	ND	3.9	4.07	104		-	-		72-128	-		30
Perfluorohexanoic Acid (PFHxA)	ND	4.4	4.52	103		-	-		70-132	-		30
Perfluoroheptanoic Acid (PFHpA)	ND	4.4	4.52	103		-	-		71-131	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	4.02	4.18	104		-	-		67-130	-		30
Perfluorooctanoic Acid (PFOA)	ND	4.4	4.48	102		-	-		69-133	-		30
Perfluorononanoic Acid (PFNA)	ND	4.4	4.64	106		-	-		72-129	-		30
Perfluorooctanesulfonic Acid (PFOS)	5.21	4.08	10.3	125		-	-		68-136	-		30
Perfluorodecanoic Acid (PFDA)	0.360	4.4	4.62	97		-	-		69-133	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	4.4	4.23	96		-	-		63-144	-		30
Perfluoroundecanoic Acid (PFUnA)	0.604	4.4	5.65	115		-	-		64-136	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	4.4	4.59	104		-	-		61-139	-		30
Perfluorododecanoic Acid (PFDoA)	ND	4.4	4.81	102		-	-		69-135	-		30
Perfluorotridecanoic Acid (PFTrDA)	ND	4.4	6.40	137		-	-		66-139	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	4.4	5.15	113		-	-		69-133	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	97				14-167
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	101				20-154
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	75				34-137
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	88				31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	99				61-155

Serial_No:06112117:30

Matrix Spike Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 06,12,20,26,34,40 QC Batch ID: WG1504298-3 QC Sample: L2127213-20 Client ID: S6-T1												

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	86				75-130
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	81				66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	76				71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	89				78-139
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	108				54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	109				24-159
Perfluoro[13C4]Butanoic Acid (MPFBA)	88				61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	93				58-150
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	91				79-136
Perfluoro[13C8]Octanoic Acid (M8PFOA)	84				75-130
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88				72-140
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	92				74-139

Serial_No:06112117:30

Lab Duplicate Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127213
Report Date: 06/11/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 41-43 QC Batch ID: WG1503141-4 QC Sample: L2126326-03 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	3.03	2.94	ng/l	3		30
Perfluoropentanoic Acid (PFPeA)	3.99	4.11	ng/l	3		30
Perfluorobutanesulfonic Acid (PFBS)	4.25	4.06	ng/l	5		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	3.28	3.34	ng/l	2		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	2.71	2.64	ng/l	3		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	7.10	6.98	ng/l	2		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	ND	ng/l	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	2.68	2.68	ng/l	0		30
Perfluorooctanesulfonic Acid (PFOS)	7.62	7.47	ng/l	2		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30

Serial_No:06112117:30

Lab Duplicate Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127213
Report Date: 06/11/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 41-43 QC Batch ID: WG1503141-4 QC Sample: L2126326-03 Client ID: DUP Sample						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	75		81		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	113		125		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	110		108		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	48		45		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	82		87		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	78		80		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	100		103		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81		77		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	49		42		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	80		72		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96		97		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	78		71		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	50		39		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	47		33		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	81		76		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	12		7	Q	10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	46		42		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	79		74		48-131

Serial_No:06112117:30

Lab Duplicate Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127213
Report Date: 06/11/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 41-43 QC Batch ID: WG1503141-4 QC Sample: L2126326-03 Client ID: DUP Sample						

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	72		75		22-136

Serial_No:06112117:30

Lab Duplicate Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127213
Report Date: 06/11/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 13,27 QC Batch ID: WG1504262-4 QC Sample: L2127112-01 Client ID: DUP Sample						
Perfluorooctanoic Acid (PFOA)	11.7	12.0	ng/l	3		30
Perfluorononanoic Acid (PFNA)	4.90	4.94	ng/l	1		30
Perfluorooctanesulfonic Acid (PFOS)	27.0	27.0	ng/l	0		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanoic Acid (M8PFOA)	75		75		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	74		76		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	92		89		69-131

Serial_No:06112117:30

Lab Duplicate Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127213
Report Date: 06/11/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 06,12,20,26,34,40 QC Batch ID: WG1504298-4 QC Sample: L2127213-26 Client ID: S6-T2						
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	ng/g	NC		30
Perfluorohexanoic Acid (PFHxA)	ND	ND	ng/g	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	ND	ng/g	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/g	NC		30
Perfluorooctanoic Acid (PFOA)	ND	ND	ng/g	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/g	NC		30
Perfluorooctanesulfonic Acid (PFOS)	1.35F	1.26F	ng/g	7		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/g	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/g	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/g	NC		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/g	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/g	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/g	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/g	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	93		90		61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	98		94		58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	99		95		74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	101		91		14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	90		87		66-128

Serial_No:06112117:30

Lab Duplicate Analysis
Batch Quality Control

Project Name: PFAS STUDY
Project Number: Not Specified
Lab Number: L2127213
Report Date: 06/11/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 06,12,20,26,34,40 QC Batch ID: WG1504298-4 QC Sample: L2127213-26 Client ID: S6-T2

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	84		80		71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	92		90		78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	89		87		75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	99		89		20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	92		88		72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98		92		79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	93		86		75-130
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	97		93		31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	118		108		61-155
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	81		73		34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	130		116		54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	123		120		24-159

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127213
Report Date: 06/11/21

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2127213-01A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-02A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-03A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-04A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-05A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-06A	Plastic 8oz unpreserved	A	NA		4.8	Y	Absent		A2-537-ISOTOPE(28)
L2127213-07A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-08A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-09A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-10A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-11A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-12A	Plastic 8oz unpreserved	A	NA		4.8	Y	Absent		A2-537-ISOTOPE(28)
L2127213-13A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127213-14A	Plastic 250ml unpreserved	A	NA		4.8	Y	Absent		CANCELLED()
L2127213-15A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-16A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-17A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-18A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-19A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-20A	Plastic 8oz unpreserved	A	NA		4.8	Y	Absent		A2-537-ISOTOPE(28)
L2127213-21A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-22A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()

*Values in parentheses indicate holding time in days

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127213
Report Date: 06/11/21

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2127213-23A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-24A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-25A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-26A	Plastic 8oz unpreserved	A	NA		4.8	Y	Absent		A2-537-ISOTOPE(28)
L2127213-26B	Plastic 8oz unpreserved	A	NA		4.8	Y	Absent		A2-537-ISOTOPE(28)
L2127213-27A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127213-28A	Plastic 250ml unpreserved	A	NA		4.8	Y	Absent		CANCELLED()
L2127213-29A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-30A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-31A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-32A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-33A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-34A	Plastic 8oz unpreserved	A	NA		4.8	Y	Absent		A2-537-ISOTOPE(28)
L2127213-34B	Plastic 8oz unpreserved	A	NA		4.8	Y	Absent		A2-537-ISOTOPE(28)
L2127213-35A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-36A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-37A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-38A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-39A	Bag	A	NA		4.8	Y	Absent		A2-TISSUE_PREP()
L2127213-40A	Plastic 8oz unpreserved	A	NA		4.8	Y	Absent		A2-537-ISOTOPE(28)
L2127213-40B	Plastic 8oz unpreserved	A	NA		4.8	Y	Absent		A2-537-ISOTOPE(28)
L2127213-41A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127213-41B	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127213-42A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)
L2127213-43A	Plastic 250ml unpreserved	B	NA		2.2	Y	Absent		A2-537-ISOTOPE(14)

Container Comments

*Values in parentheses indicate holding time in days

Serial_No:06112117:30

Project Name: PFAS STUDY
Project Number: Not Specified

Lab Number: L2127213
Report Date: 06/11/21

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)

Container Comments

L2127213-14A this is a temp blank. cannot be analyzed.

L2127213-28A this is a temp blank. Cannot be analyzed.

*Values in parentheses indicate holding time in days

Serial_No:06112117:30

Project Name: PFAS STUDY
Lab Number: L2127213
Project Number:
Report Date: 06/11/21

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

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Project Name:	PFAS STUDY	**Lab Number:**	L2127213
Project Number:	Not Specified	**Report Date:**	06/11/21

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report

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Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. (Note: 'PFAS, Total (6)' is applicable to MassDEP DW compliance analysis only.). If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

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Data Qualifiers

the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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Project Name:	PFAS STUDY	**Lab Number:**	L2127213
Project Number:	Not Specified	**Report Date:**	06/11/21

REFERENCES

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

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

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

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Chain-of-Custody

Project Name: 2021 Piscataway PFAS Sampling

Station No. & FTC yr./Description		Coordinates:		Collecting Agency:	Samplers Initials:
S3	2021	N 38.74618 °		MDE	CNL, CAP, NWK
Site Description Piscataway Creek at Commo Road and upstream		W 76.84636 °			

Composite ID Number	Sample Matrix	Individual Fish Field ID Number	Length (cm)	Weight (g/lbs.)	Requested Contaminants	Species	Collection Date
S3-T1 -01	T	0517_S3_01	16.0	75	PFAS - 14 Compounds	Redbreast Sunfish--Lepomis auritus	
-02	T	0517_S3_02	15.0	70			
-03	T	0517_S3_03	15.5	70			
-04	T	0517_S3_04	16.0	80			
-05	T	0517_S3_05	14.8	69			
Summary Information	5		15.5	72.8	Lepomis auritus		5/17/2021
S3-T2 -07	T	0517_S3_06	19.5	99	PFAS - 14 Compounds	Yellow Bullhead Catfish--Ameiurus natalis	
-08	T	0517_S3_07	18.5	89			
-09	T	0517_S3_08	18.0	80			
-10	T	0517_S3_09	17.0	66			
-11	T	0517_S3_10	15.5	45			
Summary Information	5		17.7	75.8	Ameiurus natalis		5/17/2021
Surface Water Samples							
	RS						
	RS				PFAS - 14 Compounds		
Blank ID							
S3-FB1 -13	RS	Site 3 Field Blank (S3-FB1)			PFAS - 14 Compounds		5/17/2021
TB-2 -14	RS	Trip Blank 2			PFAS - 14 Compounds		5/17/2021

LABORATORY INFORMATION

Client Information:	MDE	1800 Washington Blvd.	Baltimore, MD 21230	410-537-3614	Amy.Laliberte@maryland.gov
Project Information:	2021 Fish Tissue PFAS				
Report Information:	Email: Amy.Laliberte@maryland.gov				
Alpha Job #			**Billing Info:**	Same as Client Info.	

Analytical Method: LCMSMS - Isotope Dilution

Delivery Shipment Record:		Deliver/Ship to: (Name, address and phone)		Date/Time Shipped from Collecting Agency:	
Delivery Method:		Alpha Analytical			
☑ Hand Carried					
Relinquished by: (signature)	Date/Time 5/21/21	Received by: (signature) 5/21/21 11:30	Relinquished by: (signature)	Date/Time 5/21/21 17:02	Received by: (signature) 5/21/21 17:02
Relinquished by: (signature)	Date/Time 5/21/21 19:00	Received by Central Processing Laboratory by: (signature) 5/21/21 2300	Date/Time	Remarks: 5/22/21 0315	

Laboratory Custody:

Released Name/Date	Received Name/Date	Purpose	To Location

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Serial No:06112117:30

Chain-of-Custody

Project Name: 2021 Piscataway PFAS Sampling

Station No. & FTC yr./Description		Coordinates:		Collecting Agency:	Samplers Initials:
S6	2021	N	38.44992 °	MDE	CNL, CAP, NWK
Site Description: Nanjemoy Creek at tidal headwaters		W	77.15417 °		

Composite ID Number	Sample Matrix	Individual Fish Field ID Number	Length (cm)	Weight (g/lbs.)	Requested Contaminants	Species	Collection Date
S6-T1 -15 -16 -17 -18 -19	T	0520_S6_01	19.0	178	PFAS - 14 Compounds	Bluegill--Lepomis macrochirus	
	T	0520_S6_02	14.5	65			
	T	0520_S6_03	16.0	87			
	T	0520_S6_04	17.0	100			
	T	0520_S6_05	16.75	107			
Summary Information	5		**16.7**	**107.4**	**Lepomis macrochirus**		5/20/2021
S6-T2 -20 -21 -22 -23 -24 -25	T	0520_S6_06	48.0	1127	PFAS - 14 Compounds	Blue Catfish--Ictalurus furcatus	
	T	0520_S6_07	47.0	890			
	T	0520_S6_08	52.0	1292			
	T	0520_S6_09	44.0	791			
	T	0520_S6_10	51.0	1266			
Summary Information	5		**48.4**	**1073.2**	**Ictalurus furcatus**		5/20/2021
Surface Water Samples							
	RS				**PFAS - 14 Compounds**		
	RS				**PFAS - 14 Compounds**		
Blank ID							
S6-FB1 -27	RS	Site 1 Field Blank (S6-FB1)			**PFAS - 14 Compounds**		5/20/2021
TB-3 -28	RS	Trip Blank 3			**PFAS - 14 Compounds**		5/20/2021

LABORATORY INFORMATION

Client Information:	MDE	1800 Washington Blvd.	Baltimore, MD 21230	410-537-3614	Amy.Laliberte@maryland.gov
Project Information:	2021 Fish Tissue PFAS				
Report Information:	Email: Amy.Laliberte@maryland.gov				
Alpha Job #			**Billing Info:**	Same as Client Info.	

Analytical Method: LCMSMS - Isotope Dilution

Delivery Shipment Record:		Deliver/Ship to: (Name, address and phone)		Date/Time Shipped from Collecting Agency:	
Delivery Method: ☑ Hand Carried		Alpha Analytical			
Relinquished by: (signature)	Date/ Time	Received by: (signature) 5/21/21 11:30	Relinquished by: (signature)	Date/Time 5/21/21 17:02	Received by: (signature) 5/21/21 17:02
Relinquished by: (signature)	Date/ Time 5/21/21	Received by Central Processing Laboratory by: (signature) 5/21/21	Date/Time 7300	Remarks: AAC 5/22/21 0315	

Laboratory Custody:

Released Name/Date	Received Name/Date	Purpose	To Location

Chris Johnson 5/22/21 0830

5/28/21 Page ____ of ____ Serial No:06112117:30

Chain-of-Custody

Project Name: 2021 Piscataway PFAS Sampling

Station No. & FTC yr./Description		Coordinates:		Collecting Agency:	Samplers Initials:
S1	2021	N	38.69522 °	MDE	CNL, CAP, NWK
Site Description Piscataway Creek at tidal headwaters		W	77.00623 °		

Composite ID Number	Sample Matrix	Individual Fish Field ID Number	Length (cm)	863	Requested Contaminants	Species	Collection Date
-29	T	0514_S1_01	41.25	863	PFAS - 14 Compounds	Largemouth Bass--Micropterus salmoides	
-30	T	0514_S1_02	41.25	1028			
S1-T1 -31	T	0514_S1_03	39.4	884			
-32	T	0514_S1_04	39.4	956			
-37	T	0514_S1_05	38.1	823			
Summary Information	5		39.9	910.8	Micropterus salmoides		5/14/2021
-35	T	0514_S1_06	54.6	1772	PFAS - 14 Compounds	Blue Catfish--Ictalurus furcatus	
-36	T	0514_S1_07	49.5	1199			
S1-T2 -37	T	0514_S1_08	46.4	1055			
-38	T	0514_S1_09	45.1	827			
-39	T	0514_S1_10	41.3	552			
Summary Information	5		47.38	1081	Ictalurus furcatus		5/14/2021
Surface Water Samples							
S1-W1 -41	RS	Piscataway Creek - Tidal Water Sample			PFAS - 14 Compounds		5/14/2021
	RS				PFAS - 14 Compounds		5/14/2021
Blank ID							
S1-FB1 -42	RS	Site 1 Field Blank (S1-FB1)			PFAS - 14 Compounds		5/14/2021
TB-1 -43	RS	Trip Blank 1			PFAS - 14 Compounds		5/14/2021

LABORATORY INFORMATION

Client Information:	MDE	1800 Washington Blvd.	Baltimore, MD 21230	410-537-3614	Amy.Laliberte@maryland.gov
Project Information:	2021 Fish Tissue PFAS				
Report Information:	Email: Amy.Laliberte@maryland.gov				
Alpha Job #			**Billing Info:**	Same as Client Info.	

Analytical Method: LCMSMS - Isotope Dilution

Delivery Shipment Record:	Deliver/Ship to: (Name, address and phone)	Date/Time Shipped from Collecting Agency:
Delivery Method:	Alpha Analytical	
☑ Hand Carried		

Relinquished by: (signature)	Date/Time	Received by: (signature)	Relinquished by: (signature)	Date/Time	Received by: (signature)
	5/21/21	5/21/21 1130 AAL	AAL	5/21/21 17:02	5/21/21 17:02
Relinquished by: (signature)	Date/Time 5/22/21	Received by Central Processing Laboratory by: (signature)	Date/Time 5/21/21 2300	Remarks:	5/22/21 0315 5/22/21 0315

Laboratory Custody:

Released Name/Date	Received Name/Date	Purpose	To Location

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Chris Jelesan 5/22/21 0830

Serial_No:06172112:54

ANALYTICAL REPORT

Lab Number:	L2128737
Client:	Maryland Department of the Environment 1800 Washington Boulevard Baltimore, MD 21230
ATTN:	Amy Laliberte
Phone:	(410) 537-3614
Project Name:	2021 PISCATAWAY PFAS SAMPLING
Project Number:	Not Specified
Report Date:	06/17/21

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Serial_No:06172112:54

Project Name: 2021 PISCATAWAY PFAS SAMPLING
Project Number: Not Specified

Lab Number: L2128737
Report Date: 06/17/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2128737-01	0526_S7_01		Not Specified	05/26/21 00:00	05/28/21
L2128737-02	0526_S7_02		Not Specified	05/26/21 00:00	05/28/21
L2128737-03	0526_S7_03		Not Specified	05/26/21 00:00	05/28/21
L2128737-04	0526_S7_04		Not Specified	05/26/21 00:00	05/28/21
L2128737-05	0526_S7_05		Not Specified	05/26/21 00:00	05/28/21
L2128737-06	S7-T1	TISSUE	Not Specified	05/26/21 00:00	05/28/21
L2128737-07	0526_S7_06		Not Specified	05/26/21 00:00	05/28/21
L2128737-08	0526_S7_07		Not Specified	05/26/21 00:00	05/28/21
L2128737-09	0526_S7_08		Not Specified	05/26/21 00:00	05/28/21
L2128737-10	0526_S7_09		Not Specified	05/26/21 00:00	05/28/21
L2128737-11	0526_S7_10		Not Specified	05/26/21 00:00	05/28/21
L2128737-12	S7-T2	TISSUE	Not Specified	05/26/21 00:00	05/28/21
L2128737-13	S7-FB1	WATER	Not Specified	05/26/21 00:00	05/28/21
L2128737-14	TB-4	WATER	Not Specified	05/26/21 00:00	05/28/21

Serial_No:06172112:54

Project Name:	2021 PISCATAWAY PFAS SAMPLING	**Lab Number:**	L2128737
Project Number:	Not Specified	**Report Date:**	06/17/21

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Serial_No:06172112:54

Project Name:	2021 PISCATAWAY PFAS SAMPLING	**Lab Number:**	L2128737
Project Number:	Not Specified	**Report Date:**	06/17/21

Case Narrative (continued)

Perfluorinated Alkyl Acids by Isotope Dilution

WG1512639-1, WG1512639-2, and WG1512639-4: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

The WG1512639-3 MS recovery, performed on L2128737-06, is outside the acceptance criteria for perfluorotridecanoic acid (pftrda) (145%).

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 06/17/21

Serial_No:06172112:54

ORGANICS

Serial_No:06172112:54

SEMIVOLATILES

Serial_No:06172112:54

Project Name: 2021 PISCATAWAY PFAS SAMPLING **Lab Number:** L2128737

Project Number: Not Specified **Report Date:** 06/17/21

SAMPLE RESULTS

Lab ID: L2128737-06
Client ID: S7-T1
Sample Location: Not Specified

Date Collected: 05/26/21 00:00
Date Received: 05/28/21
Field Prep: Not Specified

Sample Depth:
Matrix: Tissue
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/16/21 21:35
Analyst: MP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: ALPHA 23528
Extraction Date: 06/16/21 07:46

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.242	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.484	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.242	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.242	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.242	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.242	--	1
Perfluorooctanesulfonic Acid (PFOS)	5.20		ng/g	0.242	--	1
Perfluorodecanoic Acid (PFDA)	0.504		ng/g	0.242	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.484	--	1
Perfluoroundecanoic Acid (PFUnA)	1.10		ng/g	0.484	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.484	--	1
Perfluorododecanoic Acid (PFDoA)	0.706		ng/g	0.484	--	1
Perfluorotridecanoic Acid (PFTrDA)	1.43	F	ng/g	0.484	--	1
Perfluorotetradecanoic Acid (PFTA)	0.653		ng/g	0.484	--	1

Serial_No:06172112:54

Project Name: 2021 PISCATAWAY PFAS SAMPLING **Lab Number:** L2128737

Project Number: Not Specified **Report Date:** 06/17/21

SAMPLE RESULTS

Lab ID: L2128737-06 Date Collected: 05/26/21 00:00

Client ID: S7-T1 Date Received: 05/28/21

Sample Location: Not Specified Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	86		61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	97		58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	93		74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	84		14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	85		66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	74		71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	84		78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	82		75-130
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	100		72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	90		79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	86		75-130
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	82		31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	98		61-155
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	85		34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	82		54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	86		24-159

Serial_No:06172112:54

Project Name: 2021 PISCATAWAY PFAS SAMPLING **Lab Number:** L2128737

Project Number: Not Specified **Report Date:** 06/17/21

SAMPLE RESULTS

Lab ID: L2128737-12
Client ID: S7-T2
Sample Location: Not Specified

Date Collected: 05/26/21 00:00
Date Received: 05/28/21
Field Prep: Not Specified

Sample Depth:
Matrix: Tissue
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/16/21 22:08
Analyst: MP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: ALPHA 23528
Extraction Date: 06/16/21 07:46

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.234	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.467	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.234	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.234	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.234	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.234	--	1
Perfluorooctanesulfonic Acid (PFOS)	3.30	F	ng/g	0.234	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/g	0.234	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.467	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/g	0.467	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.467	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/g	0.467	--	1
Perfluorotridecanoic Acid (PFTrDA)	0.472		ng/g	0.467	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/g	0.467	--	1

Serial_No:06172112:54

Project Name: 2021 PISCATAWAY PFAS SAMPLING **Lab Number:** L2128737

Project Number: Not Specified **Report Date:** 06/17/21

SAMPLE RESULTS

Lab ID: L2128737-12 Date Collected: 05/26/21 00:00

Client ID: S7-T2 Date Received: 05/28/21

Sample Location: Not Specified Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	83		61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	91		58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	88		74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	66		14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	85		66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	71		71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	78		78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	80		75-130
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	96		72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	84		79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	84		75-130
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	69		31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	95		61-155
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	72		34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	91		54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	80		24-159

Serial_No:06172112:54

Project Name: 2021 PISCATAWAY PFAS SAMPLING **Lab Number:** L2128737

Project Number: Not Specified **Report Date:** 06/17/21

SAMPLE RESULTS

Lab ID: L2128737-13
Client ID: S7-FB1
Sample Location: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 10:31
Analyst: MP

Date Collected: 05/26/21 00:00
Date Received: 05/28/21
Field Prep: Not Specified

Extraction Method: ALPHA 23528
Extraction Date: 06/02/21 17:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.84	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.84	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.84	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.84	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.84	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.84	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.84	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.84	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.84	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.84	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.84	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.84	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.84	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.84	--	1

Serial_No:06172112:54

Project Name: 2021 PISCATAWAY PFAS SAMPLING **Lab Number:** L2128737

Project Number: Not Specified **Report Date:** 06/17/21

SAMPLE RESULTS

Lab ID: L2128737-13 Date Collected: 05/26/21 00:00

Client ID: S7-FB1 Date Received: 05/28/21

Sample Location: Not Specified Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	94		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	95		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	88		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	84		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	92		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	84		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	92		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	93		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	102		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	111		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	89		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	104		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	100		22-136

Serial_No:06172112:54

Project Name: 2021 PISCATAWAY PFAS SAMPLING **Lab Number:** L2128737

Project Number: Not Specified **Report Date:** 06/17/21

SAMPLE RESULTS

Lab ID: L2128737-14
Client ID: TB-4
Sample Location: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 10:47
Analyst: MP

Date Collected: 05/26/21 00:00
Date Received: 05/28/21
Field Prep: Not Specified

Extraction Method: ALPHA 23528
Extraction Date: 06/02/21 17:05

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.82	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.82	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.82	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.82	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.82	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.82	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.82	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.82	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.82	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.82	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.82	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.82	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.82	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.82	--	1

Serial_No:06172112:54

Project Name: 2021 PISCATAWAY PFAS SAMPLING **Lab Number:** L2128737

Project Number: Not Specified **Report Date:** 06/17/21

SAMPLE RESULTS

Lab ID: L2128737-14 Date Collected: 05/26/21 00:00

Client ID: TB-4 Date Received: 05/28/21

Sample Location: Not Specified Field Prep: Not Specified

Sample Depth:

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

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	95		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	98		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	89		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	83		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	93		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	84		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	89		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	93		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	85		62-124
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	97		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	98		55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	79		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	96		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	95		22-136

Serial_No:06172112:54

Project Name: 2021 PISCATAWAY PFAS SAMPLING **Lab Number:** L2128737

Project Number: Not Specified **Report Date:** 06/17/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 09:57
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 06/02/21 17:05

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 13-14 Batch: WG1506705-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	--
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	--
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	--
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	--
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	--

Serial_No:06172112:54

Project Name: 2021 PISCATAWAY PFAS SAMPLING **Lab Number:** L2128737

Project Number: Not Specified **Report Date:** 06/17/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/05/21 09:57
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 06/02/21 17:05

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 13-14 Batch: WG1506705-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	90		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	103		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	95		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	96		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	89		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	91		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	80		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	93		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	84		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	90		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	82		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	89		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	98		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	98		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	46		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	82		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	94		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	100		22-136

Serial_No:06172112:54

Project Name: 2021 PISCATAWAY PFAS SAMPLING **Lab Number:** L2128737

Project Number: Not Specified **Report Date:** 06/17/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/16/21 20:56
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 06/16/21 07:46

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 06,12 Batch: WG1512639-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.250	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.500	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.250	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.250	--
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.250	--
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.250	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/g	0.250	--
Perfluorodecanoic Acid (PFDA)	ND		ng/g	0.250	--
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.500	--
Perfluoroundecanoic Acid (PFUnA)	ND		ng/g	0.500	--
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.500	--
Perfluorododecanoic Acid (PFDoA)	ND		ng/g	0.500	--
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/g	0.500	--
Perfluorotetradecanoic Acid (PFTA)	ND		ng/g	0.500	--

Serial_No:06172112:54

Project Name: 2021 PISCATAWAY PFAS SAMPLING **Lab Number:** L2128737

Project Number: Not Specified **Report Date:** 06/17/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/16/21 20:56
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 06/16/21 07:46

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 06,12 Batch: WG1512639-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	105		61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	125		58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	114		74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**204**	Q	14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	105		66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	92		71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	104		78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	104		75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**163**	Q	20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	132		72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	114		79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	105		75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**288**	Q	19-175
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	**138**	Q	31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	127		61-155
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	40		10-117
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	119		34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	95		54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	111		24-159

Serial_No:06172112:54

Lab Control Sample Analysis
Batch Quality Control

Project Name: 2021 PISCATAWAY PFAS SAMPLING
Project Number: Not Specified
Lab Number: L2128737
Report Date: 06/17/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 13-14 Batch: WG1506705-2								
Perfluorobutanesulfonic Acid (PFBS)	107		-		65-157	-		30
Perfluorohexanoic Acid (PFHxA)	106		-		69-168	-		30
Perfluoroheptanoic Acid (PFHpA)	106		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	109		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	112		-		63-159	-		30
Perfluorononanoic Acid (PFNA)	111		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	106		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	105		-		63-171	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	98		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	118		-		60-153	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	105		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	107		-		67-153	-		30
Perfluorotridecanoic Acid (PFTrDA)	122		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	125		-		59-182	-		30

Serial_No:06172112:54

Lab Control Sample Analysis
Batch Quality Control

Project Name: 2021 PISCATAWAY PFAS SAMPLING
Project Number: Not Specified
Lab Number: L2128737
Report Date: 06/17/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 13-14 Batch: WG1506705-2								

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	93				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	109				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	101				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	90				57-129
Perfluoro[1,2,3,4 13C4]Heptanoic Acid (M4PFHpA)	84				60 129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	93				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	85				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	103				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	86				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	86				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	98				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	99				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	99				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	41				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	86				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	105				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	93				22-136

Serial_No:06172112:54

Lab Control Sample Analysis
Batch Quality Control

Project Name: 2021 PISCATAWAY PFAS SAMPLING
Project Number: Not Specified
Lab Number: L2128737
Report Date: 06/17/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 06,12 Batch: WG1512639-2								
Perfluorobutanesulfonic Acid (PFBS)	105		-		72-128	-		30
Perfluorohexanoic Acid (PFHxA)	99		-		70-132	-		30
Perfluoroheptanoic Acid (PFHpA)	102		-		71-131	-		30
Perfluorohexanesulfonic Acid (PFHxS)	101		-		67-130	-		30
Perfluorooctanoic Acid (PFOA)	103		-		69-133	-		30
Perfluorononanoic Acid (PFNA)	91		-		72-129	-		30
Perfluorooctanesulfonic Acid (PFOS)	102		-		68-136	-		30
Perfluorodecanoic Acid (PFDA)	101		-		69-133	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	86		-		63-144	-		30
Perfluoroundecanoic Acid (PFUnA)	108		-		64-136	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	89		-		61-139	-		30
Perfluorododecanoic Acid (PFDoA)	102		-		69-135	-		30
Perfluorotridecanoic Acid (PFTrDA)	139		-		66-139	-		30
Perfluorotetradecanoic Acid (PFTA)	110		-		69-133	-		30

Serial_No:06172112:54

Lab Control Sample Analysis
Batch Quality Control

Project Name: 2021 PISCATAWAY PFAS SAMPLING
Project Number: Not Specified
Lab Number: L2128737
Report Date: 06/17/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 06,12 Batch: WG1512639-2								

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	104				61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	126				58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	116				74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**221**	Q			14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	102				66-128
Perfluoro[1,2,3,4 13C4]Heptanoic Acid (M4PFHpA)	91				71 129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	105				78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	103				75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**179**	Q			20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	129				72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	112				79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	98				75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**297**	Q			19-175
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	**155**	Q			31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	123				61-155
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	37				10-117
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	115				34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	101				54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	123				24-159

Serial_No:06172112:54

Matrix Spike Analysis
Batch Quality Control

Project Name: 2021 PISCATAWAY PFAS SAMPLING
Project Number: Not Specified
Lab Number: L2128737
Report Date: 06/17/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Sample	Associated sample(s): 13-14		QC Batch ID: WG1506705-3				QC Sample: L2129127-01		Client ID: MS			
Perfluorobutanoic Acid (PFBA)	ND	41.8	45.8	110		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	ND	41.8	43.2	103		-	-		63-161	-		30
Perfluorohexanoic Acid (PFHxA)	ND	41.8	44.9	106		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	39.3	39.7	101		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	ND	41.8	45.1	107		-	-		58-159	-		30
Perfluorooctanoic Acid (PFOA)	468	41.8	508	96		-	-		63-159	-		30
Perfluorononanoic Acid (PFNA)	ND	41.8	46.3	111		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	ND	38.8	41.2	106		-	-		52-151	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	101				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	97				60-129
Perfluoro[13C4]Butanoic Acid (MPFBA)	90				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	106				62-163
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	91				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	85				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	102				59-139

Serial_No:06172112:54

Matrix Spike Analysis
Batch Quality Control

Project Name: 2021 PISCATAWAY PFAS SAMPLING
Project Number: Not Specified
Lab Number: L2128737
Report Date: 06/17/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 06,12 QC Batch ID: WG1512639-3 QC Sample: L2128737-06 Client ID: S7-T1												
Perfluorobutanesulfonic Acid (PFBS)	ND	4.25	4.56	107		-	-		72-128	-		30
Perfluorohexanoic Acid (PFHxA)	ND	4.78	4.70	98		-	-		70-132	-		30
Perfluoroheptanoic Acid (PFHpA)	ND	4.78	4.89	102		-	-		71-131	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	4.37	4.42	101		-	-		67-130	-		30
Perfluorooctanoic Acid (PFOA)	ND	4.78	4.89	102		-	-		69-133	-		30
Perfluorononanoic Acid (PFNA)	ND	4.78	4.64	93		-	-		72-129	-		30
Perfluorooctanesulfonic Acid (PFOS)	5.20	4.44	9.54	98		-	-		68-136	-		30
Perfluorodecanoic Acid (PFDA)	0.504	4.78	5.49	104		-	-		69-133	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	4.78	4.03	80		-	-		63-144	-		30
Perfluoroundecanoic Acid (PFUnA)	1.10	4.78	6.16	106		-	-		64-136	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	4.78	4.19	83		-	-		61-139	-		30
Perfluorododecanoic Acid (PFDoA)	0.706	4.78	5.42	99		-	-		69-135	-		30
Perfluorotridecanoic Acid (PFTrDA)	1.43F	4.78	8.38	**145**	Q	-	-		66-139	-		30
Perfluorotetradecanoic Acid (PFTA)	0.653	4.78	6.46	121		-	-		69-133	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	77				14-167
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	87				34-137
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	81				31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	99				61-155
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	82				75-130

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Matrix Spike Analysis
Batch Quality Control

Project Name: 2021 PISCATAWAY PFAS SAMPLING
Project Number: Not Specified
Lab Number: L2128737
Report Date: 06/17/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 06,12 QC Batch ID: WG1512639-3 QC Sample: L2128737-06 Client ID: S7-T1												

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	82				66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	71				71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	81				78-139
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	85				54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	84				24-159
Perfluoro[13C4]Butanoic Acid (MPFBA)	83				61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	91				58-150
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	90				79-136
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81				75-130
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	100				72-140
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	89				74-139

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Lab Duplicate Analysis
Batch Quality Control

Project Name: 2021 PISCATAWAY PFAS SAMPLING
Project Number: Not Specified

Lab Number: L2128737
Report Date: 06/17/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 13-14 QC Batch ID: WG1506705-4 QC Sample: L2129127-02 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	ND	ND	ng/l	NC		30
Perfluoropentanoic Acid (PFPeA)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	ND	ND	ng/l	NC		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	442	413	ng/l	7		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	92		90		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	110		108		62-163
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	103		103		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	96		95		60-129
Perfluoro[13C8]Octanoic Acid (M8PFOA)	84		83		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	105		100		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	88		85		69-131

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Lab Duplicate Analysis
Batch Quality Control

Project Name: 2021 PISCATAWAY PFAS SAMPLING
Project Number: Not Specified
Lab Number: L2128737
Report Date: 06/17/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 06,12 QC Batch ID: WG1512639-4 QC Sample: L2128737-12 Client ID: S7-T2						
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	ng/g	NC		30
Perfluorohexanoic Acid (PFHxA)	ND	ND	ng/g	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	ND	ng/g	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/g	NC		30
Perfluorooctanoic Acid (PFOA)	ND	ND	ng/g	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/g	NC		30
Perfluorooctanesulfonic Acid (PFOS)	3.30F	3.08F	ng/g	7		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/g	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/g	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/g	NC		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/g	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/g	NC		30
Perfluorotridecanoic Acid (PFTrDA)	0.472	ND	ng/g	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/g	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	83		80		61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	91		87		58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	88		85		74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	66		67		14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	85		82		66-128

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Lab Duplicate Analysis
Batch Quality Control

Project Name: 2021 PISCATAWAY PFAS SAMPLING
Project Number: Not Specified

Lab Number: L2128737
Report Date: 06/17/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 06,12 QC Batch ID: WG1512639-4 QC Sample: L2128737-12 Client ID: S7-T2

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	71		69	Q	71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	78		78		78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	80		77		75-130
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	96		91		72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	84		83		79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	84		77		75-130
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	69		68		31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	95		91		61-155
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	72		62		34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	91		86		54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	80		82		24-159

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Project Name: 2021 PISCATAWAY PFAS SAMPLING
Project Number: Not Specified

Lab Number: L2128737
Report Date: 06/17/21

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2128737-01A	Bag	A	NA		3.0	Y	Absent		A2-TISSUE_PREP()
L2128737-02A	Bag	A	NA		3.0	Y	Absent		A2-TISSUE_PREP()
L2128737-03A	Bag	A	NA		3.0	Y	Absent		A2-TISSUE_PREP()
L2128737-04A	Bag	A	NA		3.0	Y	Absent		A2-TISSUE_PREP()
L2128737-05A	Bag	A	NA		3.0	Y	Absent		A2-TISSUE_PREP()
L2128737-06A	Plastic 8oz unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(28)
L2128737-06X	Plastic 8oz unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(28)
L2128737-07A	Bag	A	NA		3.0	Y	Absent		A2-TISSUE_PREP()
L2128737-08A	Bag	A	NA		3.0	Y	Absent		A2-TISSUE_PREP()
L2128737-09A	Bag	A	NA		3.0	Y	Absent		A2-TISSUE_PREP()
L2128737-10A	Bag	A	NA		3.0	Y	Absent		A2-TISSUE_PREP()
L2128737-11A	Bag	A	NA		3.0	Y	Absent		A2-TISSUE_PREP()
L2128737-12A	Plastic 8oz unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(28)
L2128737-12X	Plastic 8oz unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(28)
L2128737-13A	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2128737-14A	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

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PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

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GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

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Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. (Note: 'PFAS, Total (6)' is applicable to MassDEP DW compliance analysis only.). If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

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Data Qualifiers

the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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Project Number:	Not Specified	**Report Date:**	06/17/21

REFERENCES

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

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

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

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Chain-of-Custody

Project Name: 2021 Piscataway PFAS Sampling

Station No. & FTC yr./Description		Coordinates:		Collecting Agency:	Samplers Initials:
S7	2021	N	38.42201 °	MDE	CNL, CAP
Site Description Nanjemoy Creek, NON tidal		W	77.21040 °		

Composite ID Number	Sample Matrix	Individual Fish Field ID Number	Length (cm)	Weight (g/lbs.)	Requested Contaminants	Species	Collection Date
-01	T	0526_S7_01	16.5	79	PFAS - 14 Compounds	Redbreast Sunfish--Lepomis auritus	
-02	T	0526_S7_02	14.0	54			
S7-T1 -03	T	0526_S7_03	14.5	53			
-04	T	0526_S7_04	15.0	58			
-05	T	0526_S7_05	14.5	57			
Summary Information	5		14.9	60.2	Lepomis auritus		5/26/2021
-07	T	0526_S7_06	24.0	209	PFAS - 14 Compounds	Yellow Bullhead Catfish--Ameiurus natalis	
-08	T	0526_S7_07	22.0	137			
S7-T2 -09	T	0526_S7_08	20.0	135			
-10	T	0526_S7_09	19.5	121			
-11	T	0526_S7_10	20.0	109			
Summary Information	5		21.1	142.2	Ameiurus natalis		5/26/2021
Surface Water Samples							
	RS				PFAS - 14 Compounds		
	RS				PFAS - 14 Compounds		
Blank ID							
S7-FB1 -12	RS	Site 7 Field Blank (S7-FB1)			PFAS - 14 Compounds		5/26/2021
TB-4 -14	RS	Trip Blank 4			PFAS - 14 Compounds		5/26/2021

LABORATORY INFORMATION

Client Information:	MDE	1800 Washington Blvd.	Baltimore, MD 21230	410-537-3614	Amy.Laliberte@maryland.gov
Project Information:	2021 Fish Tissue PFAS				
Report Information:	Email: Amy.Laliberte@maryland.gov				
Alpha Job #			**Billing Info:**	Same as Client Info.	

Analytical Method: LCMSMS - Isotope Dilution

Delivery Shipment Record:		Deliver/Ship to: (Name, address and phone)		Date/Time Shipped from Collecting Agency:	
Delivery Method:		Alpha Analytical		5-28-2021 1000	
☑ Hand Carried					
Relinquished by: (signature)	Date/ Time 5-28 1001	Received by: (signature)	Relinquished by: (signature)	Date/Time	Received by: (signature)
Relinquished by: (signature)	Date/ Time	Received by Central Processing Laboratory by: (signature)	Date/Time	Remarks:	

Laboratory Custody:

Released Name/Date	Received Name/Date	Purpose	To Location
	5/28/21	Alpha	
	5/28/21	1800	
	5/28/21 0130	MDE	5/28/21 0200
MDE 5/29/21 0250			5/29/21 0250

APPENDIX 3: TARGET ANALYTE LIST, ANALYTICAL METHODOLOGY, AND SUPPORTING DOCUMENTATION

APPENDIX 3: Target Analyte List, Analytical Methodology, and Supporting Documentation

Per- and Polyfluoroalkyl Substances (PFAS) Substance Surface Water and Fish Tissue Target Analyte List (TAL) and Methodology

The TAL of PFAS compounds utilized in this study will comprise 1 suite of 14 PFAS compounds (see attached tables identifying the PFAS TALs and approximate method detection limits for water and tissue). Additionally, a brief narrative of the sample preparation and analytical methodology is presented in the supporting documents.

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PFAAs via LCMSMS-Isotope Dilution (WATER)

Holding Time: 14 days
Container/Sample Preservation: 1 - 2 Plastic Trizma/1 Plastic/1 H20+Trizma

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	2	0.284	ng/l	70-130	30	70-130	30	30			
Perfluorohexanoic Acid (PFHxA)	307-24-4	2	0.2632	ng/l	70-130	30	70-130	30	30			
Perfluoroheptanoic Acid (PFHpA)	375-85-9	2	0.26	ng/l	70-130	30	70-130	30	30			
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	2	0.48	ng/l	70-130	30	70-130	30	30			
Perfluorooctanoic Acid (PFOA)	335-67-1	2	0.624	ng/l	70-130	30	70-130	30	30			
Perfluorononanoic Acid (PFNA)	375-95-1	2	0.476	ng/l	70-130	30	70-130	30	30			
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	2	0.492	ng/l	70-130	30	70-130	30	30			
Perfluorodecanoic Acid (PFDA)	335-76-2	2	0.644	ng/l	70-130	30	70-130	30	30			
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOS/	2355-31-9	2	0.936	ng/l	70-130	30	70-130	30	30			
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	2	0.816	ng/l	70-130	30	70-130	30	30			
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	2	0.952	ng/l	70-130	30	70-130	30	30			
Perfluorododecanoic Acid (PFDoA)	307-55-1	2	0.648	ng/l	70-130	30	70-130	30	30			
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	2	0.508	ng/l	70-130	30	70-130	30	30			
Perfluorotetradecanoic Acid (PFTA)	376-06-7	2	0.432	ng/l	70-130	30	70-130	30	30			
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	*NONE*									*70-130*		
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	*NONE*									*70-130*		
N-Deuteroethylperfluoro-1-octanesulfonamidoacetic Acid (	*NONE*									*70-130*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, In

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PFAAs via LCMSMS-Isotope Dilution (WATER)

Holding Time: 14 days
Container/Sample Preservation: 1 - 2 Plastic/1 Plastic/1 H20 Plastic

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluorobutanoic Acid (PFBA)	375-22-4	2	0.408	ng/l	67-148	30	67-148	30	30			
Perfluoropentanoic Acid (PFPeA)	2706-90-3	2	0.396	ng/l	63-161	30	63-161	30	30			
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	2	0.238	ng/l	65-157	30	65-157	30	30			
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	757124-72-4	2	0.452	ng/l	37-219	30	37-219	30	30			
Perfluorohexanoic Acid (PFHxA)	307-24-4	2	0.328	ng/l	69-168	30	69-168	30	30			
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	2	0.2452	ng/l	52-156	30	52-156	30	30			
Perfluoroheptanoic Acid (PFHpA)	375-85-9	2	0.2252	ng/l	58-159	30	58-159	30	30			
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	2	0.376	ng/l	69-177	30	69-177	30	30			
Perfluorooctanoic Acid (PFOA)	335-67-1	2	0.236	ng/l	63-159	30	63-159	30	30			
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	27619-97-2	2	1.332	ng/l	49-187	30	49-187	30	30			
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	2	0.688	ng/l	61-179	30	61-179	30	30			
Perfluorononanoic Acid (PFNA)	375-95-1	2	0.312	ng/l	68-171	30	68-171	30	30			
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	2	0.504	ng/l	52-151	30	52-151	30	30			
Perfluorodecanoic Acid (PFDA)	335-76-2	2	0.304	ng/l	63-171	30	63-171	30	30			
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	39108-34-4	2	1.212	ng/l	56-173	30	56-173	30	30			
Perfluorononanesulfonic Acid (PFNS)	68259-12-1	2	1.12	ng/l	48-150	30	48-150	30	30			
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSA	2355-31-9	2	0.648	ng/l	60-166	30	60-166	30	30			
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	2	0.26	ng/l	60-153	30	60-153	30	30			
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	2	0.98	ng/l	38-156	30	38-156	30	30			
Perfluorooctanesulfonamide (FOSA)	754-91-6	2	0.58	ng/l	46-170	30	46-170	30	30			
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA	2991-50-6	2	0.804	ng/l	45-170	30	45-170	30	30			
Perfluorododecanoic Acid (PFDoA)	307-55-1	2	0.372	ng/l	67-153	30	67-153	30	30			
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	2	0.3272	ng/l	48-158	30	48-158	30	30			
Perfluorotetradecanoic Acid (PFTA)	376-06-7	2	0.248	ng/l	59-182	30	59-182	30	30			
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-P	13252-13-6	50	22.7	ng/l	50-150	30	50-150	30	30			
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	919005-14-4	2	0.336	ng/l	50-150	30	50-150	30	30			
Perfluorohexadecanoic Acid (PFHxDA)	67905-19-5	4	1.24	ng/l	50-150	30	50-150	30	30			
Perfluorooctadecanoic Acid (PFODA)	16517-11-6	4	1.148	ng/l	50-150	30	50-150	30	30			
Perfluorododecane Sulfonic Acid (PFDoDS)	79780-39-5	2	0.616	ng/l	50-150	30	50-150	30	30			
1H,1H,2H,2H-Perfluorododecanesulfonic Acid (10:2FTS)	120226-60-0	5	2.02	ng/l	50-150	30	50-150	30	30			
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF	756426-58-1	2	0.2768	ng/l	50-150	30	50-150	30	30			
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11C	763051-92-9	2	0.2932	ng/l	50-150	30	50-150	30	30			
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	31506-32-8	20	7.36	ng/l	50-150	30	50-150	30	30			
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	4151-50-2	20	6.64	ng/l	50-150	30	50-150	30	30			
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	24448-09-7	50	22.2	ng/l	50-150	30	50-150	30	30			
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	1691-99-2	50	22.52	ng/l	50-150	30	50-150	30	30			
PFOA/PFOS, Total		2	0.236	ng/l				30	30			
PFAS, Total (5)		2	0.2252	ng/l				30	30			
Perfluoro[13C4]Butanoic Acid (MPFBA)	*NONE*									*2-156*		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	*NONE*									*16-173*		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	*NONE*									*31-159*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2	*NONE*									*1-313*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor (Soil/Solids only)
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PFAAs via LCMSMS-Isotope Dilution (WATER)

Holding Time: 14 days
Container/Sample Preservation: 1 - 2 Plastic/1 Plastic/1 H20 Plastic

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	NONE									21-145		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	NONE									30-139		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	NONE									47-153		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	NONE									36-149		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2	NONE									1-244		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	NONE									34-146		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	NONE									42-146		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	NONE									38-144		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2	NONE									7-170		
N-Deuteromethylperfluoro-1-octanesulfonamidoacetic Acic	NONE									1-181		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA	NONE									40-144		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	NONE									1-87		
N-Deuteroethylperfluoro-1-octanesulfonamidoacetic Acid (	NONE									23-146		
Perfluoro[1,2-13C2]Dodecanoic Acid (M2PFDOA)	NONE									24-161		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	NONE									33-143		
2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-Heptafluoropropoxy)-1	NONE									50-150		
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	NONE									50-150		
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (d3-NMeFOSA	NONE									50-150		
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (d5-NEtFOSA)	NONE									50-150		
2-(N-Methyl-d3-Perfluoro-1-Octanesulfonamido)ethan-d4-(	1265205-95-5									50-150		
2-(N-Ethyl-d5-Perfluoro-1-Octanesulfonamido)ethan-d4-ol	NONE									50-150		

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PFAAs via LCMSMS-Isotope Dilution (TISSUE)

Holding Time: 28 days
Container/Sample Preservation: 1 - Plastic 8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	1	0.039	ng/g	72-128	30	72-128	30	30			
Perfluorohexanoic Acid (PFHxA)	307-24-4	1	0.0525	ng/g	70-132	30	70-132	30	30			
Perfluoroheptanoic Acid (PFHpA)	375-85-9	1	0.0451	ng/g	71-131	30	71-131	30	30			
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	1	0.0605	ng/g	67-130	30	67-130	30	30			
Perfluorooctanoic Acid (PFOA)	335-67-1	1	0.0419	ng/g	69-133	30	69-133	30	30			
Perfluorononanoic Acid (PFNA)	375-95-1	1	0.075	ng/g	72-129	30	72-129	30	30			
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	1	0.13	ng/g	68-136	30	68-136	30	30			
Perfluorodecanoic Acid (PFDA)	335-76-2	1	0.067	ng/g	69-133	30	69-133	30	30			
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSA	2355-31-9	1	0.2015	ng/g	63-144	30	63-144	30	30			
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	1	0.0468	ng/g	64-136	30	64-136	30	30			
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA	2991-50-6	1	0.0845	ng/g	61-139	30	61-139	30	30			
Perfluorododecanoic Acid (PFDoA)	307-55-1	1	0.07	ng/g	69-135	30	69-135	30	30			
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	1	0.2045	ng/g	66-139	30	66-139	30	30			
Perfluorotetradecanoic Acid (PFTA)	376-06-7	1	0.054	ng/g	69-133	30	69-133	30	30			
Perfluoro[13C4]Butanoic Acid (MPFBA)	*NONE*									*60-153*		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	*NONE*									*65-182*		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	*NONE*									*70-151*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2	*NONE*									*56-138*		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	*NONE*									*61-147*		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	*NONE*									*62-149*		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	*NONE*									*63-166*		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	*NONE*									*62-152*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-	*NONE*									*32-182*		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	*NONE*									*61-154*		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	*NONE*									*65-151*		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	*NONE*									*65-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2	*NONE*									*25-186*		
N-Deuteromethylperfluoro-1-octanesulfonamidoacetic Acid	*NONE*									*45-137*		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	*NONE*									*64-158*		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	*NONE*									*1-125*		
N-Deuteroethylperfluoro-1-octanesulfonamidoacetic Acid (	*NONE*									*42-136*		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	*NONE*									*56-148*		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	*NONE*									*26-160*		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-1	*NONE*									*50-150*		
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	*NONE*									*50-150*		
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (d3-NMeFOSA	*NONE*									*50-150*		
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (d5-NEtFOSA)	*NONE*									*50-150*		
2-(N-Methyl-d3-Perfluoro-1-Octanesulfonamido)ethan-d4-c	*1265205-95-5*									*50-150*		
2-(N-Ethyl-d5-Perfluoro-1-Octanesulfonamido)ethan-d4-ol	*NONE*									*50-150*		

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PFAAs via LCMSMS-Isotope Dilution (TISSUE)

Holding Time: 28 days
Container/Sample Preservation: 1 - Plastic 8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluorobutanoic Acid (PFBA)	375-22-4	1	0.0227	ng/g	71-135	30	71-135	30	30			
Perfluoropentanoic Acid (PFPeA)	2706-90-3	1	0.046	ng/g	69-132	30	69-132	30	30			
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	1	0.039	ng/g	72-128	30	72-128	30	30			
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	757124-72-4	1	0.0645	ng/g	62-145	30	62-145	30	30			
Perfluorohexanoic Acid (PFHxA)	307-24-4	1	0.0525	ng/g	70-132	30	70-132	30	30			
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	1	0.0835	ng/g	73-123	30	73-123	30	30			
Perfluoroheptanoic Acid (PFHpA)	375-85-9	1	0.0451	ng/g	71-131	30	71-131	30	30			
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	1	0.0605	ng/g	67-130	30	67-130	30	30			
Perfluorooctanoic Acid (PFOA)	335-67-1	1	0.0419	ng/g	69-133	30	69-133	30	30			
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	27619-97-2	1	0.1795	ng/g	64-140	30	64-140	30	30			
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	1	0.1365	ng/g	70-132	30	70-132	30	30			
Perfluorononanoic Acid (PFNA)	375-95-1	1	0.075	ng/g	72-129	30	72-129	30	30			
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	1	0.13	ng/g	68-136	30	68-136	30	30			
Perfluorodecanoic Acid (PFDA)	335-76-2	1	0.067	ng/g	69-133	30	69-133	30	30			
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	39108-34-4	1	0.287	ng/g	65-137	30	65-137	30	30			
Perfluorononanesulfonic Acid (PFNS)	68259-12-1	1	0.299	ng/g	69-125	30	69-125	30	30			
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSA	2355-31-9	1	0.2015	ng/g	63-144	30	63-144	30	30			
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	1	0.0468	ng/g	64-136	30	64-136	30	30			
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	1	0.153	ng/g	59-134	30	59-134	30	30			
Perfluorooctanesulfonamide (FOSA)	754-91-6	1	0.098	ng/g	67-137	30	67-137	30	30			
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA	2991-50-6	1	0.0845	ng/g	61-139	30	61-139	30	30			
Perfluorododecanoic Acid (PFDoA)	307-55-1	1	0.07	ng/g	69-135	30	69-135	30	30			
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	1	0.2045	ng/g	66-139	30	66-139	30	30			
Perfluorotetradecanoic Acid (PFTA)	376-06-7	1	0.054	ng/g	69-133	30	69-133	30	30			
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-P	13252-13-6	10	3.81	ng/g	50-150	30	50-150	30	30			
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	919005-14-4	1	0.0413	ng/g	50-150	30	50-150	30	30			
Perfluorohexadecanoic Acid (PFHxDA)	67905-19-5	2	0.12	ng/g	50-150	30	50-150	30	30			
Perfluorooctadecanoic Acid (PFODA)	16517-11-6	2	0.171	ng/g	50-150	30	50-150	30	30			
Perfluorododecane Sulfonic Acid (PFDoDS)	79780-39-5	1	0.086	ng/g	50-150	30	50-150	30	30			
1H,1H,2H,2H-Perfluorododecanesulfonic Acid (10:2FTS)	120226-60-0	1	0.275	ng/g	50-150	30	50-150	30	30			
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF	756426-58-1	1	0.0374	ng/g	50-150	30	50-150	30	30			
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11C	763051-92-9	1	0.0388	ng/g	50-150	30	50-150	30	30			
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	31506-32-8	1	0.379	ng/g	50-150	30	50-150	30	30			
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	4151-50-2	1	0.407	ng/g	50-150	30	50-150	30	30			
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	24448-09-7	2	0.52	ng/g	50-150	30	50-150	30	30			
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	1691-99-2	2	0.73	ng/g	50-150	30	50-150	30	30			
PFOA/PFOS, Total		1	0.0419	ng/g				30	30			
PFAS, Total (5)		1	0.0419	ng/g				30	30			
Perfluoro[13C4]Butanoic Acid (MPFBA)	*NONE*									*60-153*		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	*NONE*									*65-182*		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	*NONE*									*70-151*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2	*NONE*									*56-138*		

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PFAAs via LCMSMS-Isotope Dilution (TISSUE)

Holding Time: 28 days
Container/Sample Preservation: 1 - Plastic 8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (MSPFHxA)	NONE									61-147		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	NONE									62-149		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	NONE									63-166		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	NONE									62-152		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2	NONE									32-182		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	NONE									61-154		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	NONE									65-151		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	NONE									65-150		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2	NONE									25-186		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid	NONE									45-137		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	NONE									64-158		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	NONE									1-125		
N-Deuteroethylperfluoro-1-octanesulfonamidoacetic Acid (	NONE									42-136		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	NONE									56-148		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	NONE									26-160		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-2	NONE									50-150		
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	NONE									50-150		
N-Methyl-d3-Perfluoro-1-Octanesulfonamide (d3-NMeFOSA	NONE									50-150		
N-Ethyl-d5-Perfluoro-1-Octanesulfonamide (d5-NEtFOSA)	NONE									50-150		
2-(N-Methyl-d3-Perfluoro-1-Octanesulfonamido)ethan-d4-o	1265205-95-5									50-150		
2-(N-Ethyl-d5-Perfluoro-1-Octanesulfonamido)ethan-d4-ol	NONE									50-150		

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Alpha SPE-LC/MS/MS Isotope Dilution Method

EPA Methods 537.1 and 533 are limited to clean water applications primarily. For all other cases, where non-potable water, soils or tissues need to be analyzed, another analytical method will need to be utilized. This is also the case when there are additional, specific PFAS compounds that need to be included that are not on either method's target compound list. EPA did release SW-846 Method 8327 in 2019. While this method was intended for non-potable water, it does not address solid matrices. Anecdotally, this method was not well received in the environmental laboratory community. It specifies direct aqueous injection rather than solid phase extraction (SPE), and the analyte quantification procedure is based on an external rather internal calibration approach that does not incorporate isotopic dilution. The DoD considers Method 8327 a "screening method" (Alyssa G. Wingard, Senior Chemist, NAVSEA 04X6 Laboratory Quality and Accreditation Office (LQAO); July 2019, email correspondence, DENIX).

Given the lack of standardized, published analytical methods for non-drinking water sample media, and the fact that EPA 500 series methods are not allowed to be modified in this way, Alpha Analytical has developed its own procedure. This Alpha method is also a liquid chromatography tandem mass spectrometry method (LC/MS/MS) with solid phase extraction and it is most similar to Method 533 in that it utilizes the weak anion exchange (WAX) SPE cartridge and the method calibration employs the isotope dilution technique. This method incorporates the maximum number of commercially available extracted internal standards, consisting of (18) ^{13}C –enriched and (2) ^{2}H-enriched compounds. As more of these reference standards become available, they will be incorporated into our method as well. We can analyze for up to 36 PFAS compounds, or any subset, using this approach. We analyze a wide range of sample matrices in addition to aqueous samples including soils/sediments, biosolids, and tissues. Given our laboratory's extensive background supporting ecological risk assessments in general, we have considerable experience working with fish, shellfish, soils and sediments.

In practice, aqueous reporting limits are 2 ng/L and we have demonstrated reporting limits in the range of 1 ng/G for oyster samples from a past project. Some of the more difficult target analytes have poorer performance and higher reporting limits. Please see the attached compound lists and the associated standard RL/MDL information that is included with our quotation.

Summary of Method

A 250-mL water sample is fortified with extracted internal standards (EIS) and passed through a solid phase extraction (WAX) cartridge containing a mixed mode, Weak Anion Exchange, reversed phase, water-wettable polymer to extract the method analytes and isotopically-labeled compounds. The compounds are eluted from the solid phase in two fractions. An injection is made into an LC equipped with a C18 column that is interfaced to an MS/MS. The analytes are separated and identified by comparing the acquired mass spectra and retention times to reference spectra and retention times for calibration standards acquired under

identical LC/MS/MS conditions. The concentration of each analyte is determined by using the isotope dilution technique. Extracted Internal Standards (EIS) analytes are used to monitor the extraction efficiency of the method analytes.

Initial Calibration Verification (ICV)

As part of the IDC and after each ICAL, analyze a QCS sample from a source different from the source of the CAL standards. If a second vendor is not available, then a different lot of the standard should be used. The QCS should be prepared and analyzed just like a CCV. Acceptance criteria for the QCS are identical to the CCVs; the calculated amount for each analyte must be ± 30% of the expected value. If measured analyte concentrations are not of acceptable accuracy, check the entire analytical procedure to locate and correct the problem

Continuing Calibration Verification (CCV)

CCV Standards are analyzed at the beginning of each analysis batch, after every 10 Field Samples, and at the end of the analysis batch. See Section 10.7 for concentration requirements and acceptance criteria.

Initial Calibration - Demonstration and documentation of acceptable initial calibration is required before any samples are analyzed. After the initial calibration is successful, a CCV is required at the beginning and end of each period in which analyses are performed, and after every tenth Field Sample.

Establish LC operating parameters that optimize resolution and peak shape. Modifying the standard or extract composition to more aqueous content to prevent poor shape is not permitted.

Inject a mid-level CAL standard under LC/MS conditions to obtain the retention times of each method analyte.

Inject a mid-level CAL standard under optimized LC/MS/MS conditions to ensure that each method analyte is observed in its MS/MS window and that there are at least 10 scans across the peak for optimum precision.

CAL standards are prepared according to SOP. The lowest concentration CAL standard must be at or below the RL (2 ng/L), which may depend on system sensitivity.

The LC/MS/MS system is calibrated using the IS technique. Use the LC/MS/MS data system software to generate a linear regression or quadratic calibration curve for each of the analytes. This curve must always be forced through zero and may be concentration weighted, if necessary. Forcing zero allows for a better estimate of the background levels of method analytes. A minimum of 5 levels are required for a linear calibration model and a minimum of 6 levels are required for a quadratic calibration model.

CALIBRATION ACCEPTANCE CRITERIA – A linear fit is acceptable if the coefficient of determination (r2) is greater than 0.99. When quantitated using the initial calibration curve, each calibration point, except the lowest point, for each analyte should calculate to be within 70-130% of its true value. The lowest CAL point should calculate to be within 50-150% of its true value. If these criteria cannot be met, the analyst will have difficulty meeting ongoing QC criteria. It is recommended that corrective action is taken to reanalyze the CAL standards, restrict the range of calibration, or select an alternate method of calibration (forcing the curve through zero is still required).

CONTINUING CALIBRATION CHECK (CCV) – Minimum daily calibration verification is as follows. Verify the initial calibration at the beginning and end of each group of analyses, and after every tenth sample during analyses. In this context, a "sample" is considered to be a Field Sample. MBs, CCVs, LCSs, MSs, FDs FRBs and MSDs are not counted as samples. The beginning CCV of each analysis batch must be at or below the RL in order to verify instrument sensitivity prior to any analyses. If standards have been prepared such that all low CAL points are not in the same CAL solution, it may be necessary to analyze two CAL standards to meet this requirement. Alternatively, the analyte concentrations in the analyte PDS may be customized to meet these criteria. Subsequent CCVs should alternate between a medium and Low concentration CAL standard.

REMEDIAL ACTION – Failure to meet CCV QC performance criteria may require remedial action. Major maintenance, such as cleaning the electrospray probe, atmospheric pressure ionization source, cleaning the mass analyzer, replacing the LC column, etc., requires recalibration (Sect 10.6) and verification of sensitivity by analyzing a CCV at or below the RL (Sect 10.7).

PFAS Tissue Prep Summary

Sample Prep and Extraction Protocol for Tissues, Oils and Biosolids, Methanol Extraction

Homogenize and weigh sample (measured to the nearest hundredth of a gram) into a 50 ml polypropylene centrifuge tube. For laboratory control blanks and spikes, clean sand is used. Add EIS PDS to each sample.

If the sample is an LCS, LCSD, MS, or MSD, add the necessary amount of analyte PDS . Cap and invert each sample to mix. Samples vortexed, sonicated and centrifuged.

Extract Clean-up: Tissues, Oils and Biosolids

CARTRIDGE CLEAN-UP AND CONDITIONING – WAX cartridge and GCB cartridges. Sequential rinses. Attach the sample transfer tubes, turn on the vacuum.

SAMPLE elution AND CARTRIDGE RINSE

Extract Concentration

Concentrate the extract to dryness under a gentle stream of nitrogen in a heated water bath. Vortex

APPENDIX 4: RISK CALCULATION SPREADSHEETS

Surface Water Recreator - 52 days per year

Site-specific
Recreator Surface Water Inputs 1

Variable	Recreator Surface Water Default Value	Form-input Value
$BW_{0<2}$ (body weight) kg	15	15
$BW_{2<6}$ (body weight) kg	15	15
$BW_{6<16}$ (body weight) kg	80	80
$BW_{16<30}$ (body weight) kg	80	80
BW_{a} (body weight - adult) kg	80	80
BW_{adult} (body weight - adult) kg	80	80
DFW_{adult} (age-adjusted dermal factor) cm ^{2}-event/kg	.	387868
$DFWM_{adult}$ (mutagenic age-adjusted dermal factor) cm ^{2}-event/kg	.	1217042.66
ED_{rec} (exposure duration - recreator) years	26	26
$ED_{0<2}$ (exposure duration) years	2	2
$ED_{2<6}$ (exposure duration) years	4	4
$ED_{6<16}$ (exposure duration) years	10	10
$ED_{16<30}$ (exposure duration) years	10	10
ED_{adult} (exposure duration - adult) years	20	20
EF_{rec} (exposure frequency) days/year	.	52
$EF_{2<6}$ (exposure frequency) days/year	.	52
$EF_{6<16}$ (exposure frequency) days/year	.	52
$EF_{16<30}$ (exposure frequency) days/year	.	52
EF_{adult} (adult exposure frequency) days/year	.	52
$ET_{0<2}$ (exposure time) hours/event	.	2
$ET_{2<6}$ (exposure time) hours/event	.	2
$ET_{6<16}$ (exposure time) hours/event	.	2
$ET_{16<30}$ (exposure time) hours/event	.	2
ET_{adult} (adult exposure time) hours/event	.	2
$EV_{0<2}$ (events) events/day	.	1
$EV_{2<6}$ (events) events/day	.	1
$EV_{6<16}$ (events) events/day	.	1
$EV_{16<30}$ (events) events/day	.	1
EV_{adult} (adult) events/day	.	1
THQ (target hazard quotient) unitless	0.1	1

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Site-specific
Recreator Surface Water Inputs

2

Variable	Recreator Surface Water Default Value	Form-input Value
IFW (age-adjusted water intake rate) L/kg	.	7.852
IFWM (mutagenic age-adjusted water intake rate) L/kg	.	32.741
IRW (water intake rate) L/hour	0.12	0.12
IRW (water intake rate) L/hour	0.12	0.12
IRW (water intake rate) L/hour	0.124	0.124
IRW (water intake rate) L/hour	0.0985	0.0985
IRW (water intake rate - adult) L/day	0.11	0.11
IRW (water intake rate - adult) L/hr	0.11	0.11
LT (lifetime - recreator) years	70	70
SA (skin surface area) cm ^{2}	6365	6365
SA (skin surface area) cm ^{2}	6365	6365
SA (skin surface area) cm ^{2}	19652	19652
SA (skin surface area) cm ^{2}	19652	19652
SA (skin surface area - adult) cm ^{2}	19652	19652
SA (skin surface area - adult) cm ^{2}	19652	19652
Apparent thickness of stratum corneum (cm)	0.001	0.001
TR (target risk) unitless	1.0E-06	1.0E-05

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Site-specific

3

Recreator Regional Screening Levels (RSL) for Surface Water

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	Chemical Type	SF$_o$ (mg/kg-day)$^{-1}$	SF$_o$ Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	RAGSe GIABS (unitless)	K$_p$ (cm/hr)	MW	FA (unitless)
Perfluorobutane sulfonic acid (PFBS)	375-73-5	No	No	Organics	Organics	-		3.00E-04	P	-		1	0.0000193	300.1	1
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	No	No	Organics	Organics	-		2.00E-05	D	-		1	4.6851E-7	500.1	1
Perfluorooctanoic acid (PFOA)	335-67-1	No	No	Organics	Organics	7.00E-02	D	2.00E-05	D	-		1	-	414.4	0

In EPD?	DA$_{event}$ (c)	DA$_{event}$ (nc child)	DA$_{event}$ (nc adult)	Ingestion SL TR=1E-05 (ug/L)	Dermal SL TR=1E-05 (ug/L)	Carcinogenic SL TR=1E-05 (ug/L)	Ingestion SL (Child) THQ=1 (ug/L)	Dermal SL (Child) THQ=1 (ug/L)	Noncarcinogenic SL (Child) THQ=1 (ug/L)	Ingestion SL (Adult) THQ=1 (ug/L)	Dermal SL (Adult) THQ=1 (ug/L)	Noncarcinogenic SL (Adult) THQ=1 (ug/L)	Screening Level (ug/L)
Yes	-	0.0049625	0.0085722	-	-	-	1.32E+02	2.93E+04	1.31E+02	7.66E+02	5.07E+04	7.54E+02	1.31E+02 nc
No	-	-	-	-	-	-	8.77E+00	-	8.77E+00	5.10E+01	-	5.10E+01	8.77E+00 nc
No	-	-	-	4.65E+02	-	4.65E+02	8.77E+00	-	8.77E+00	5.10E+01	-	5.10E+01	8.77E+00 nc

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Surface Water Recreator - 26 days per year

Site-specific
Recreator Surface Water Inputs 1

Variable	Recreator Surface Water Default Value	Form-input Value
$BW_{a,y}$ (body weight) kg	15	15
$BW_{y,6}$ (body weight) kg	15	15
$BW_{6,16}$ (body weight) kg	80	80
$BW_{16,30}$ (body weight) kg	80	80
BW_{a} (body weight - adult) kg	80	80
BW_{a-c} (body weight - adult) kg	80	80
DFW_{a-30} (age-adjusted dermal factor) cm^2-event/kg	.	193934
$DFWM_{a-30}$ (mutagenic age-adjusted dermal factor) cm^2-event/kg	.	608521.333
ED_{a-r} (exposure duration - recreator) years	26	26
$ED_{a,y}$ (exposure duration) years	2	2
$ED_{y,6}$ (exposure duration) years	4	4
$ED_{6,16}$ (exposure duration) years	10	10
$ED_{16,30}$ (exposure duration) years	10	10
ED_{a-a} (exposure duration - adult) years	20	20
EF_{a-r} (exposure frequency) days/year	.	26
$EF_{y,6}$ (exposure frequency) days/year	.	26
$EF_{6,16}$ (exposure frequency) days/year	.	26
$EF_{16,30}$ (exposure frequency) days/year	.	26
EF_{a-a} (adult exposure frequency) days/year	.	26
$ET_{a,y}$ (exposure time) hours/event	.	2
$ET_{y,6}$ (exposure time) hours/event	.	2
$ET_{6,16}$ (exposure time) hours/event	.	2
$ET_{16,30}$ (exposure time) hours/event	.	2
ET_{a-a} (adult exposure time) hours/event	.	2
$EV_{a,y}$ (events) events/day	.	1
$EV_{y,6}$ (events) events/day	.	1
$EV_{6,16}$ (events) events/day	.	1
$EV_{16,30}$ (events) events/day	.	1
EV_{a-a} (adult) events/day	.	1
THQ (target hazard quotient) unitless	0.1	1

Output generated 28SEP2021:13:13:14

Site-specific
Recreator Surface Water Inputs

2

Variable	Recreator Surface Water Default Value	Form-input Value
IFW (age-adjusted water intake rate) L/kg	.	3.926
IFWM (mutagenic age-adjusted water intake rate) L/kg	.	16.37
IRW (water intake rate) L/hour	0.12	0.12
IRW (water intake rate) L/hour	0.12	0.12
IRW (water intake rate) L/hour	0.124	0.124
IRW (water intake rate) L/hour	0.0985	0.0985
IRW (water intake rate - adult) L/day	0.11	0.11
IRW (water intake rate - adult) L/hr	0.11	0.11
LT (lifetime - recreator) years	70	70
SA (skin surface area) cm ^{2}	6365	6365
SA (skin surface area) cm ^{2}	6365	6365
SA (skin surface area) cm ^{2}	19652	19652
SA (skin surface area) cm ^{2}	19652	19652
SA (skin surface area - adult) cm ^{2}	19652	19652
SA (skin surface area - adult) cm ^{2}	19652	19652
Apparent thickness of stratum corneum (cm)	0.001	0.001
TR (target risk) unitless	1.0E-06	1.0E-05

Site-specific
Recreator Regional Screening Levels (RSL) for Surface Water

3

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	Chemical Type	SF$_o$ (mg/kg-day)$^{-1}$	SF$_o$ Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	RAGSe GIABS (unitless)	K$_p$ (cm/hr)	MW	FA (unitless)
Perfluorobutane sulfonic acid (PFBS)	375-73-5	No	No	Organics	Organics	-		3.00E-04	P	-		1	0.0000193	300.1	1
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	No	No	Organics	Organics	-		2.00E-05	D	-		1	4.6851E-7	500.1	1
Perfluorooctanoic acid (PFOA)	335-67-1	No	No	Organics	Organics	7.00E-02	D	2.00E-05	D	-		1	-	414.4	0

In EPD?	DA$_{event}$ (c-ST)	DA$_{event}$ (nc child)	DA$_{event}$ (nc adult)	Ingestion SL TR=1E-05 (ug/L)	Dermal SL TR=1E-05 (ug/L)	Carcinogenic SL TR=1E-05 (ug/L)	Ingestion SL (Child) THQ=1 (ug/L)	Dermal SL (Child) THQ=1 (ug/L)	Noncarcinogenic SL (Child) THQ=1 (ug/L)	Ingestion SL (Adult) THQ=1 (ug/L)	Dermal SL (Adult) THQ=1 (ug/L)	Noncarcinogenic SL (Adult) THQ=1 (ug/L)	Screening Level (ug/L)
Yes	-	0.0099251	0.0171445	-	-	-	2.63E+02	5.87E+04	2.62E+02	1.53E+03	1.01E+05	1.51E+03	2.62E+02 nc
No	-	-	-	-	-	-	1.75E+01	-	1.75E+01	1.02E+02	-	1.02E+02	1.75E+01 nc
No	-	-	-	9.30E+02	-	9.30E+02	1.75E+01	-	1.75E+01	1.02E+02	-	1.02E+02	1.75E+01 nc

Adult MDE Fish Consumption, 96 days, 8oz Meal

Site-specific
Fish Fish Inputs

1

Variable	Fish Fish Default Value	Form-input Value
AT (averaging time)	365	365
BW_{adult} (body weight) kg	80	76
ED_{adult} (exposure duration) yr	26	26
EF_{adult} (exposure frequency) days/yr	350	365
THQ (target hazard quotient) unitless	0.1	1
$IRFI_{adult}$ (fish consumption rate - adult) mg/day		59650
LT (lifetime) yr	70	70
TR (target cancer risk) unitless	1.0E-06	1.0E-05

Site-specific
Fish Regional Screening Levels (RSL) for Fish

2

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	RfD (mg/kg-day)	RfD Ref	Ingestion SL TR=1E-05 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Screening Level (mg/kg)
Perfluorobutane sulfonic acid (PFBS)	375-73-5	No	No	Organics	-		3.00E-04	P	-	3.82E-01	3.82E-01 nc
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	No	No	Organics	-		2.00E-05	D	-	2.55E-02	2.55E-02 nc
Perfluorooctanoic acid (PFOA)	335-67-1	No	No	Organics	7.00E-02	D	2.00E-05	D	4.90E-01	2.55E-02	2.55E-02 nc

Adult MDE Fish Consumption, 48 Days, 8oz Meal

Site-specific
Fish Fish Inputs

Variable	Fish Fish Default Value	Form-input Value
AT (averaging time)	365	365
BW_{adult} (body weight) kg	80	76
ED_{adult} (exposure duration) yr	26	26
EF_{adult} (exposure frequency) days/yr	350	365
THQ (target hazard quotient) unitless	0.1	1
$IRFI_{adult}$ (fish consumption rate - adult) mg/day		29825
LT (lifetime) yr	70	70
TR (target cancer risk) unitless	1.0E-06	1.0E-05

Site-specific
Fish Regional Screening Levels (RSL) for Fish

2

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	RfD (mg/kg-day)	RfD Ref	Ingestion SL TR=1E-05 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Screening Level (mg/kg)
Perfluorobutane sulfonic acid (PFBS)	375-73-5	No	No	Organics	-		3.00E-04	P	-	7.64E-01	7.64E-01 nc
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	No	No	Organics	-		2.00E-05	D	-	5.10E-02	5.10E-02 nc
Perfluorooctanoic acid (PFOA)	335-67-1	No	No	Organics	7.00E-02	D	2.00E-05	D	9.80E-01	5.10E-02	5.10E-02 nc

Adult MDE Fish Consumption, 12 days, 8oz Meal

Site-specific 1
Fish Fish Inputs

Variable	Fish Fish Default Value	Form-input Value
AT (averaging time)	365	365
BW_{adult} (body weight) kg	80	76
ED_{adult} (exposure duration) yr	26	26
EF_{adult} (exposure frequency) days/yr	350	365
THQ (target hazard quotient) unitless	0.1	1
$IRFI_{adult}$ (fish consumption rate - adult) mg/day		7456
LT (lifetime) yr	70	70
TR (target cancer risk) unitless	1.0E-06	1.0E-05

Site-specific 2
Fish Regional Screening Levels (RSL) for Fish
Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	RfD (mg/kg-day)	RfD Ref	Ingestion SL TR=1E-05 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Screening Level (mg/kg)
Perfluorobutane sulfonic acid (PFBS)	375-73-5	No	No	Organics	-		3.00E-04	P	-	3.06E+00	3.06E+00 nc
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	No	No	Organics	-		2.00E-05	D	-	2.04E-01	2.04E-01 nc
Perfluorooctanoic acid (PFOA)	335-67-1	No	No	Organics	7.00E-02	D	2.00E-05	D	3.92E+00	2.04E-01	2.04E-01 nc

Child-bearing Women Fish Consumption, 96 days, 8oz Meal

Site-specific
Fish Fish Inputs 1

Variable	Fish Fish Default Value	Form-input Value
AT (averaging time)	365	365
BW (body weight) kg	80	67
ED (exposure duration) yr	26	26
EF (exposure frequency) days/yr	350	365
THQ (target hazard quotient) unitless	0.1	1
IRFI (fish consumption rate - adult) mg/day		59650
LT (lifetime) yr	70	70
TR (target cancer risk) unitless	1.0E-06	1.0E-05

Site-specific 2
Fish Regional Screening Levels (RSL) for Fish
Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	RfD (mg/kg-day)	RfD Ref	Ingestion SL TR=1E-05 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Screening Level (mg/kg)
Perfluorobutane sulfonic acid (PFBS)	375-73-5	No	No	Organics	-		3.00E-04	P	-	3.37E-01	3.37E-01 nc
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	No	No	Organics	-		2.00E-05	D	-	2.25E-02	2.25E-02 nc
Perfluorooctanoic acid (PFOA)	335-67-1	No	No	Organics	7.00E-02	D	2.00E-05	D	4.32E-01	2.25E-02	2.25E-02 nc

Child-bearing Women Fish Consumption, 48 days, 8oz Meal

Site-specific
Fish Fish Inputs

1

Variable	Fish Fish Default Value	Form-input Value
AT (averaging time)	365	365
$BW_{\_\_\_}$ (body weight) kg	80	67
$ED_{\_\_}$ (exposure duration) yr	26	26
$EF_{\_\_\_}$ (exposure frequency) days/yr	350	365
THQ (target hazard quotient) unitless	0.1	1
$IRFI_{\_\_\_}$ (fish consumption rate - adult) mg/day		29825
LT (lifetime) yr	70	70
TR (target cancer risk) unitless	1.0E-06	1.0E-05

Site-specific
Fish Regional Screening Levels (RSL) for Fish

2

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o $(mg/kg\text{-}day)^{-1}$	SF_o Ref	RfD (mg/kg-day)	RfD Ref	Ingestion SL TR=1E-05 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Screening Level (mg/kg)
Perfluorobutane sulfonic acid (PFBS)	375-73-5	No	No	Organics	-		3.00E-04	P	-	6.74E-01	6.74E-01 nc
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	No	No	Organics	-		2.00E-05	D	-	4.49E-02	4.49E-02 nc
Perfluorooctanoic acid (PFOA)	335-67-1	No	No	Organics	7.00E-02	D	2.00E-05	D	8.64E-01	4.49E-02	4.49E-02 nc

Child-bearing Women Fish Consumption, 12 days, 8oz Meal

Site-specific
Fish Fish Inputs

1

Variable	Fish Fish Default Value	Form-input Value
AT (averaging time)	365	365
$BW_{\_\_\_\_}$ (body weight) kg	80	67
$ED_{\_\_}$ (exposure duration) yr	26	26
$EF_{\_\_\_\_}$ (exposure frequency) days/yr	350	365
THQ (target hazard quotient) unitless	0.1	1
$IRFI_{\_\_\_\_}$ (fish consumption rate - adult) mg/day		7456
LT (lifetime) yr	70	70
TR (target cancer risk) unitless	1.0E-06	1.0E-05

Site-specific
Fish Regional Screening Levels (RSL) for Fish

2

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	RfD (mg/kg-day)	RfD Ref	Ingestion SL TR=1E-05 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Screening Level (mg/kg)
Perfluorobutane sulfonic acid (PFBS)	375-73-5	No	No	Organics	-		3.00E-04	P	-	2.70E+00	2.70E+00 nc
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	No	No	Organics	-		2.00E-05	D	-	1.80E-01	1.80E-01 nc
Perfluorooctanoic acid (PFOA)	335-67-1	No	No	Organics	7.00E-02	D	2.00E-05	D	3.46E+00	1.80E-01	1.80E-01 nc

Child Fish Consumption, 96 days, 3oz Meal

Site-specific
Fish Fish Inputs

1

Variable	Fish Fish Default Value	Form-input Value
AT (averaging time)	365	365
BW$_{ad}$ (body weight) kg	80	14.5
ED$_{ad}$ (exposure duration) yr	26	26
EF$_{ad}$ (exposure frequency) days/yr	350	365
THQ (target hazard quotient) unitless	0.1	1
IRFI$_{ad}$ (fish consumption rate - adult) mg/day		22369
LT (lifetime) yr	70	70
TR (target cancer risk) unitless	1.0E-06	1.0E-05

Site-specific
Fish Regional Screening Levels (RSL) for Fish

2

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF$_o$ (mg/kg-day)$^{-1}$	SF$_o$ Ref	RfD (mg/kg-day)	RfD Ref	Ingestion SL TR=1E-05 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Screening Level (mg/kg)
Perfluorobutane sulfonic acid (PFBS)	375-73-5	No	No	Organics	-		3.00E-04	P	-	1.94E-01	1.94E-01 nc
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	No	No	Organics	-		2.00E-05	D	-	1.30E-02	1.30E-02 nc
Perfluorooctanoic acid (PFOA)	335-67-1	No	No	Organics	7.00E-02	D	2.00E-05	D	2.49E-01	1.30E-02	1.30E-02 nc

Child Fish Consumption, 48 days, 3oz Meal

Site-specific
Fish Fish Inputs

1

Variable	Fish Fish Default Value	Form-input Value
AT (averaging time)	365	365
BW_{a-c} (body weight) kg	80	14.5
ED_{a} (exposure duration) yr	26	26
EF_{a-c} (exposure frequency) days/yr	350	365
THQ (target hazard quotient) unitless	0.1	1
$IRFI_{a-c}$ (fish consumption rate - adult) mg/day		11184
LT (lifetime) yr	70	70
TR (target cancer risk) unitless	1.0E-06	1.0E-05

Site-specific
Fish Regional Screening Levels (RSL) for Fish

2

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	RfD (mg/kg-day)	RfD Ref	Ingestion SL TR=1E-05 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Screening Level (mg/kg)
Perfluorobutane sulfonic acid (PFBS)	375-73-5	No	No	Organics	-		3.00E-04	P	-	3.89E-01	3.89E-01 nc
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	No	No	Organics	-		2.00E-05	D	-	2.59E-02	2.59E-02 nc
Perfluorooctanoic acid (PFOA)	335-67-1	No	No	Organics	7.00E-02	D	2.00E-05	D	4.99E-01	2.59E-02	2.59E-02 nc

Child Fish Consumption, 12 days, 3oz Meal

Site-specific
Fish Fish Inputs

1

Variable	Fish Fish Default Value	Form-input Value
AT (averaging time)	365	365
BW_{child} (body weight) kg	80	14.5
ED_{nc} (exposure duration) yr	26	26
EF_{child} (exposure frequency) days/yr	350	365
THQ (target hazard quotient) unitless	0.1	1
$IRFI_{child}$ (fish consumption rate - adult) mg/day		2796
LT (lifetime) yr	70	70
TR (target cancer risk) unitless	1.0E-06	1.0E-05

Site-specific
Fish Regional Screening Levels (RSL) for Fish

2

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o $(mg/kg\text{-}day)^{-1}$	SF_o Ref	RfD (mg/kg-day)	RfD Ref	Ingestion SL TR=1E-05 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Screening Level (mg/kg)
Perfluorobutane sulfonic acid (PFBS)	375-73-5	No	No	Organics	-		3.00E-04	P	-	1.56E+00	1.56E+00 nc
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	No	No	Organics	-		2.00E-05	D	-	1.04E-01	1.04E-01 nc
Perfluorooctanoic acid (PFOA)	335-67-1	No	No	Organics	7.00E-02	D	2.00E-05	D	1.99E+00	1.04E-01	1.04E-01 nc

APPENDIX 5: EXPOSURE EQUATIONS AND VARIABLES

Exposure Equations and Variables

Noncarcinogenic - Child

The recreator surface water land use equation, presented here, contains the following exposure routes:

- incidental ingestion of water

$$SL_{rec\text{-}wat\text{-}nc\text{-}ing\text{-}c}\left(\mu g/L\right)=\frac{THQ\times AT_{rec\text{-}c}\left(\frac{365\ days}{year}\times ED_{rec\text{-}c}\left(6\ years\right)\right)\times BW_{rec\text{-}c}\left(15\ kg\right)\times\left(\frac{1000\ \mu g}{mg}\right)}{EF_{rec\text{-}c}\left(\frac{days}{year}\right)\times ED_{rec\text{-}c}\left(6\ years\right)\times\frac{1}{RfD_o\left(\frac{mg}{kg\text{-}d}\right)}\times IRW_{rec\text{-}c}\left(\frac{0.12\ L}{hour}\right)\times EV_{rec\text{-}c}\left(\frac{events}{day}\right)\times ET_{event\text{-}rec\text{-}c}\left(\frac{hours}{event}\right)}$$

- dermal

FOR INORGANICS:

$$SL_{rec\text{-}wat\text{-}nc\text{-}der\text{-}c}\left(\mu g/L\right)=\frac{DA_{event}\left(\frac{ug}{cm^2\text{-}event}\right)\times\left(\frac{1000\ cm^3}{L}\right)}{K_p\left(\frac{cm}{hour}\right)\times ET_{event\text{-}rec\text{-}c}\left(\frac{hours}{event}\right)}$$

FOR ORGANICS:

$$IF\ ET_{event\text{-}rec\text{-}c}\left(\frac{hours}{event}\right)\le t^*\left(hour\right),then\ SL_{rec\text{-}wat\text{-}nc\text{-}der}\left(\mu g/L\right)=\frac{DA_{event}\left(\frac{ug}{cm^2\text{-}event}\right)\times\left(\frac{1000\ cm^3}{L}\right)}{2\times FA\times K_p\left(\frac{cm}{hour}\right)\sqrt{\frac{6\times\tau_{event}\left(\frac{hours}{event}\right)\times ET_{event\text{-}rec\text{-}c}\left(\frac{hours}{event}\right)}{\pi}}}$$

or,

$$IF\ ET_{event\text{-}rec\text{-}c}\left(\frac{hours}{event}\right)>t^*\left(hour\right),then\ SL_{rec\text{-}wat\text{-}nc\text{-}der}\left(\mu g/L\right)=\frac{DA_{event}\left(\frac{ug}{cm^2\text{-}event}\right)\times\left(\frac{1000\ cm^3}{L}\right)}{FA\times K_p\left(\frac{cm}{hour}\right)\times\left[\frac{ET_{event\text{-}rec\text{-}c}\left(\frac{hours}{event}\right)}{1+B}+2\times\tau_{event}\left(\frac{hours}{event}\right)\times\left(\frac{1+3B+3B^2}{\left(1+B\right)^2}\right)\right]}$$

where:

$$DA_{event}\left(\frac{ug}{cm^2\text{-}event}\right)=\frac{THQ\times AT_{rec\text{-}c}\left(\frac{365\ days}{year}\times ED_{rec\text{-}c}\left(6\ years\right)\right)\times\left(\frac{1000\ \mu g}{mg}\right)\times BW_{rec\text{-}c}\left(15\ kg\right)}{\left(\frac{1}{RfD_o\left(\frac{mg}{kg\text{-}day}\right)\times GIABS}\right)\times EV_{rec\text{-}c}\left(\frac{events}{day}\right)\times ED_{rec\text{-}c}\left(6\ years\right)\times EF_{rec\text{-}c}\left(\frac{days}{year}\right)\times SA_{rec\text{-}c}\left(6365\ cm^2\right)}$$

- Total

$$SL_{rec\text{-}wat\text{-}nc\text{-}tot\text{-}c}\left(\mu g/L\right)=\frac{1}{\frac{1}{SL_{rec\text{-}wat\text{-}nc\text{-}ing\text{-}c}}+\frac{1}{SL_{rec\text{-}wat\text{-}nc\text{-}der\text{-}c}}}$$

Noncarcinogenic - Adult

The recreator surface water land use equation, presented here, contains the following exposure routes:

- incidental ingestion of water

$$SL_{rec\text{-}wat\text{-}nc\text{-}ing\text{-}a}\left(\mu g/L\right)=\frac{THQ\times AT_{rec\text{-}a}\left(\frac{365\ days}{year}\times ED_{rec\text{-}a}\left(20\ years\right)\right)\times BW_{rec\text{-}a}\left(80\ kg\right)\times\left(\frac{1000\ \mu g}{mg}\right)}{EF_{rec\text{-}a}\left(\frac{days}{year}\right)\times ED_{rec\text{-}a}\left(20\ years\right)\times\frac{1}{RfD_o\left(\frac{mg}{kg\text{-}d}\right)}\times IRW_{rec\text{-}a}\left(\frac{0.11\ L}{hour}\right)\times EV_{rec\text{-}a}\left(\frac{events}{day}\right)\times ET_{event\text{-}rec\text{-}a}\left(\frac{hours}{event}\right)}$$

- dermal

FOR INORGANICS:

$$SL_{rec\text{-}wat\text{-}nc\text{-}der\text{-}a}\left(\mu g/L\right)=\frac{DA_{event}\left(\frac{ug}{cm^2\text{-}event}\right)\times\left(\frac{1000\ cm^3}{L}\right)}{K_p\left(\frac{cm}{hour}\right)\times ET_{event\text{-}rec\text{-}c}\left(\frac{hours}{event}\right)}$$

FOR ORGANICS:

$$IF\ ET_{event\text{-}rec\text{-}a}\left(\frac{hours}{event}\right)\le t^*\left(hour\right),then\ SL_{rec\text{-}wat\text{-}nc\text{-}der}\left(\mu g/L\right)=\frac{DA_{event}\left(\frac{ug}{cm^2\text{-}event}\right)\times\left(\frac{1000\ cm^3}{L}\right)}{2\times FA\times K_p\left(\frac{cm}{hour}\right)\sqrt{\frac{6\times\tau_{event}\left(\frac{hours}{event}\right)\times ET_{event\text{-}rec\text{-}a}\left(\frac{hours}{event}\right)}{\pi}}}$$

or,

$$IF\ ET_{event\text{-}rec\text{-}a}\left(\frac{hours}{event}\right)>t^*\left(hour\right),then\ SL_{rec\text{-}wat\text{-}nc\text{-}der}\left(\mu g/L\right)=\frac{DA_{event}\left(\frac{ug}{cm^2\text{-}event}\right)\times\left(\frac{1000\ cm^3}{L}\right)}{FA\times K_p\left(\frac{cm}{hour}\right)\times\left[\frac{ET_{event\text{-}rec\text{-}a}\left(\frac{hours}{event}\right)}{1+B}+2\times\tau_{event}\left(\frac{hours}{event}\right)\times\left(\frac{1+3B+3B^2}{\left(1+B\right)^2}\right)\right]}$$

where:

$$DA_{event}\left(\frac{ug}{cm^2\text{-}event}\right)=\frac{THQ\times AT_{rec\text{-}a}\left(\frac{365\ days}{year}\times ED_{rec\text{-}a}\left(20\ years\right)\right)\times\left(\frac{1000\ \mu g}{mg}\right)\times BW_{rec\text{-}a}\left(80\ kg\right)}{\left(\frac{1}{RfD_o\left(\frac{mg}{kg\text{-}day}\right)\times GIABS}\right)\times EV_{rec\text{-}a}\left(\frac{events}{day}\right)\times ED_{rec\text{-}a}\left(20\ years\right)\times EF_{rec\text{-}a}\left(\frac{days}{year}\right)\times SA_{rec\text{-}a}\left(19652\ cm^2\right)}$$

- Total

$$SL_{rec\text{-}wat\text{-}nc\text{-}tot\text{-}a}\left(\mu g/L\right)=\frac{1}{\frac{1}{SL_{rec\text{-}wat\text{-}nc\text{-}ing\text{-}a}}+\frac{1}{SL_{rec\text{-}wat\text{-}nc\text{-}der\text{-}a}}}$$

Ingestion of Fish

The fish RSL represents the concentration, in the fish, that can be consumed. Note: the consumption rate for fish is not age adjusted for this land use.

The ingestion of fish land use is not provided in the Generic Tables but RSLs can be created by using the Calculator.

Noncarcinogenic

The ingestion of fish equation, presented here, contains the following exposure route:

- consumption of fish.

$$SL_{res\text{-}fsh\text{-}nc\text{-}ing}\left(\frac{mg}{kg}\right) = \frac{THQ \times AT_{res\text{-}a}\left(\frac{365\ days}{year}\right) \times ED_{res}\left(26\ years\right) \times BW_{res\text{-}a}\left(80\ kg\right)}{EF_{res\text{-}a}\left(\frac{350\ days}{year}\right) \times ED_{res}\left(26\ years\right) \times \frac{1}{RfD_o\left(\frac{mg}{kg\text{-}day}\right)} \times IRF_{res\text{-}a}\left(\frac{mg}{day}\right) \times \frac{10^{-6}kg}{1mg}}$$

Recreator SLs			
$SL_{rec\text{-}water\text{-}nc\text{-}ing}$	Recreator Surface Water Non-Carcinogenic Ingestion (µg/L)	Contaminant-specific	Determined in this calculator
$SL_{rec\text{-}water\text{-}nc\text{-}der}$	Recreator Surface Water Non-Carcinogenic Dermal (µg/L)	Contaminant-specific	Determined in this calculator
$SL_{rec\text{-}water\text{-}nc\text{-}tot}$	Recreator Surface Water Non-Carcinogenic Total (µg/L)	Contaminant-specific	Determined in this calculator
$SL_{rec\text{-}water\text{-}ca\text{-}ing}$	Recreator Surface Water Carcinogenic Ingestion (µg/L)	Contaminant-specific	Determined in this calculator
$SL_{rec\text{-}water\text{-}ca\text{-}der}$	Recreator Surface Water Carcinogenic Dermal (µg/L)	Contaminant-specific	Determined in this calculator
$SL_{rec\text{-}water\text{-}ca\text{-}tot}$	Recreator Surface Water Carcinogenic Total (µg/L)	Contaminant-specific	Determined in this calculator
$SL_{rec\text{-}water\text{-}mu\text{-}ing}$	Recreator Surface Water Mutagenic Ingestion (µg/L)	Mutagen-specific	Determined in this calculator
$SL_{rec\text{-}water\text{-}mu\text{-}der}$	Recreator Surface Water Mutagenic Dermal (µg/L)	Mutagen-specific	Determined in this calculator
$SL_{rec\text{-}water\text{-}mu\text{-}tot}$	Recreator Surface Water Mutagenic Total (µg/L)	Mutagen-specific	Determined in this calculator
Fish SLs			
$SL_{res\text{-}fsh\text{-}nc\text{-}ing}$	Resident Fish Noncarcinogenic Ingestion (mg/kg)	Contaminant-specific	Determined in this calculator
$SL_{res\text{-}fsh\text{-}ca\text{-}ing}$	Resident Fish Carcinogenic Ingestion (mg/kg)	Contaminant-specific	Determined in this calculator
Toxicity Values			

RfD_o or RFDOC	Chronic Oral Reference Dose (mg/kg-day)	Contaminant-specific	EPA Superfund hierarchy
RfC or RFCIC	Chronic Inhalation Reference Concentration (mg/m^3)	Contaminant-specific	EPA Superfund hierarchy
CSF_o or SFO	Oral Slope Factor $(mg/kg\text{-}day)^{-1}$	Contaminant-specific	EPA Superfund hierarchy
IUR	Inhalation Unit Risk $(\mu g/m^3)^{-1}$	Contaminant-specific	EPA Superfund hierarchy
Miscellaneous Variables			
TR	target risk	1×10^{-5}	Selected by user
THQ	target hazard quotient	1	Selected by user
THI	target hazard index	1	Selected by user
K	Andelman Volatilization Factor (L/m^3)	0.5	U.S. EPA 1991b (pg. 20)
K_p	Dermal Permeability Constant (cm/hour)	Contaminant-specific Inorganic default = 0.001	U.S. EPA 2004 Exhibit 3-1 and Section 3.1.2.1
$K_{p,ve}$	Steady-state Permeability Coefficient (cm/hour)	Contaminant-specific	U.S. EPA 2004
K_{ew}	Equilibrium Partition Coefficient between epidermis and water (unitless)	1 - assuming epidermis behaves essentially as water	U.S. EPA 2004
D_e	Effective Diffusivity of absorbing chemical in the epidermis (cm^2/sec)	$(7.1 \times 10^{-6}) / (\sqrt{MW})$	U.S. EPA 2004
L_e	Effective Thickness of the Epidermis (cm)	10^{-2}	U.S. EPA 2004

AT_{res-c}	Averaging time - resident child (days)	365 x ED_{res-c} = 2190	U.S. EPA 1989 (pg. 6-23)
AT_{res-a}	Averaging time - resident adult (days)	365 x ED_{res} = 9490	U.S. EPA 1989 (pg. 6-23)
AT_{res}	Averaging time - resident age adjusted (days)	365 x LT = 25550	U.S. EPA 1989 (pg. 6-23)
AT_{rec-c}	Averaging time - recreator child (days)	365 x ED_{rec-c}	U.S. EPA 1989 (pg. 6-23)
AT_{rec-a}	Averaging time - recreator adult (days)	365 x ED_{rec-a}	U.S. EPA 1989 (pg. 6-23)
AT_{rec}	Averaging time - recreator (days)	365 x LT	U.S. EPA 1989 (pg. 6-23)
LT	Lifetime (years)	70	U.S. EPA 1989 (pg. 6-22)
$\Delta H_{v,b}$	Enthalpy of vaporization at the normal boiling point (cal/mol)	Contaminant-specific	See Chemical-specific hierarchy
$\Delta H_{v,gw}$	Enthalpy of vaporization at temperature of groundwater (cal/mol)	Contaminant-specific	Determined in this calculator
HLC	Henry's Law Constant at specified groundwater temperature (atm-m^3/mol)	Contaminant-specific	See Chemical-specific hierarchy
T_{gw}	Groundwater Temperatures (Kelvin)	Site-specific	Site-specific
T_C	Critical Temperatures (Kelvin)	Contaminant-specific	See Chemical-specific hierarchy
T_b	Normal Boiling Point (Kelvin)	Contaminant-specific	See Chemical-specific hierarchy

n	If ($T_b/T_C < 0.57$)
	If ($T_b/T_C > 0.71$)
	If ($0.57 < T_b/T_C \leq 0.71$)
		n = 0.3
		n = 0.41
		n = (0.74 x T_b/T_C - 0.116)
			U.S. EPA Fact Sheet
			Unitless exponent values used to determine ΔHv,gw

VPT_{gw}	Vapor Pressure at Groundwater Temperature (mmHg)	Contaminant-specific	Determined in this calculator

VP	Vapor Pressure at 25°C (mmHg)	Contaminant-specific	Contaminant-specific
Ingestion and Dermal Contact Rates			
IRW_{rec-c}	Recreator Surface Water Ingestion Rate - Child (L/hour)	0.12	U.S. EPA 2011, Table 3.5
IRW_{rec-a}	Recreator Surface Water Ingestion Rate - Adult (L/hour)	0.11	Time weighted average was calculated based on the upper percentile from U.S. EPA 2019, Table 3.7
$IFW_{rec-adj}$	Recreator Surface Water Ingestion Rate - Age-adjusted (L/kg)	Site-specific	Calculated using the age adjusted intake factors equation
IRW_{0-2}	Surface Water Ingestion Rate - Age Segment 0-2 (L/hour)	0.12	U.S. EPA 2011, Table 3.5
IRW_{2-6}	Surface Water Ingestion Rate - Age Segment 2-6 (L/hour)	0.12	U.S. EPA 2011, Table 3.5
IRW_{6-16}	Surface Water Ingestion Rate - Age Segment 6-16 (L/hour)	0.124	Time weighted average was calculated based on the upper percentile from U.S. EPA 2019, Table 3.7
IRW_{16-26}	Surface Water Ingestion Rate - Age Segment 16-26 (L/hour)	0.0985	Time weighted average was calculated based on the upper percentile from U.S. EPA 2019, Table 3.7
$IFWM_{rec-adj}$	Recreator Mutagenic Surface Water Ingestion Rate - Age-adjusted (L/kg)	Site-specific	Calculated using the age adjusted intake factors equation
$DFW_{res-adj}$	Resident water dermal contact factor-age-adjusted (cm^2 - event/kg)	2610650	Calculated using the age adjusted intake factors equation
$DFWM_{res-adj}$	Resident Mutagenic water dermal contact factor- age-adjusted (cm^2 - event/kg)	8191633	Calculated using the age adjusted intake factors equation

$DFW_{rec-adj}$	Recreator water dermal contact factor-age-adjusted (cm^2 - event/kg)	Site-specific	Calculated using the age adjusted intake factors equation
$DFWM_{rec-adj}$	Recreator Mutagenic water dermal contact factor- age-adjusted (cm^2 - event/kg)	Site-specific	Calculated using the age adjusted intake factors equation
IRF_{res-a}	Fish Ingestion Rate (mg/day)	Site-specific	Recommend using site-specific values
SA_{res-c}	Resident surface area water - child (cm^2)	6365	U.S. EPA 2014, weighted average of mean values for children <6 years.
SA_{res-a}	Resident surface area water - adult (cm^2)	19652	U.S. EPA 2014, weighted average of mean values for adults, male and female 21+.
SA_{rec-c}	Recreator surface area water - child (cm^2)	6365	U.S. EPA 2014, weighted average of mean values for children <6 years.
SA_{rec-a}	Recreator surface area water - adult (cm^2)	19652	U.S. EPA 2014, weighted average of mean values for adults, male and female 21+.
SA_{0-2}	Resident/Recreator surface area water - age segment 0-2 (cm^2)	6365	U.S. EPA 2014, weighted average of mean values for children <6 years.
SA_{2-6}	Resident/Recreator surface area water - age segment 2-6 (cm^2)	6365	U.S. EPA 2014, weighted average of mean values for children <6 years.
SA_{6-16}	Resident/Recreator surface area water - age segment 6-16 (cm^2)	19652	U.S. EPA 2014, weighted average of mean values for adults, male and female 21+.
SA_{16-26}	Resident/Recreator surface area water - age segment 16-26 (cm^2)	19652	U.S. EPA 2014, weighted average of mean values

			for adults, male and female 21+.
BW_{res-c}	Resident Body Weight - child (kg)	15	U.S. EPA 1991a (pg. 15)
BW_{res-a}	Resident Body Weight - adult (kg)	80	U.S. EPA 2011, Table 8-3; weighted mean values for adults 21 - 78
BW_{rec-c}	Recreator Body Weight - child (kg)	15	U.S. EPA 1991a (pg. 15)
BW_{rec-a}	Recreator Body Weight - adult (kg)	80	U.S. EPA 2011, Table 8-3; weighted mean values for adults 21 - 78
BW_{0-2}	Resident/Recreator Body Weight - age segment 0-2 (kg)	15	U.S. EPA 1991a (pg. 15)
BW_{2-6}	Resident/Recreator Body Weight - age segment 2-6 (kg)	15	U.S. EPA 1991a (pg. 15)
BW_{6-16}	Resident/Recreator Body Weight - age segment 6-16 (kg)	80	U.S. EPA 2011, Table 8-3; weighted mean values for adults 21 - 78
BW_{16-26}	Resident/Recreator Body Weight - age segment 16-26 (kg)	80	U.S. EPA 2011, Table 8-3; weighted mean values for adults 21 - 78
ABS_d	Fraction of contaminant absorbed dermally from soil (unitless)	Contaminant-specific Inorganic default = none VOC default = none SVOC default = 0.1	U.S. EPA 2004 (Exhibit 3-4 and section 3.2.2.4)
GIABS	Fraction of contaminant absorbed in gastrointestinal tract (unitless) Note: if the GIABS is >50% then it is set to 100% for the calculation of dermal toxicity values.	Contaminant-specific Inorganic default = 1.0 VOC default = 1.0 SVOC default = 1.0	U.S. EPA 2004 (Exhibit 4-1 and section 4.2)

DA_{event}	Absorbed dose per event (µg/cm² - event)	Contaminant-specific	U.S. EPA 2004 (Equation 3.2 and 3.3)
Exposure Frequency, Exposure Duration, and Exposure Time Variables			
EF_{rec}	Recreator Exposure Frequency (days/year)	Site-specific	Site-specific
EF_{rec-c}	Recreator Exposure Frequency - child (days/year)	Site-specific	Site-specific
EF_{rec-a}	Recreator Exposure Frequency - adult (days/year)	Site-specific	Site-specific
EF_{0-2}	Resident/Recreator Exposure Frequency - age segment 0-2 (days/year)	Resident - 350 Recreator - Site-specific	Resident - U.S. EPA 1991a (pg. 15) Recreator - Site-specific
EF_{2-6}	Resident/Recreator Exposure Frequency - age segment 2-6 (days/year)	Resident - 350 Recreator - Site-specific	Resident - U.S. EPA 1991a (pg. 15) Recreator - Site-specific
EF_{6-16}	Resident/Recreator Exposure Frequency - age segment 6-16 (days/year)	Resident - 350 Recreator - Site-specific	Resident - U.S. EPA 1991a (pg. 15) Recreator - Site-specific
EF_{16-26}	Resident/Recreator Exposure Frequency - age segment 16-26 (days/year)	Resident - 350 Recreator - Site-specific	Resident - U.S. EPA 1991a (pg. 15) Recreator - Site-specific
ED_{rec}	Recreator Exposure Duration (years)	26	EPA 2011, Table 16-108; 90th percentile for current residence time.
ED_{rec-c}	Recreator Exposure Duration - child (years)	6	U.S. EPA 1991a (pg. 15)
ED_{rec-a}	Recreator Exposure Duration - adult (years)	20	ED_{rec} (26 years) - ED_{rec-c} (6 years)
ED_{0-2}	Resident/Recreator Exposure Duration - age segment 0-2 (years)	2	U.S. EPA 2005 (pg. 37)

ED_{2-6}	Resident/Recreator Exposure Duration - age segment 2-6 (years)	4	U.S. EPA 2005 (pg. 37)
ED_{6-16}	Resident/Recreator Exposure Duration - age segment 6-16 (years)	10	U.S. EPA 2005 (pg. 37)
ED_{16-26}	Resident/Recreator Exposure Duration - age segment 16-26 (years)	10	U.S. EPA 2005 (pg. 37)
ET_{rec}	Recreator Exposure Time (hours/day)	Site-specific	Site-specific
ET_{rec-c}	Recreator Exposure Time - child (hours/day)	Site-specific	Site-specific
ET_{rec-a}	Recreator Exposure Time - adult (hours/day)	Site-specific	Site-specific
$ET_{event-rec-c}$	Recreator Surface Water Exposure Time - child (hours/event)	Site-specific	Site-specific
$ET_{event-rec-a}$	Recreator Surface Water Exposure Time - adult (hours/event)	Site-specific	Site-specific
$ET_{event-rec-adj}$	Recreator Exposure Time - age-adjusted (hours/event)	Site-specific	Calculated using the age adjusted intake factors equation
$ET_{event-rec(0-2)}$	Recreator Exposure Time - age segment 0-2 (hours/event)	Site-specific	Site-specific
$ET_{event-rec(2-6)}$	Recreator Exposure Time - age segment 2-6 (hours/event)	Site-specific	Site-specific
$ET_{event-rec(6-16)}$	Recreator Exposure Time - age segment 6-16 (hours/event)	Site-specific	Site-specific
$ET_{event-rec(16-26)}$	Recreator Exposure Time - age segment 16-26 (hours/event)	Site-specific	Site-specific

$ET_{event\text{-}rec\text{-}madj}$	Recreator Exposure Time - age-adjusted (hours/event)	Site-specific	Calculated using the age adjusted intake factors equation
$EV_{rec\text{-}c}$	Recreator Events - child (events/day)	Site-specific	Site-specific
$EV_{rec\text{-}a}$	Recreator Events - adult (events/day)	Site-specific	Site-specific
$EV_{0\text{-}2}$	Resident/Recreator Events - age segment 0-2 (events/day)	Resident - 1 Recreator - Site-specific	U.S. EPA 2004; Exhibit 3-2
$EV_{2\text{-}6}$	Resident/Recreator Events - age segment 2-6 (events/day)	Resident - 1 Recreator - Site-specific	U.S. EPA 2004; Exhibit 3-2
$EV_{6\text{-}16}$	Resident/Recreator Events - age segment 6-16 (events/day)	Resident - 1 Recreator - Site-specific	U.S. EPA 2004; Exhibit 3-2
$EV_{16\text{-}26}$	Resident/Recreator Events - age segment 16-26 (events/day)	Resident - 1 Recreator - Site-specific	U.S. EPA 2004; Exhibit 3-2

APPENDIX 6: SOCIOECONOMIC INFORMATION ON COMMUNITIES SURROUNDING PISCATAWAY CREEK

ID	Zip Code	Percent Minority	Percent Less Than High School	Percent Low Income	Percent Unemployed	Percent Linguistic Isolation
449	24033	44	1.2	24.40	2.9	0.8
389	24033	55.3	8.5	9.92	3.1	0
691	24033	78.4	5.3	4.69	5.4	2
702	24033	88.5	4.8	4.29	3.6	0.8
388	24033	93.1	2.1	4.61	3.1	0
655	24033	88.5	6.4	5.48	2.5	1.8
391	24033	92	5.5	4.74	1.8	1
701	24033	93.4	4.9	3.93	3.6	0
653	24033	89.3	5.4	5.94	5.2	0
579	24033	88.8	7.4	5.56	4.6	0
390	24033	89.4	4.7	6.93	5.9	0
573	24033	80.8	9.4	9.74	0.8	6.4
650	24033	94.5	3	8.36	2	0
450	24033	87.4	6.3	7.93	6.7	0
652	24033	87.5	10.1	4.94	5.1	1.3
396	24033	91.3	4.9	9.52	4.1	1.5
651	24033	90.8	10.3	7.05	4	0
842	24033	89.9	10.2	5.90	7	0
687	24033	94.7	4.6	14.85	1.5	0
692	24033	85	9.7	11.49	4.5	5.3
706	24033	92.6	7	10.08	2.2	4.2
394	24033	89	5.6	17.75	3.4	1.3
833	24033	93.8	10.1	7.67	3.6	2.4
704	24033	93.3	6.8	11.84	3.6	2.5
703	24033	92.6	8.5	14.68	2.2	1.7
733	24033	89.6	10.7	10.95	3.9	5.2
576	24033	79.6	12.6	19.20	5.3	5.2
841	24033	88.5	16.9	12.24	3.1	3.2
688	24033	95.1	14.3	8.04	5.4	2
414	24033	94.8	16	11.50	7.1	2.3
395	24033	90.8	10.7	23.61	5.4	6.1
474	24033	95.1	7	29.32	6.2	2.7
412	24033	84	19.8	28.80	4.2	4.7
705	24033	93.9	23.5	16.88	6	6.2

Socioeconomic information in the above Table is based on the following:

1. **Minority Population** - % of individuals who do not identify as non-Hispanic white

2. **Low Income** - % of households whose income is less than 200% of the federal poverty threshold (i.e., income less than twice the poverty level)

3. **Over 25 years old with less than High School** - % of individuals 25 years or older who do not have a high school diploma (they may have completed some high school, so long as they did not graduate)

4. **Unemployment** - % of individuals 16 years or older who are eligible for the labor force that are not employed

5. **Linguistic Isolation** - % of limited English-speaking households (i.e., one in which no member 14 years old and over (1) speaks only English or (2) speaks a non-English language and speaks English "very well." In other words, all members 14 years old and over have at least some difficulties with English)