

County of Brunswick

3954 Clearwell Dr NE
Leland, NC 28451

Northwest Water Plant

Leland, NC
Samples Received: 11/24/21

Analytical Report 1121-790

Isotope Dilution Method PFAS



Enthalpy Analytical, LLC – Ultratrace

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I certify that to the best of my knowledge all analytical data presented in this report:

- Have been checked for completeness
- Are accurate, error-free, and legible
- Have been conducted in accordance with approved protocol, and that all deviations and analytical problems are summarized in the appropriate narrative(s)

This analytical report was prepared in Portable Document Format (.PDF) and contains _____ pages.

....."Report Issued Date: _____"



Summary of Results

Enthalpy Analytical

Job No.: 1121-790-1 PFAS by Isotope Dilution (non-potable water)
 County of Brunswick Client Proj.: N/A Site: Northwest Water Plant

Summary

	Compound	CAS	11242021S01 ng/L	11242021E01 ng/L
Acids	PFBA	375-22-4	4.63	4.30
	PFPeA	2706-90-3	21.4	23.3
	PFHxA	307-24-4	19.2	16.4
	PFHpA	375-85-9	6.12	5.38
	PFOA	335-67-1	8.59	6.72
	PFNA	375-95-1	0.824	0.705
	PFDA	335-76-2	0.353	0.306
	PFUnDA	2058-94-8	0.0492 L	0.0603 L
	PFDoDA	307-55-1	0.00241 LB	ND U
	PFTTrDA	72629-94-8	ND U	ND U
Sulfonates	PFTeDA	376-06-7	0.0200 LB	ND U
	PFBS	375-73-5	9.30	9.98
	PFPeS	2706-91-4	1.26	1.04
	PFHxS	355-46-4	6.44	6.50
	PFHpS	375-92-8	0.196 J	0.371
	PFOS	1763-23-1	12.2	11.6
	PFNS	68259-12-1	ND U	ND U
	PFDS	335-77-3	ND U	ND U
	4:2 FTS	757124-72-4	ND U	0.0259 L
	6:2 FTS	27619-97-2	0.159 J	0.274
other	8:2 FTS	39108-34-4	ND U	ND U
	PFOSA	754-91-6	0.000957 L	ND U
	N-MeFOSAA	2355-31-9	ND U	0.000546 L
	N-EtFOSAA	2991-50-6	0.0645 LB	0.0868 LB
	HFPO-DA	13252-13-6	15.6	10.7
	PFMOAA	674-13-5	63.6	76.0
	PFMOPra	377-73-1	0.0982 L	0.0942 L
	PFO2HxA	39492-88-1	10.2	8.36
	PFO3OA	39492-89-2	2.69	3.78
	PFO4DA	39492-90-5	0.191 L	ND U
	Nafion Byproduct 1	29311-67-9	ND U	ND U
	ADONA	919005-14-4	ND U	ND U
	9Cl-PF3ONS	756426-58-1	ND U	ND U
	11Cl-PF3OUdS	763051-92-9	ND U	ND U
	10:2 FTS	120226-60-0	ND U	ND U
	EVE Acid	69087-46-3	ND U	ND U
	FBSA	30334-69-1	0.325	0.354
	Hydro-EVE Acid	773804-62-9	0.770 L	0.663 L
	Hydrolyzed PSDA	2416366-19-1	20.4	28.2
	Nafion Byproduct 2	749836-20-2	0.417	0.820
	N-EtFOFA	4151-50-2	ND U	ND U
	N-EtFOFE	1691-99-2	ND U	ND U
	NFDHA	151772-58-6	ND U	ND U
	N-MeFOFA	31506-32-8	ND U	ND U
	N-MeFOFE	24448-09-7	ND U	ND U
	NVHOS	1132933-86-8	7.07	13.5
	PEPA	267239-61-2	ND U	6.80
	PFECA-G	801212-59-9	ND U	ND U
	PFEESA	113507-82-7	ND U	ND U
	PFHxDA	67905-19-5	0.125 LB	ND U
	PFMOBA	863090-89-5	ND U	ND U
	PFO5DA	39492-91-6	ND U	ND U
	PMPA	13140-29-9	20.0	ND U
	R-EVE	2416366-22-6	15.8	20.4
	R-PSDA	2416366-18-0	41.0	58.5
	R-PSDCA	2416366-21-5	0.122 L	0.118 L

Detailed Results

Enthalpy Analytical

Job No.: 1121-790-1 PFAS by Isotope Dilution (non-potable water)
 County of Brunswick Client Proj.: N/A Site: Northwest Water Plant

Enthalpy ID	1121-790-001-1	Prep Batch	EU12656	Sample Vol (mL)	273.62
Sample Name	11242021S01	Prep Date	2021-11-29 16:25	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2021-11-30 11:53	Dilution Factor	1
Sampling Date	20211124 00:00	Analyst	wicleve/tbrooker	Method Code	WM-026
Received Date	2021-11-24 14:00	Instrument	Fill	Sample Type	Sample

	Compound	CAS	Extract Concentration ng/L	Sample Concentration ng/L	Formatted Result ng/L	LOD ng/L	LOQ ng/L	Recovery Limits	Recovery	Flags
Acids	PFBA	375-22-4	3165.45	4.63	4.63	0.140	0.278			
	PFPeA	2706-90-3	14608.11	21.4	21.4	0.155	0.278			
	PfHxA	307-24-4	13160.53	19.2	19.2	0.176	0.278			
	PfHpA	375-85-9	4183.70	6.12	6.12	0.111	0.278			
	PFOA	335-67-1	5873.78	8.59	8.59	0.162	0.278			
	PFNA	375-95-1	563.95	0.824	0.824	0.0695	0.278			
	PFDA	335-76-2	241.18	0.353	0.353	0.0772	0.278			
	PFUnDA	2058-94-8	33.67	0.0492	0.0492	0.169	0.278			L
	PFDODA	307-55-1	1.65	0.00241	0.00241	0.185	0.278			LB
	PFTeDA	72629-94-8	ND	ND	ND	0.138	0.278			U
PFTeDA	376-06-7	13.69	0.0200	0.0200	0.199	0.278			LB	
Sulfonates	PFBS	375-73-5	6361.33	9.30	9.30	0.324	0.324			
	PFPeS	2706-91-4	864.58	1.26	1.26	0.188	0.262			
	PfHxS	355-46-4	4404.68	6.44	6.44	0.175	0.254			
	PfHpS	375-92-8	134.38	0.196	0.196	0.123	0.265			J
	PFOS	1763-23-1	8374.14	12.2	12.2	0.146	0.257			
	PFNS	68259-12-1	ND	ND	ND	0.0789	0.268			U
	PFDs	335-77-3	ND	ND	ND	0.175	0.268			U
	4:2 FTS	757124-72-4	ND	ND	ND	0.108	0.260			U
	6:2 FTS	27619-97-2	108.57	0.159	0.159	0.106	0.265			J
	8:2 FTS	39108-34-4	ND	ND	ND	0.156	0.266			U
Other	PFOSA	754-91-6	0.65	0.000957	0.000957	0.119	0.278			L
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.132	0.278			U
	N-EtFOSAA	2991-50-6	44.12	0.0645	0.0645	0.0996	0.278			LB
	HFPO-DA	13252-13-6	10696.58	15.6	15.6	0.208	0.278			
	PFMOAA	674-13-5	43531.64	63.6	63.6	1.32	1.32			
	PFMOPrA	377-73-1	67.14	0.0982	0.0982	0.219	0.278			L
	PFO2HxA	39492-88-1	6990.51	10.2	10.2	1.32	1.32			
	PFO3OA	39492-89-2	1838.63	2.69	2.69	1.32	1.32			
	PFO4DA	39492-90-5	130.36	0.191	0.191	1.39	1.39			L
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.278	0.278			U
	ADONA	919005-14-4	ND	ND	ND	0.110	0.263			U
	9Cl-PF3OUdS	756426-58-1	ND	ND	ND	0.110	0.259			U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.110	0.262			U
	10:2 FTS	120226-60-0	ND	ND	ND	0.219	0.278			U
	EVE Acid	69087-46-3	ND	ND	ND	1.32	1.32			U
	FBSA	30334-69-1	222.40	0.325	0.325	0.219	0.278			
	Hydro-EVE Acid	773804-62-9	526.51	0.770	0.770	1.32	1.32			L
	Hydrolyzed PSDA	2416366-19-1	13969.07	20.4	20.4	1.32	1.32			
	Nafion Byproduct 2	749836-20-2	285.21	0.417	0.417	0.278	0.278			
	N-EtFOSA	4151-50-2	ND	ND	ND	0.219	0.278			U
	N-EtFOSE	1691-99-2	ND	ND	ND	6.58	6.58			U
	NFDHA	151772-58-6	ND	ND	ND	0.219	0.278			U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.219	0.278			U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.58	6.58			U
	NVHOS	1132933-86-8	4833.07	7.07	7.07	1.32	1.32			
	PEPA	267239-61-2	ND	ND	ND	1.32	1.32			U
	PFECA-G	801212-59-9	ND	ND	ND	0.278	1.32			U
	PFEESA	113507-82-7	ND	ND	ND	0.219	0.278			U
	PfHxDA	67905-19-5	85.84	0.125	0.125	1.32	1.32			LB
	PFMOBA	863090-89-5	ND	ND	ND	1.32	1.32			U
PFOSDA	39492-91-6	ND	ND	ND	1.39	1.39			U	
PMPA	13140-29-9	13695.11	20.0	20.0	1.32	1.32				
R-EVE	2416366-22-6	10797.98	15.8	15.8	1.32	1.32				
R-PSDA	2416366-18-0	28037.60	41.0	41.0	1.32	1.32				
R-PSDCA	2416366-21-5	83.79	0.122	0.122	1.32	1.32			L	
ES	MPFBA		6359.10	9.30				20-150%	127.2%	
	M5PFPeA		15379.13	22.5				20-150%	307.6%	Q
	M3PFBS		21220.51	31.0				20-150%	424.4%	Q
	M2-4:2 FTS		13629.50	19.9				20-150%	272.6%	Q
	M5PFHxA		3945.07	5.77				20-150%	78.9%	
	M3HFPO-DA		3491.67	5.10				20-150%	69.8%	
	M4PFHpA		4794.18	7.01				20-150%	95.9%	
	M3PFHxS		5797.40	8.48				20-150%	115.9%	
	M2-6:2 FTS		12165.14	17.8				20-150%	243.3%	Q
	M8PFOA		5136.18	7.51				20-150%	102.7%	
	M9PFNA		5348.54	7.82				20-150%	107.0%	
	M8PFOS		4924.68	7.20				20-150%	98.5%	
	M2-8:2 FTS		11212.09	16.4				20-150%	224.2%	Q
	M8FOSA-I		1390.06	2.03				20-150%	27.8%	
	M6PFDA		5590.52	8.17				20-150%	111.8%	
	d3-N-MeFOSAA		9248.44	13.5				20-150%	185.0%	Q
	d5-N-EtFOSAA		8379.38	12.2				20-150%	167.6%	Q
	M7PFUDa		5362.51	7.84				20-150%	107.3%	
	MPFDa		4607.36	6.74				20-150%	92.1%	
	M2PFTeDA		2484.55	3.63				20-150%	49.7%	

Enthalpy Analytical

Job No.: 1121-790-1 PFAS by Isotope Dilution (non-potable water)
 County of Brunswick Client Proj.: N/A Site: Northwest Water Plant

Enthalpy ID	1121-790-002-1	Prep Batch	EU12656	Sample Vol (mL)	273.54
Sample Name	11242021E01	Prep Date	2021-11-29 16:25	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2021-11-30 12:16	Dilution Factor	1
Sampling Date	2021-11-24 00:00	Analyst	wicleve/tbrooker	Method Code	WM-026
Received Date	2021-11-24 14:00	Instrument	Fill	Sample Type	Sample

	Compound	CAS	Extract Concentration ng/L	Sample Concentration ng/L	Formatted Result ng/L	LOD ng/L	LOQ ng/L	Recovery Limits	Recovery	Flags
Acids	PFBA	375-22-4	2938.73	4.30	4.30	0.140	0.278			
	PFPeA	2706-90-3	15920.03	23.3	23.3	0.155	0.278			
	PFHxA	307-24-4	11191.10	16.4	16.4	0.176	0.278			
	PFHpA	375-85-9	3679.17	5.38	5.38	0.112	0.278			
	PFOA	335-67-1	4596.07	6.72	6.72	0.162	0.278			
	PFNA	375-95-1	482.40	0.705	0.705	0.0695	0.278			
	PFDA	335-76-2	209.35	0.306	0.306	0.0772	0.278			
	PFUnDA	2058-94-8	41.24	0.0603	0.0603	0.169	0.278			L
	PFDoDA	307-55-1	ND	ND	ND	0.185	0.278			U
	PFTriDA	72629-94-8	ND	ND	ND	0.138	0.278			U
	PFTeDA	376-06-7	ND	ND	ND	0.199	0.278			U
	PFBS	375-73-5	6828.07	9.98	9.98	0.324	0.324			
Sulfonates	PFPeS	2706-91-4	710.78	1.04	1.04	0.188	0.262			
	PFHxS	355-46-4	4446.98	6.50	6.50	0.175	0.254			
	PFHpS	375-92-8	254.01	0.371	0.371	0.123	0.265			
	PFOS	1763-23-1	7941.08	11.6	11.6	0.146	0.257			
	PFNS	68259-12-1	ND	ND	ND	0.0790	0.268			U
	PFDS	335-77-3	ND	ND	ND	0.175	0.268			U
	4:2 FTS	757124-72-4	17.73	0.0259	0.0259	0.108	0.260			L
	6:2 FTS	27619-97-2	187.69	0.274	0.274	0.106	0.265			
	8:2 FTS	39108-34-4	ND	ND	ND	0.156	0.266			U
	PFOSA	754-91-6	ND	ND	ND	0.119	0.278			U
other	N-MeFOSAA	2355-31-9	0.37	0.000546	0.000546	0.132	0.278			L
	N-EtFOSAA	2991-50-6	59.38	0.0868	0.0868	0.0996	0.278			LB
	HFPO-DA	13252-13-6	7290.90	10.7	10.7	0.208	0.278			
	PFMOAA	674-13-5	51965.81	76.0	76.0	1.32	1.32			
	PFMOPrA	377-73-1	64.41	0.0942	0.0942	0.219	0.278			L
	PFO2HxA	39492-88-1	5714.35	8.36	8.36	1.32	1.32			
	PFO3OA	39492-89-2	2587.04	3.78	3.78	1.32	1.32			
	PFO4DA	39492-90-5	ND	ND	ND	1.39	1.39			U
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.278	0.278			U
	ADONA	919005-14-4	ND	ND	ND	0.110	0.263			U
	9Cl-PF3OUdS	756426-58-1	ND	ND	ND	0.110	0.259			U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.110	0.262			U
	10:2 FTS	120226-60-0	ND	ND	ND	0.219	0.278			U
	EVE Acid	69087-46-3	ND	ND	ND	1.32	1.32			U
	FBSA	30334-69-1	242.10	0.354	0.354	0.219	0.278			
	Hydro-EVE Acid	773804-62-9	453.44	0.663	0.663	1.32	1.32			L
	Hydrolyzed PSDA	2416366-19-1	19314.03	28.2	28.2	1.32	1.32			
	Nafion Byproduct 2	749836-20-2	560.99	0.820	0.820	0.278	0.278			
	N-EtFOSE	4151-50-2	ND	ND	ND	0.219	0.278			U
	N-EtFOSE	1691-99-2	ND	ND	ND	6.58	6.58			U
	NFDHA	151772-58-6	ND	ND	ND	0.219	0.278			U
	N-MeFOSE	31506-32-8	ND	ND	ND	0.219	0.278			U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.58	6.58			U
	NVHOS	1132933-86-8	9229.83	13.5	13.5	1.32	1.32			
	PEPA	267239-61-2	4652.43	6.80	6.80	1.32	1.32			
	PFECA-G	801212-59-9	ND	ND	ND	0.278	1.32			U
	PFEESA	113507-82-7	ND	ND	ND	0.219	0.278			U
	PFHxDA	67905-19-5	ND	ND	ND	1.32	1.32			U
	PFMOBA	863090-89-5	ND	ND	ND	1.32	1.32			U
	PFOSDA	39492-91-6	ND	ND	ND	1.39	1.39			U
	PMPA	13140-29-9	ND	ND	ND	1.32	1.32			U
	R-EVE	2416366-22-6	13934.60	20.4	20.4	1.32	1.32			
R-PSDA	2416366-18-0	39983.01	58.5	58.5	1.32	1.32				
R-PSDCA	2416366-21-5	81.02	0.118	0.118	1.32	1.32			L	
ES	MPFBA		5001.37	7.31				20-150%	100.0%	
	M5PFPeA		12460.20	18.2				20-150%	249.2%	Q
	M3PFBS		21140.98	30.9				20-150%	422.8%	Q
	M2-4:2 FTS		16622.08	24.3				20-150%	332.4%	Q
	M5PFHxA		4074.59	5.96				20-150%	81.5%	
	M3HFPO-DA		4132.81	6.04				20-150%	82.7%	
	M4PFHpA		4861.55	7.11				20-150%	97.2%	
	M3PFHxS		5169.91	7.56				20-150%	103.4%	
	M2-6:2 FTS		18450.10	27.0				20-150%	369.0%	Q
	M8PFOA		5058.06	7.40				20-150%	101.2%	
	M9PFNA		4189.53	6.13				20-150%	83.8%	
	M8PFOS		3500.72	5.12				20-150%	70.0%	
	M2-8:2 FTS		10509.36	15.4				20-150%	210.2%	Q
	M8FOSA-I		1630.90	2.38				20-150%	32.6%	
	M6PFDA		3388.93	4.96				20-150%	67.8%	
	d3-N-MeFOSAA		5713.42	8.35				20-150%	114.3%	
	d5-N-EtFOSAA		5717.05	8.36				20-150%	114.3%	
	M7PFUDa		3174.71	4.64				20-150%	63.5%	
MPFDa		3233.59	4.73				20-150%	64.7%		
M2PFTeDA		2308.03	3.38				20-150%	46.2%		

QC Data

Enthalpy Analytical

Job No.: 1121-790-1 PFAS by Isotope Dilution (non-potable water)
 County of Brunswick Client Proj.: N/A Site: Northwest Water Plant

Enthalpy ID	MB-12656-PFAS	Prep Batch	EU12656	Sample Vol (mL)	250
Sample Name	MB-12656-PFAS	Prep Date	2021-11-29 16:25	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2021-11-30 11:07	Dilution Factor	1
Sampling Date		Analyst	wicleve/tbrooker	Method Code	WM-026
Received Date	2021-11-29 16:25	Instrument	Fii	Sample Type	Blank

	Compound	CAS	Extract Concentration ng/L	Sample Concentration ng/L	Formatted Result ng/L	LOD ng/L	LOQ ng/L	Recovery Limits	Recovery	Flags
Acids	PFBA	375-22-4	ND	ND	ND	0.153	0.304			U
	PFPeA	2706-90-3	ND	ND	ND	0.170	0.304			U
	PFFhxA	307-24-4	ND	ND	ND	0.193	0.304			U
	PFFHpA	375-85-9	ND	ND	ND	0.122	0.304			U
	PFOA	335-67-1	11.59	0.0185	0.0185	0.177	0.304			L
	PFNA	375-95-1	ND	ND	ND	0.0761	0.304			U
	PFDA	335-76-2	ND	ND	ND	0.0845	0.304			U
	PFUnDA	2058-94-8	0.44	0.000699	0.000699	0.185	0.304			L
	PFDoDA	307-55-1	13.76	0.0220	0.0220	0.202	0.304			L
	PFFTrDA	72629-94-8	33.86	0.0539	0.0539	0.151	0.304			L
PFTeDA	376-06-7	74.59	0.119	0.119	0.218	0.304			L	
Sulfonates	PFBS	375-73-5	ND	ND	ND	0.355	0.355			U
	PFFPeS	2706-91-4	ND	ND	ND	0.206	0.286			U
	PFFHxS	355-46-4	ND	ND	ND	0.191	0.278			U
	PFFHpS	375-92-8	ND	ND	ND	0.135	0.290			U
	PFOS	1763-23-1	ND	ND	ND	0.160	0.282			U
	PFNS	68259-12-1	ND	ND	ND	0.0864	0.293			U
	PFDS	335-77-3	ND	ND	ND	0.192	0.293			U
	4:2 FTS	757124-72-4	ND	ND	ND	0.118	0.285			U
	6:2 FTS	27619-97-2	ND	ND	ND	0.116	0.290			U
	8:2 FTS	39108-34-4	ND	ND	ND	0.171	0.291			U
other	PFOSA	754-91-6	ND	ND	ND	0.130	0.304			U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.144	0.304			U
	N-EtFOSAA	2991-50-6	34.03	0.0544	0.0544	0.109	0.304			L
	HFPO-DA	13252-13-6	ND	ND	ND	0.228	0.304			U
	PFMOAA	674-13-5	ND	ND	ND	1.44	1.44			U
	PFMOPrA	377-73-1	ND	ND	ND	0.240	0.304			U
	PFO2HxA	39492-88-1	ND	ND	ND	1.44	1.44			U
	PFO3OA	39492-89-2	ND	ND	ND	1.44	1.44			U
	PFO4DA	39492-90-5	ND	ND	ND	1.52	1.52			U
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.304	0.304			U
	ADONA	919005-14-4	ND	ND	ND	0.120	0.288			U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.120	0.283			U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.120	0.286			U
	10:2 FTS	120226-60-0	18.98	0.0304	0.0304	0.240	0.304			L
	EVE Acid	69087-46-3	5.64	0.00903	0.00903	1.44	1.44			L
	FBSA	30334-69-1	ND	ND	ND	0.240	0.304			U
	Hydro-EVE Acid	773804-62-9	3.57	0.00571	0.00571	1.44	1.44			L
	Hydrolyzed PSDA	2416366-19-1	ND	ND	ND	1.44	1.44			U
	Nafion Byproduct 2	749836-20-2	ND	ND	ND	0.304	0.304			U
	N-EtFOA	4151-50-2	ND	ND	ND	0.240	0.304			U
	N-EtFOSE	1691-99-2	ND	ND	ND	7.20	7.20			U
	NFDHA	151772-58-6	ND	ND	ND	0.240	0.304			U
	N-MeFOA	31506-32-8	ND	ND	ND	0.240	0.304			U
	N-MeFOSE	24448-09-7	ND	ND	ND	7.20	7.20			U
	NVHOS	1132933-86-8	ND	ND	ND	1.44	1.44			U
	PEPA	267239-61-2	ND	ND	ND	1.44	1.44			U
	PFECA-G	801212-59-9	ND	ND	ND	0.304	1.44			U
	PFEESA	113507-82-7	ND	ND	ND	0.240	0.304			U
	PFFHxDA	67905-19-5	158.47	0.254	0.254	1.44	1.44			L
	PFMOBA	863090-89-5	ND	ND	ND	1.44	1.44			U
PFO5DA	39492-91-6	ND	ND	ND	1.52	1.52			U	
PMPA	13140-29-9	ND	ND	ND	1.44	1.44			U	
R-EVE	2416366-22-6	ND	ND	ND	1.44	1.44			U	
R-PSDA	2416366-18-0	ND	ND	ND	1.44	1.44			U	
R-PSDCA	2416366-21-5	7.32	0.0117	0.0117	1.44	1.44			L	
ES	MPFBA		4776.28	7.64				20-150%	95.5%	
	M5PFPeA		5461.91	8.74				20-150%	109.2%	
	M3PFBS		5089.87	8.14				20-150%	101.8%	
	M2-4:2 FTS		7699.12	12.3				20-150%	154.0%	Q
	M5PFFhxA		4232.84	6.77				20-150%	84.7%	
	M3HFPO-DA		5243.36	8.39				20-150%	104.9%	
	M4PFFHpA		4276.30	6.84				20-150%	85.5%	
	M3PFFHxS		5350.07	8.56				20-150%	107.0%	
	M2-6:2 FTS		9925.82	15.9				20-150%	198.5%	Q
	M8PFOA		4842.14	7.75				20-150%	96.8%	
	M9PFNA		4607.15	7.37				20-150%	92.1%	
	M8PFOS		4477.84	7.16				20-150%	89.6%	
	M2-8:2 FTS		9289.38	14.9				20-150%	185.8%	Q
	M8FOSA-I		3664.07	5.86				20-150%	73.3%	
	M6PFDA		4372.07	7.00				20-150%	87.4%	
	d3-N-MeFOSAA		7585.59	12.1				20-150%	151.7%	Q
	d5-N-EtFOSAA		6815.69	10.9				20-150%	136.3%	
	M7PFUdA		4211.37	6.74				20-150%	84.2%	
MPFDoA		3655.69	5.85				20-150%	73.1%		
M2PFTeDA		2385.62	3.82				20-150%	47.7%		

Enthalpy Analytical

Job No.: 1121-790-1 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Client Proj.: N/A Site: Northwest Water Plant

Enthalpy ID	OPR-12656-PFAS	Prep Batch	EU12656	Sample Vol (mL)	250
Sample Name	OPR-12656-PFAS	Prep Date	2021-11-29 16:25	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2021-11-30 11:30	Dilution Factor	1
Sampling Date		Analyst	wicleve/itbrooker	Method Code	WM-026
Received Date	2021-11-29 16:25	Instrument	Fili	Sample Type	Control

	Compound	CAS	Extract Concentration ng/L	Sample Concentration ng/L	Formatted Result ng/L	LOD ng/L	LOQ ng/L	Recovery Limits	Recovery	Flags
Acids	PFBA	375-22-4	12170.91	19.5	19.5	0.153	0.304	73-129%	97.4%	
	PFPeA	2706-90-3	12617.52	20.2	20.2	0.170	0.304	72-129%	100.9%	
	PFHxA	307-24-4	12226.33	19.6	19.6	0.193	0.304	72-129%	97.8%	
	PFHpA	375-85-9	12533.13	20.1	20.1	0.122	0.304	72-130%	100.3%	
	PFOA	335-67-1	12423.09	19.9	19.9	0.177	0.304	71-133%	99.4%	
	PFNA	375-95-1	12351.42	19.8	19.8	0.0761	0.304	69-130%	98.8%	
	PFDA	335-76-2	11982.48	19.2	19.2	0.0845	0.304	71-129%	95.9%	
	PFUnDA	2058-94-8	12172.88	19.5	19.5	0.185	0.304	69-133%	97.4%	
	PFDoDA	307-55-1	11773.21	18.8	18.8	0.202	0.304	72-134%	94.2%	
	PFTTrDA	72629-94-8	13270.76	21.2	21.2	0.151	0.304	65-144%	106.2%	
PFTeDA	376-06-7	12797.63	20.5	20.5	0.218	0.304	71-132%	102.4%		
Sulfonates	PFBS	375-73-5	11698.86	18.7	18.7	0.355	0.355	72-134%	105.5%	
	PFPeS	2706-91-4	11548.03	18.5	18.5	0.206	0.286	71-127%	98.2%	
	PFHxS	355-46-4	12783.10	20.5	20.5	0.191	0.278	68-131%	111.9%	
	PFHpS	375-92-8	13483.58	21.6	21.6	0.135	0.290	69-134%	113.2%	
	PFOS	1763-23-1	12488.66	20.0	20.0	0.160	0.282	65-140%	107.7%	
	PFNS	68259-12-1	12058.53	19.3	19.3	0.0864	0.293	69-127%	100.3%	
	PFDS	335-77-3	12214.57	19.5	19.5	0.192	0.293	53-142%	101.3%	
	4:2 FTS	757124-72-4	11310.14	18.1	18.1	0.118	0.285	63-143%	96.6%	
6:2 FTS	27619-97-2	10976.17	17.6	17.6	0.116	0.290	64-140%	92.3%		
8:2 FTS	39108-34-4	10847.46	17.4	17.4	0.171	0.291	67-138%	90.4%		
Other	PFOSA	754-91-6	13205.06	21.1	21.1	0.130	0.304	67-137%	105.6%	
	N-MeFOSAA	2355-31-9	12320.47	19.7	19.7	0.144	0.304	65-136%	98.6%	
	N-EtFOSAA	2991-50-6	11719.57	18.8	18.8	0.109	0.304	61-135%	93.8%	
	HFPO-DA	13252-13-6	13127.56	21.0	21.0	0.228	0.304	70-130%	105.0%	
ES	MPFBA		5382.62	8.61				20-150%	107.7%	
	M5PFPeA		5749.64	9.20				20-150%	115.0%	
	M3PFBS		5530.00	8.85				20-150%	110.6%	
	M2-4:2 FTS		7556.95	12.1				20-150%	151.1%	Q
	M5PFHxA		4343.09	6.95				20-150%	86.9%	
	M3HFPO-DA		4724.65	7.56				20-150%	94.5%	
	M4PFHpA		4776.17	7.64				20-150%	95.5%	
	M3PFHxS		5221.21	8.35				20-150%	104.4%	
	M2-6:2 FTS		11279.51	18.0				20-150%	225.6%	Q
	M8PFOA		5300.23	8.48				20-150%	106.0%	
	M9PFNA		4813.29	7.70				20-150%	96.3%	
	M8PFOS		5297.18	8.48				20-150%	105.9%	
	M2-8:2 FTS		10815.94	17.3				20-150%	216.3%	Q
	M8FOSA-I		4329.59	6.93				20-150%	86.6%	
	M6PFDA		5159.17	8.25				20-150%	103.2%	
	d3-N-MeFOSAA		8958.49	14.3				20-150%	179.2%	Q
	d5-N-EtFOSAA		8433.82	13.5				20-150%	168.7%	Q
	M7PFUdA		5468.41	8.75				20-150%	109.4%	
MPFDoA		5289.45	8.46				20-150%	105.8%		
M2PFTeDA		4212.31	6.74				20-150%	84.2%		

Narrative Summary



Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	1121-790-1 PFAS by Isotope Dilution (non-potable water)
Client ID.	N/A Site: Northwest Water Plant

1. Custody

Dallas King received the samples on November 24, 2021 at 4.9 °C after being relinquished by County of Brunswick. The samples were received in good condition.

Prior to, during, and after analysis, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, LLC

Table 1 - Sample Inventory

EU Lab Sample ID	Client Sample ID	Matrix
1121-790-001-1	11242021S01	Aqueous
1121-790-002-1	11242021E01	Aqueous

2. Methods and Analytes

A list of analytes of interest and corresponding methods of analysis is shown in Table 3. Abbreviations are defined in the listed Appendices.

Table 3 - Methods and Analytes

EU Method	Analytes	Cleanup Method
EU-047	brunswick pfas list	ENVI-Carb

3. Analysis

The samples were analyzed using Waters Acquity UPLC equipped with Xevo TQ MS (LC/MS/MS "Fili" and "Kili").

For aqueous samples, the sample volume was measured gravimetrically by the laboratory, and spiked with Extraction Standard (ES). The sample was then mixed well and centrifuged, if needed. The samples were then extracted via SPE, and the extracts were cleaned up using ENVI-Carb.

Each final sample extract was transferred to an autosampler vial, spiked with Injection Standard (IS), and brought to a final volume of 400µL prior to analysis.

Samples that run in more than one sequence in order to analyze all analytes of interest and to be in compliance with method criteria.

4. Calibration

Except where noted below, in the initial calibration, the reported analytes exhibited R² of ≥ 0.99. The reported analytes in the calibration standards, continuing calibration (concal) and Initial Calibration Verification (ICV) met the accuracy criterion for native analytes with the following exception: N-MeFOSA and PFO5DA fell outside method criteria. However, there is no adverse impact as these analytes were not detected in the samples.

Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	1121-790-1 PFAS by Isotope Dilution (non-potable water)
Client ID.	N/A Site: Northwest Water Plant

5. QC Notes

Except where noted below, the QC sample analyses passed all method criteria.

QC samples that did not meet method acceptance criteria were:

MB-12656-PFAS M2-4:2 FTS, OPR-12656-PFAS M2-4:2 FTS, MB-12656-PFAS M2-6:2 FTS, OPR-12656-PFAS M2-6:2 FTS, MB-12656-PFAS M2-8:2 FTS, OPR-12656-PFAS M2-8:2 FTS, MB-12656-PFAS d3-N-MeFOSAA, OPR-12656-PFAS d3-N-MeFOSAA, OPR-12656-PFAS d5-N-EtFOSAA

Some labeled ES in the QC analyses fell outside the control limits for ES recovery, as denoted by the "Q" qualifier. The target analytes are quantified based on their ratio to their labeled standard analogs. As a result, low or high labeled standard recovery do not cause any change to ratios or contribute any additional error in the measurement of the target analytes. The data have been accepted and reported with no further actions.

The samples were extracted within the 28-day from collection holding time and analyzed within the 28-day from extraction to analysis holding time required by the method.

6. Reporting Notes

Some labeled ES in the sample analyses fell outside the control limits for ES recovery, as denoted by the "Q" qualifier. The target analytes are quantified based on their ratio to their labeled standard analogs. As a result, low or high labeled standard recovery do not cause any change to ratios or contribute any additional error in the measurement of the target analytes. The data have been accepted and reported with no further actions.

The results presented in this report are representative of the samples as provided to the laboratory.

These analyses met the requirements of the TNI Standard. Any deviations from the requirements of the reference method or TNI Standard have been stated above.

Enthalpy Analytical, LLC in Wilmington NC is accredited by the Louisiana Department of Environmental Quality to the 2009 TNI Standard under certificate number 05075.



General Reporting Notes – Data Qualifiers

The following are general reporting notes that are applicable to all Enthalpy Analytical, LLC - Wilmington, NC data reports, unless specifically noted otherwise.

General Data Qualifiers

- B – The analyte was found in the method blank, at a concentration that was at least 10% of the concentration in the sample.
- Cxx – Two or more congeners co-elute. In EDDs, C denotes the lowest IUPAC congener in a co-elution group and additional co-eluters for the group ('xx') are shown with the number of the lowest IUPAC co-eluter.
- E – The reported concentration exceeds the calibration range (upper point of the calibration curve). For HRMS data, this condition does not imply additional measurement uncertainty. For LC-MS/MS data, these values should be considered as having measurement uncertainty higher than values within the calibration range.
- EDL – Estimated Detection Level. Specific to Dioxin/Furan tests and equivalent to MDL
- EMPC – Estimated Maximum Possible Concentration Specific to Dioxin/Furan tests to indicate the signal/noise ratio was not sufficient for peak identification (the determined ion-abundance ratio was outside the allowed theoretical range), or where there was a co-eluting interference. Indicates that a peak was identified but did not meet the method specified ion-abundance ratio.
- IR – The ion ratio between the primary and secondary ions was observed to be outside the method criteria therefore the actual analyte concentration cannot be accurately determined as defined by DoD QSM Table B-15.
- J – The analyte has a concentration below the minimum calibration level (LOQ value) but greater than the LOD. These values should be considered as having measurement uncertainty higher than values within the calibration range
- L - Indicates that an analyte has a concentration below the Minimum Detection Limit (MDL). The reported concentration is not recommended for regulatory use as the analyte signal may have a signal-to-noise ratio less than the criteria deemed necessary to be considered a detected analyte.
- LOD – Limit of Detection: For reports conforming to the DOD ELAP QSM, this is the QSM-defined LOD. For reports conforming to TNI requirements (but not DOD ELAP QSM requirements), this value is the minimum detection limit (MDL). The LOD is adjusted for sample weight or volume.
- LOQ – Limit of Quantiation: For reports conforming to the DOD ELAP QSM, this is the QSM-defined LOQ. For reports conforming to TNI requirements (but not DOD ELAP QSM requirements), this value is the reporting limit (RL). The LOD is adjusted for sample weight or volume.
- <LOD() – Analyte was not found at a concentration high enough to be reported as detected. It is reported as less than the LOD, and the LOD is given in the parentheses.



General Reporting Notes – Data Qualifiers

- ND – Indicates a non-detect.
- NR – Indicates a value that is not reportable due to issues observed in sample preparation or analysis.
- PR – The associated congener(s) is(are) poorly resolved.
- QI – Indicates the presence of a quantitative interference.
- RL – Reporting Limit. Lowest reportable value. The level is higher than the MDL.
- SI – Denotes “Single Ion Mode” and is utilized for PCBs where the secondary ion trace has a significantly elevated noise level due to background PFK. Responses for such peaks are calculated using an EMPC approach based solely on the primary ion area(s) and may be considered estimates.
- U – The analyte was not detected.
- V – The labeled standard recovery is not within method control limits.
- X – Results from re-injection/repeat/second-column analysis.

Lab Identifiers/ Data Attributes

- AR – Indicates use of the archived portion of the sample extract.
- CU – Indicates a sample that required additional clean-up prior to HRMS injection/processing.
- D – Dilution Data. Result was obtained from the analysis of a dilution. The number that follows the “D” indicates the dilution factor.
- DE – Indicates a dilution performed with the addition of ES (Extraction Standard) solution.
- DUP – Designation for a duplicate sample.
- MS – Designation for a matrix spike.
- MSD – Designation for a matrix spike duplicate.
- RJ – Indicates a reinjection of the sample extract.
- S – Indicates a sample split. The number that follows the “S” indicates the split factor.
- R – Indicates a re-extraction of the sample.

PFAS Compound Acronym List		
Acronym	CAS #	Compound Name
Target Analytes		
* Analyte is not accredited		
PFBA	375-22-4	Perfluorobutanoic Acid
PFPeA	2706-90-3	Perfluoropentanoic Acid
PFHxA	307-24-4	Perfluorohexanoic Acid
PFHpA	375-85-9	Perfluoroheptanoic Acid
PFOA	335-67-1	Perfluorooctanoic Acid
PFNA	375-95-1	Perfluorononanoic Acid
PFDA	335-76-2	Perfluorodecanoic acid
PFUnA (PFUnDA)	2058-94-8	Perfluoroundecanoic acid
PFDoA (PFDoDA)	307-55-1	Perfluorododecanoic acid
PFTriA (PFTriA)	72629-94-8	Perfluorotridecanoic acid
PFTeDA (PFTA)	376-06-7	Perfluorotetradecanoic acid
PFBS	375-73-5	Perfluorobutane sulfonic acid
PFPeS	2706-91-4	Perfluoropentane sulfonic acid
PFHxS	355-46-4	Perfluorohexane sulfonic acid
PFHpS	375-92-8	Perfluoroheptane sulfonic acid
PFOS	1763-23-1	Perfluorooctane sulfonic acid
PFNS	68259-12-1	Perfluorononane sulfonic acid
PFDS	335-77-3	Perfluorodecane sulfonic acid
4:2 FTS	757124-72-4	4:2 fluorotelomer sulfonic acid
6:2 FTS	27619-97-2	6:2 fluorotelomer sulfonic acid
8:2 FTS	39108-34-4	8:2 fluorotelomer sulfonic acid
PFOSA (FOSA)	754-91-6	Perfluorooctane sulfonamide
N-MeFOSAA	2355-31-9	N-methyl perfluorooctane sulfonamido acetic acid
N-EtFOSAA	2991-50-6	N-ethyl perfluorooctane sulfonamido acetic acid
HFPO-DA	13252-13-6	2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)-propanoic acid (Gen-X)
11Cl-PF3OUdS	763051-92-9	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
9Cl-PF3ONS	756426-58-1	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
ADONA	919005-14-4	4,8-dioxa-3H-perfluorononanoic acid
* PFMOAA	674-13-5	Perfluoro-2-methoxyacetic acid
PFMOPrA (PFMPA)	377-73-1	Perfluoro-3-methoxypropanoic acid
* PFO2HxA	39492-88-1	Perfluoro (3,5-dioxahexanoic) acid
* PFO3OA	39492-89-2	Perfluoro (3,5,7-trioxaoctanoic) acid
* PFO4DA	39492-90-5	Perfluoro (3,5,7,9-tetraoxadecanoic) acid
* PFO5DA	39492-91-6	Perfluoro(3,5,7,9,11-pentaoxadodecanoic) acid
* Nafion Byproduct 1	29311-67-9	Nafion Byproduct 1
* Nafion Byproduct 2	749836-20-2	Nafion Byproduct 2
PFEESA	113507-82-7	Perfluoro(2-ethoxyethane)sulphonic acid
PFMOBA (PFMBA)	863090-89-5	Perfluoro-4-methoxybutanic acid
NFDHA	151772-58-6	Nonafluoro-3,6-dioxaheptanoic acid
* PEPA	267239-61-2	Perfluoro-2-ethoxypropanoic acid
* PMPA	13140-29-9	Perfluoro-2-methoxypropanoic acid
* 10:2 FTS	120226-60-0	Fluorotelomer sulfonate 10:2
* N-EtFOSA	4151-50-2	N-ethylperfluoro-1-octanesulfonamide
* N-EtFOSE	1691-99-2	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
* N-MeFOSA	31506-32-8	N-methylperfluoro-1-octanesulfonamide
* N-MeFOSE	24448-09-7	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
* PFECA-G	801212-59-9	4-(Heptafluoroisopropoxy)hexafluorobutanoic acid
* PFHxDA	67905-19-5	Perfluorohexadecanoic acid
* R-PSDA	2416366-18-0	Perfluoro-4-(2-sulfoethoxy)pentanoic acid

PFAS Compound Acronym List		
Acronym	CAS #	Compound Name
Target Analytes		
* Analyte is not accredited		
* Hydrolyzed PSDA	2416366-19-1	2-fluoro-2-[1,1,2,3,3,3-hexafluoro-2-(1,1,2,2-tetrafluoro-2-sulfoethoxy)propoxy]-acetic acid
* R-PSDCA	2416366-21-5	1,1,2,2-tetrafluoro-2-[1,2,2,3,3-pentafluoro-1-(trifluoromethyl)propoxy] ethanesulfonic acid
* EVE Acid	69087-46-3	2,2,3,3-tetrafluoro-3-({1,1,1,2,3,3-hexafluoro-3-[(1,2,2-trifluoroethenyl)oxy]propan-2-yl}oxy)propionic acid
* FBSA	30334-69-1	Perfluorobutylsulfonamide
* Hydro-EVE Acid	773804-62-9	2,2,3,3-Tetrafluoro-3-([1,1,1,2,3,3-hexafluoro-3-(1,2,2,2-tetrafluoroethoxy)propan-2-yl]oxy)propanoic acid
* R-EVE Acid	2416366-22-6	4-(2-carboxy-1,1,2,2-tetrafluoroethoxy)-2,2,3,3,4,5,5,5-octafluoro-pentanoic acid
* NVHOS	1132933-86-8	Perfluoroethoxysulfonic acid
* PFDoS	79780-39-5	Perfluorododecane sulfonic acid
* PFODA	16517-11-6	Perfluorooctadecanoic acid

Sample Custody

**This Is The Last Page
Of This Report.**