

# County of Brunswick

3954 Clearwell Dr NE  
Leland, NC 28451

## Northwest Water Plant

Leland, NC  
Samples Received: 01/14/22

### Analytical Report 0122-742

#### *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.: 0122-742-1 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: Northwest Water Plant - Leland, NC

### Summary

	Compound	CAS	011322SO1 ng/L	011322EO1 ng/L
Acids	PFBA	375-22-4	4.34	ND U
	PFPeA	2706-90-3	4.99	4.03
	PFHxA	307-24-4	4.65	3.88
	PFHpA	375-85-9	2.18	1.90
	PFOA	335-67-1	4.84	3.57
	PFNA	375-95-1	0.689	0.548
	PFDA	335-76-2	0.451	0.296
	PFUnDA	2058-94-8	0.0913 L	0.0669 L
	PFDoDA	307-55-1	ND UB	ND UB
	PFTrDA	72629-94-8	ND UB	ND UB
	PFTeDA	376-06-7	ND UB	ND UB
Sulfonates	PFBS	375-73-5	3.69	2.89
	PFPeS	2706-91-4	0.542	0.502
	PFHxS	355-46-4	3.13	2.49
	PFHpS	375-92-8	0.206 J	0.198 J
	PFOS	1763-23-1	8.51	6.86
	PFNS	68259-12-1	ND U	ND U
	PFDS	335-77-3	ND U	ND U
	4:2 FTS	757124-72-4	ND U	0.00670 L
	6:2 FTS	27619-97-2	0.103 L	0.172 J
8:2 FTS	39108-34-4	ND U	ND U	
other	PFOSA	754-91-6	ND U	ND U
	N-MeFOSAA	2355-31-9	ND UB	0.0186 LB
	N-EtFOSAA	2991-50-6	ND UB	ND UB
	HFPO-DA	13252-13-6	6.33	3.77
	PFMOAA	674-13-5	47.3	38.7
	PFMOPrA	377-73-1	ND U	ND U
	PFO2HxA	39492-88-1	1.75	2.01
	PFO3OA	39492-89-2	1.74	1.41
	PFO4DA	39492-90-5	1.23 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	0.00282 LB	ND UB
	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	0.345	0.232 J
	Hydro-EVE Acid	773804-62-9	0.271 L	0.272 L
	Hydrolyzed PSDA	2416366-19-1	10.9	6.72
	Nafion Byproduct 2	749836-20-2	0.248 L	0.429
	N-EtFOSA	4151-50-2	ND U	ND U
	N-EtFOSE	1691-99-2	ND U	ND U
	NFDHA	151772-58-6	ND U	ND U
	N-MeFOSA	31506-32-8	ND U	ND U
	N-MeFOSE	24448-09-7	ND U	ND U
	NVHOS	1132933-86-8	1.88	2.20
	PEPA	267239-61-2	ND U	ND U
	PFECA-G	801212-59-9	ND U	ND U
	PFEESA	113507-82-7	ND U	ND U
	PFHxDA	67905-19-5	ND UB	ND UB
	PFMOBA	863090-89-5	ND U	ND U
	PFO5DA	39492-91-6	0.0581 L	ND U
	PMPA	13140-29-9	4.80	3.17
	R-EVE	2416366-22-6	5.56	9.77
R-PSDA	2416366-18-0	14.9	18.4	
R-PSDCA	2416366-21-5	0.0299 L	0.0278 L	

# Detailed Results

### Enthalpy Analytical

Job No.: 0122-742-1 PFAS by Isotope Dilution (non-potable water)  
 County of Brunswick Site: Northwest Water Plant - Leland, NC

Enthalpy ID	0122-742-001-1	Prep Batch	EU12859	Sample Vol (mL)	275.83
Sample Name	011322SO1	Prep Date	2022-01-17 14:16	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2022-01-22 17:59	Dilution Factor	1
Sampling Date	20220113 00:00	Analyst	rappelle	Method Code	WM-026
Received Date	2022-01-14 13:15	Instrument	Fili	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	PFPeA	2706-90-3	3441.05	4.99	4.99	0.154	0.276			
	PFHxA	307-24-4	3203.61	4.65	4.65	0.175	0.276			
	PFHpA	375-85-9	1503.95	2.18	2.18	0.111	0.276			
	PFOA	335-67-1	3337.85	4.84	4.84	0.160	0.276			
	PFNA	375-95-1	475.30	0.689	0.689	0.0690	0.276			
	PFDA	335-76-2	311.32	0.451	0.451	0.0766	0.276			
	PFUnDA	2058-94-8	62.93	0.0913	0.0913	0.168	0.276			L
	PFDODA	307-55-1	ND	ND	ND	0.183	0.276			U
	PFTrDA	72629-94-8	ND	ND	ND	0.137	0.276			U
	PFTeDA	376-06-7	ND	ND	ND	0.198	0.276			U
Sulfonates	PFBS	375-73-5	2547.06	3.69	3.69	0.322	0.322			
	PFPeS	2706-91-4	373.44	0.542	0.542	0.187	0.260			
	PFHxS	355-46-4	2159.40	3.13	3.13	0.173	0.252			
	PFHpS	375-92-8	142.38	0.206	0.206	0.122	0.262			J
	PFOS	1763-23-1	5866.07	8.51	8.51	0.145	0.255			
	PFNS	68259-12-1	ND	ND	ND	0.0783	0.265			U
	PFDS	335-77-3	ND	ND	ND	0.174	0.265			U
	4:2 FTS	757124-72-4	ND	ND	ND	0.107	0.258			U
	6:2 FTS	27619-97-2	71.22	0.103	0.103	0.105	0.262			L
	8:2 FTS	39108-34-4	ND	ND	ND	0.155	0.264			U
other	PFOSA	754-91-6	ND	ND	ND	0.118	0.276			U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.131	0.276			U
	N-EiFOSAA	2991-50-6	ND	ND	ND	0.0988	0.276			U
	HFPO-DA	13252-13-6	4366.46	6.33	6.33	0.207	0.276			
	PFMOAA	674-13-5	32647.29	47.3	47.3	1.31	1.31			
	PFMOPrA	377-73-1	ND	ND	ND	0.218	0.276			U
	PFOzHxA	39492-88-1	1205.43	1.75	1.75	1.31	1.31			
	PFOzOA	39492-89-2	1202.94	1.74	1.74	1.31	1.31			
	PFOzDA	39492-90-5	847.70	1.23	1.23	1.38	1.38			L
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.276	0.276			U
	ADONA	919005-14-4	ND	ND	ND	0.109	0.261			U
	9Cl-PF3ONS	756426-58-1	1.95	0.00282	0.00282	0.109	0.257			LB
	11Cl-PF3OUds	763051-92-9	ND	ND	ND	0.109	0.260			U
	10:2 FTS	120226-60-0	ND	ND	ND	0.218	0.276			U
	EVE Acid	69087-46-3	ND	ND	ND	1.31	1.31			U
	FBSA	30334-69-1	237.62	0.345	0.345	0.218	0.276			
	Hydro-EVE Acid	773804-62-9	186.85	0.271	0.271	1.31	1.31			L
	Hydrolyzed PSDA	2416366-19-1	7543.81	10.9	10.9	1.31	1.31			
	Nafion Byproduct 2	749836-20-2	170.71	0.248	0.248	0.276	0.276			L
	N-EiFOSA	4151-50-2	ND	ND	ND	0.218	0.276			U
N-EiFOSE	1691-99-2	ND	ND	ND	6.53	6.53			U	
NFDHA	151772-68-6	ND	ND	ND	0.218	0.276			U	
N-MeFOSA	31506-32-8	ND	ND	ND	0.218	0.276			U	
N-MeFOSE	24448-09-7	ND	ND	ND	6.53	6.53			U	
NVHOS	1132933-86-8	1295.57	1.88	1.88	1.31	1.31				
PEPA	267239-61-2	ND	ND	ND	1.31	1.31			U	
PFCEA-G	801212-59-9	ND	ND	ND	0.276	1.31			U	
PFEEESA	113507-82-7	ND	ND	ND	0.218	0.276			U	
PFHxDA	67905-19-5	ND	ND	ND	1.31	1.31			U	
PFMOBA	863090-89-5	ND	ND	ND	1.31	1.31			U	
PFOzSDA	39492-91-6	40.05	0.0581	0.0581	1.38	1.38			L	
PMPA	13140-29-9	3307.50	4.80	4.80	1.31	1.31				
R-EVE	2416366-22-6	3833.49	5.56	5.56	1.31	1.31				
R-PSDA	2416366-18-0	10275.93	14.9	14.9	1.31	1.31				
R-PSDCA	2416366-21-5	20.59	0.0299	0.0299	1.31	1.31			L	
ES	MPFBA		3862.22	5.60				20-150%	77.2%	
	M5PFPeA		11015.37	16.0				20-150%	220.3%	Q
	M3PFBS		16336.54	23.7				20-150%	326.7%	Q
	M2-4:2 FTS		10108.20	14.7				20-150%	202.2%	Q
	M5PFHxA		3550.56	5.15				20-150%	71.0%	
	M3HFPO-DA		2563.00	3.72				20-150%	51.3%	
	M4PFHpA		4047.26	5.87				20-150%	80.9%	
	M3PFHxS		3877.68	5.62				20-150%	77.6%	
	M2-6:2 FTS		5286.98	7.67				20-150%	105.7%	
	M8PFOA		3779.34	5.48				20-150%	75.6%	
	M9PFNA		2909.30	4.22				20-150%	58.2%	
	M8PFOS		3296.60	4.78				20-150%	65.9%	
	M2-8:2 FTS		3362.23	4.88				20-150%	67.2%	
	M8FOSA-I		3001.90	4.35				20-150%	60.0%	
	M6PFDA		2674.22	3.88				20-150%	53.5%	
	d3-N-MeFOSAA		2979.56	4.32				20-150%	59.6%	
	d5-N-EiFOSAA		2587.56	3.75				20-150%	51.8%	
	M7PFUDa		2573.41	3.73				20-150%	51.5%	
	MPFDaA		1972.93	2.86				20-150%	39.5%	
	M2PFTeDA		1503.80	2.18				20-150%	30.1%	

## Enthalpy Analytical

Job No.: 0122-742-1 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: Northwest Water Plant - Leland, NC

Enthalpy ID	0122-742-001-2	Prep Batch	EU12927	Sample Vol (mL)	281.56
Sample Name	011322SO1	Prep Date	2022-01-31 14:00	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2022-02-04 13:13	Dilution Factor	1
Sampling Date	20220113 00:00	Analyst	brneff/ITB	Method Code	WM-026
Received Date	2022-01-14 13:15	Instrument	Kili	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	3052.38	4.34	4.34	0.136	0.270			
ES	MPFBA		4653.61	6.61				20-150%	93.1%	

### Enthalpy Analytical

Job No.: 0122-742-1 PFAS by Isotope Dilution (non-potable water)  
 County of Brunswick Site: Northwest Water Plant - Leland, NC

Enthalpy ID	0122-742-002-1	Prep Batch	EU12859	Sample Vol (mL)	266.9
Sample Name	011322EO1	Prep Date	2022-01-17 14:16	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2022-01-22 18:22	Dilution Factor	1
Sampling Date	20220113 00:00	Analyst	rappelle	Method Code	WM-026
Received Date	2022-01-14 13:15	Instrument	Fili	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	PFPeA	2706-90-3	2686.17	4.03	4.03	0.159	0.285			
	PFHxA	307-24-4	2592.19	3.88	3.88	0.181	0.285			
	PFHpA	375-85-9	1269.96	1.90	1.90	0.114	0.285			
	PFOA	335-67-1	2385.39	3.57	3.57	0.166	0.285			
	PFNA	375-95-1	365.91	0.548	0.548	0.0713	0.285			
	PFDA	335-76-2	197.29	0.296	0.296	0.0791	0.285			
	PFUnDA	2058-94-8	44.63	0.0669	0.0669	0.173	0.285			L
	PFDODA	307-55-1	ND	ND	ND	0.189	0.285			U
Sulfonates	PFTDA	72629-94-8	ND	ND	ND	0.141	0.285			U
	PFTeDA	376-06-7	ND	ND	ND	0.204	0.285			U
	PFBS	375-73-5	1925.05	2.89	2.89	0.333	0.333			
	PFPeS	2706-91-4	335.12	0.502	0.502	0.193	0.268			
	PFHxS	355-46-4	1662.57	2.49	2.49	0.179	0.261			
	PFHpS	375-92-8	131.97	0.198	0.198	0.126	0.271			J
	PFOS	1763-23-1	4574.26	6.86	6.86	0.150	0.264			
	PFNS	68259-12-1	ND	ND	ND	0.0809	0.274			U
other	PFDS	335-77-3	ND	ND	ND	0.180	0.274			U
	4:2 FTS	757124-72-4	4.47	0.00670	0.00670	0.111	0.267			L
	6:2 FTS	27619-97-2	114.48	0.172	0.172	0.109	0.271			J
	8:2 FTS	39108-34-4	ND	ND	ND	0.160	0.273			U
	PFOSA	754-91-6	ND	ND	ND	0.122	0.285			U
	N-MeFOSAA	2355-31-9	12.44	0.0186	0.0186	0.135	0.285			LB
	N-EiFOSAA	2991-50-6	ND	ND	ND	0.102	0.285			U
	HFPO-DA	13252-13-6	2514.45	3.77	3.77	0.214	0.285			
	PFMOAA	674-13-5	25836.07	38.7	38.7	1.35	1.35			
	PFMOPrA	377-73-1	ND	ND	ND	0.225	0.285			U
	PFOzHxA	39492-88-1	1338.24	2.01	2.01	1.35	1.35			
	PFO3OA	39492-89-2	943.99	1.41	1.41	1.35	1.35			
	PFO4DA	39492-90-5	ND	ND	ND	1.42	1.42			U
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.285	0.285			U
	ADONA	919005-14-4	ND	ND	ND	0.112	0.270			U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.112	0.265			U
	11Cl-PF3OUds	763051-92-9	ND	ND	ND	0.112	0.268			U
	10:2 FTS	120226-60-0	ND	ND	ND	0.225	0.285			U
EVE Acid	69087-46-3	ND	ND	ND	1.35	1.35			U	
other	FBSA	30334-69-1	154.72	0.232	0.232	0.225	0.285			J
	Hydro-EVE Acid	773804-62-9	181.73	0.272	0.272	1.35	1.35			L
	Hydrolyzed PSDA	2416366-19-1	4482.28	6.72	6.72	1.35	1.35			
	Nafion Byproduct 2	749836-20-2	286.53	0.429	0.429	0.285	0.285			
	N-EiFOSA	4151-50-2	ND	ND	ND	0.225	0.285			U
	N-EiFOSE	1691-99-2	ND	ND	ND	6.74	6.74			U
	NFDHA	151772-68-6	ND	ND	ND	0.225	0.285			U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.225	0.285			U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.74	6.74			U
	NVHOS	1132933-86-8	1468.13	2.20	2.20	1.35	1.35			
	PEPA	267239-61-2	ND	ND	ND	1.35	1.35			U
	PFECA-G	801212-59-9	ND	ND	ND	0.285	1.35			U
	PFEEESA	113507-82-7	ND	ND	ND	0.225	0.285			U
	PFHxDA	67905-19-5	ND	ND	ND	1.35	1.35			U
	PFMOBA	863090-89-5	ND	ND	ND	1.35	1.35			U
	PFO5DA	39492-91-6	ND	ND	ND	1.42	1.42			U
	PMPA	13140-29-9	2115.25	3.17	3.17	1.35	1.35			
	R-EVE	2416366-22-6	6520.05	9.77	9.77	1.35	1.35			
R-PSDA	2416366-18-0	12261.03	18.4	18.4	1.35	1.35				
R-PSDCA	2416366-21-5	18.57	0.0278	0.0278	1.35	1.35			L	
ES	MPFBA		4720.18	7.07				20-150%	94.4%	
	M5PFPeA		11915.89	17.9				20-150%	238.3%	Q
	M3PFBS		23650.94	35.4				20-150%	473.0%	Q
	M2-4:2 FTS		14158.82	21.2				20-150%	283.2%	Q
	M5PFHxA		3395.76	5.09				20-150%	67.9%	
	M3HFPO-DA		2887.62	4.33				20-150%	57.8%	
	M4PFHpA		3986.13	5.97				20-150%	79.7%	
	M3PFHxS		4396.73	6.59				20-150%	87.9%	
	M2-6:2 FTS		12235.04	18.3				20-150%	244.7%	Q
	M8PFOA		4039.05	6.05				20-150%	80.8%	
	M9PFNA		3221.38	4.83				20-150%	64.4%	
	M8PFOS		3337.03	5.00				20-150%	66.7%	
	M2-8:2 FTS		5891.28	8.83				20-150%	117.8%	
	M8FOSA-I		2429.68	3.64				20-150%	48.6%	
	M6PFDA		3061.23	4.59				20-150%	61.2%	
	d3-N-MeFOSAA		3014.12	4.52				20-150%	60.3%	
	d5-N-EiFOSAA		2887.01	4.33				20-150%	57.7%	
	M7PFUdA		2501.22	3.75				20-150%	50.0%	
	MPFDaA		1973.94	2.96				20-150%	39.5%	
	M2PFTeDA		1420.83	2.13				20-150%	28.4%	

## Enthalpy Analytical

Job No.: 0122-742-1 PFAS by Isotope Dilution (non-potable water)  
 County of Brunswick Site: Northwest Water Plant - Leland, NC

Enthalpy ID	0122-742-002-2	Prep Batch	EU12927	Sample Vol (mL)	269.59
Sample Name	011322EO1	Prep Date	2022-01-31 14:00	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2022-02-04 13:36	Dilution Factor	1
Sampling Date	20220113 00:00	Analyst	brneff/ITB	Method Code	WM-026
Received Date	2022-01-14 13:15	Instrument	Kili	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	ND	ND	ND	0.142	0.282			U
ES	MPFBA		4839.74	7.18				20-150%	96.8%	

# QC Data



### Enthalpy Analytical

Job No.: 0122-742-1 PFAS by Isotope Dilution (non-potable water)  
 County of Brunswick Site: Northwest Water Plant - Leland, NC

Enthalpy ID	MB-12859-PFAS	Prep Batch	EU12859	Sample Vol (mL)	250
Sample Name	MB-12859-PFAS	Prep Date	2022-01-17 14:16	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2022-01-22 16:03	Dilution Factor	1
Sampling Date		Analyst	rappelle	Method Code	WM-026
Received Date		Instrument	Fili	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	319.49	0.511	0.511	0.153	0.304			
	PFPeA	2706-90-3	ND	ND	ND	0.170	0.304			U
	PFHxA	307-24-4	10.17	0.0163	0.0163	0.193	0.304			L
	PFHpA	375-85-9	ND	ND	ND	0.122	0.304			U
	PFOA	335-67-1	ND	ND	ND	0.177	0.304			U
	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	ND	ND	ND	0.185	0.304			U
	PFDoDA	307-55-1	32.32	0.0517	0.0517	0.202	0.304			L
	PFTeDA	72629-94-8	132.86	0.213	0.213	0.151	0.304			J
	PFTeDA	376-06-7	324.46	0.519	0.519	0.218	0.304			U
	PFBS	375-73-5	80.67	0.129	0.129	0.355	0.355			L
	PFPeS	2706-91-4	ND	ND	ND	0.206	0.286			U
	PFHxS	355-46-4	ND	ND	ND	0.191	0.278			U
Sulfonates	PFHpS	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
	PFOSA	754-91-6	ND	ND	ND	0.130	0.304			U
	N-MeFOSAA	2355-31-9	11.66	0.0187	0.0187	0.144	0.304			L
	N-EtFOSAA	2991-50-6	37.19	0.0595	0.0595	0.109	0.304			L
other	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-PF3OUds	756426-58-1	4.66	0.00745	0.00745	0.120	0.283			L
	11Cl-PF3OUds	763051-92-9	ND	ND	ND	0.120	0.286			U
	10:2 FTS	120226-60-0	ND	ND	ND	0.240	0.304			U
	EVE Acid	69087-46-3	ND	ND	ND	1.44	1.44			U
	FBSA	30334-69-1	ND	ND	ND	0.240	0.304			U
	Hydro-EVE Acid	773804-62-9	ND	ND	ND	1.44	1.44			U
	Hydrolyzed PSDA	2416366-19-1	41.93	0.0671	0.0671	1.44	1.44			L
	Nafion Byproduct 2	749836-20-2	ND	ND	ND	0.304	0.304			U
	N-EtFOSE	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-MeFOSE	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
	PFCEA-G	801212-59-9	ND	ND	ND	0.304	1.44			U
	PFEESA	113507-82-7	ND	ND	ND	0.240	0.304			U
	PFHxDA	67905-19-5	38.80	0.0621	0.0621	1.44	1.44			L
	PFMOBA	863090-89-5	ND	ND	ND	1.44	1.44			U
	PFOSDA	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	ND	ND	ND	1.44	1.44			U	
ES	MPFBA		4625.13	7.40				20-150%	92.5%	
	M5PFPeA		5478.35	8.77				20-150%	109.6%	
	M3PFBS		5015.84	8.03				20-150%	100.3%	
	M2-4:2 FTS		4743.56	7.59				20-150%	94.9%	
	M5PFHxA		4305.54	6.89				20-150%	86.1%	
	M3HFPO-DA		4823.12	7.72				20-150%	96.5%	
	M4PFHpA		4704.52	7.53				20-150%	94.1%	
	M3PFHxS		4310.51	6.90				20-150%	86.2%	
	M2-6:2 FTS		4650.61	7.44				20-150%	93.0%	
	M8PFOA		4235.28	6.78				20-150%	84.7%	
	M9PFNA		4168.23	6.67				20-150%	83.4%	
	M8PFOS		4709.56	7.54				20-150%	94.2%	
	M2-8:2 FTS		4719.02	7.55				20-150%	94.4%	
	M8FOSA-I		4161.53	6.66				20-150%	83.2%	
	M6PFDA		4610.00	7.38				20-150%	92.2%	
	d3-N-MeFOSAA		4750.57	7.60				20-150%	95.0%	
	d5-N-EtFOSAA		4357.22	6.97				20-150%	87.1%	
	M7PFUdA		4181.42	6.69				20-150%	83.6%	
	MPFDaA		3548.68	5.68				20-150%	71.0%	
	M2PFTeDA		2736.91	4.38				20-150%	54.7%	

## Enthalpy Analytical

Job No.: 0122-742-1 PFAS by Isotope Dilution (non-potable water)  
 County of Brunswick Site: Northwest Water Plant - Leland, NC

Enthalpy ID	MB-12927-PFAS	Prep Batch	EU12927	Sample Vol (mL)	250
Sample Name	MB-12927-PFAS	Prep Date	2022-01-31 14:00	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2022-02-04 10:55	Dilution Factor	1
Sampling Date		Analyst	brneff/ITB	Method Code	WM-026
Received Date		Instrument	Kili	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
ES	MPFBA		4957.11	7.93				20-150%	99.1%	

# Enthalpy Analytical

Job No.: 0122-742-1 PFAS by Isotope Dilution (non-potable water)  
 County of Brunswick Site: Northwest Water Plant - Leland, NC

Enthalpy ID	OPR-12859-PFAS	Prep Batch	EU12859	Sample Vol (mL)	250
Sample Name	OPR-12859-PFAS	Prep Date	2022-01-17 14:16	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2022-01-22 16:26	Dilution Factor	1
Sampling Date		Analyst	rappelle	Method Code	WM-026
Received Date		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	11010.31	17.6	17.6	0.153	0.304	73-129%	88.1%	
	PFPeA	2706-90-3	11837.02	18.9	18.9	0.170	0.304	72-129%	94.7%	
	PFHxA	307-24-4	11044.57	17.7	17.7	0.193	0.304	72-129%	88.4%	
	PFHpA	375-85-9	10322.73	16.5	16.5	0.122	0.304	72-130%	82.6%	
	PFOA	335-67-1	11268.23	18.0	18.0	0.177	0.304	71-133%	90.1%	
	PFNA	375-95-1	10953.16	17.5	17.5	0.0761	0.304	69-130%	87.6%	
	PFDA	335-76-2	11198.58	17.9	17.9	0.0845	0.304	71-129%	89.6%	
	PFUnDA	2058-94-8	11204.04	17.9	17.9	0.185	0.304	69-133%	89.6%	
	PFDoDA	307-55-1	11433.71	18.3	18.3	0.202	0.304	72-134%	91.5%	
	PFTeDA	72629-94-8	11849.16	19.0	19.0	0.151	0.304	65-144%	94.8%	
Sulfonates	PFTeDA	376-06-7	10474.89	16.8	16.8	0.218	0.304	71-132%	83.8%	
	PFBS	375-73-5	10196.79	16.3	16.3	0.355	0.355	72-134%	92.0%	
	PFPeS	2706-91-4	9748.69	15.6	15.6	0.206	0.286	71-127%	82.9%	
	PFHxS	355-46-4	10872.01	17.4	17.4	0.191	0.278	68-131%	95.2%	
	PFHpS	375-92-8	11738.21	18.8	18.8	0.135	0.290	69-134%	98.5%	
	PFOS	1763-23-1	11163.42	17.9	17.9	0.160	0.282	65-140%	96.2%	
	PFNS	68259-12-1	12144.25	19.4	19.4	0.0864	0.293	69-127%	101.0%	
	PFDS	335-77-3	11205.44	17.9	17.9	0.192	0.293	53-142%	92.9%	
Other	4:2 FTS	757124-72-4	10665.09	17.1	17.1	0.118	0.285	63-143%	91.1%	
	6:2 FTS	27619-97-2	10903.52	17.4	17.4	0.116	0.290	64-140%	91.7%	
	8:2 FTS	39108-34-4	9770.45	15.6	15.6	0.171	0.291	67-138%	81.4%	
	PFOSA	754-91-6	11275.66	18.0	18.0	0.130	0.304	67-137%	90.2%	
	N-MeFOSAA	2355-31-9	11288.07	18.1	18.1	0.144	0.304	65-136%	90.3%	
	N-EtFOSAA	2991-50-6	11630.90	18.6	18.6	0.109	0.304	61-135%	93.0%	
ES	HFPO-DA	13252-13-6	11640.11	18.6	18.6	0.228	0.304	70-130%	93.1%	
	MFPBA		5101.01	8.16				20-150%	102.0%	
	M5PFPeA		5863.54	9.38				20-150%	117.3%	
	M3PFBS		5778.09	9.24				20-150%	115.6%	
	M2-4:2 FTS		4772.37	7.64				20-150%	95.4%	
	M5PFHxA		5071.16	8.11				20-150%	101.4%	
	M3HFPO-DA		4553.06	7.28				20-150%	91.1%	
	M4PFHpA		5246.89	8.40				20-150%	104.9%	
	M3PFHxS		4924.89	7.88				20-150%	98.5%	
	M2-6:2 FTS		5694.69	9.11				20-150%	113.9%	
	M8PFOA		5262.84	8.42				20-150%	105.3%	
	M9PFNA		4845.57	7.75				20-150%	96.9%	
	M8PFOS		4915.29	7.86				20-150%	98.3%	
	M2-8:2 FTS		6347.22	10.2				20-150%	126.9%	
	M8FOSA-I		4469.74	7.15				20-150%	89.4%	
	M6PFDA		4608.20	7.37				20-150%	92.2%	
	d3-N-MeFOSAA		5392.50	8.63				20-150%	107.9%	
	d5-N-EtFOSAA		4912.60	7.86				20-150%	98.3%	
M7PFUdA		4502.42	7.20				20-150%	90.0%		
MPFDoA		4092.08	6.55				20-150%	81.8%		
M2PFTeDA		2855.97	4.57				20-150%	57.1%		

## Enthalpy Analytical

Job No.: 0122-742-1 PFAS by Isotope Dilution (non-potable water)  
 County of Brunswick Site: Northwest Water Plant - Leland, NC

Enthalpy ID	OPR-12927-PFAS	Prep Batch	EU12927	Sample Vol (mL)	250
Sample Name	OPR-12927-PFAS	Prep Date	2022-01-31 14:00	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2022-02-04 11:18	Dilution Factor	1
Sampling Date		Analyst	brneff/ITB	Method Code	WM-026
Received Date		Instrument	Kili	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	10905.58	17.4	17.4	0.153	0.304	73-129%	87.2%	
ES	MPFBA		5446.42	8.71				20-150%	108.9%	

# Narrative Summary



# Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	0122-742-1 PFAS by Isotope Dilution (non-potable water)
Client ID.	N/A Site: Northwest Water Plant

## 1. Custody

Lois Walton received the samples on January 14, 2022 at 3.2 °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
0122-742-001-1	011322SO1	Aqueous
0122-742-001-2		
0122-742-002-1	011322EO1	Aqueous
0122-742-002-2		

## 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

In the initial calibration, the reported analytes exhibited R<sup>2</sup> of  $\geq 0.99$ . The reported analytes in the calibration standards, continuing calibration (concal) and Initial Calibration Verification (ICV) met the 30% accuracy criterion for native analytes.

Supplemental compounds were run using a single point calibration forced through zero.

# Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	0122-742-1 PFAS by Isotope Dilution (non-potable water)
Client ID.	N/A Site: Northwest Water Plant

## 5. QC Notes

The QC sample analyses passed all method criteria with the exception of the following:

Method Blank (MB)-12859- PFAS PFBA was detected above 1/2 LOQ. Samples were re-extracted and reported for this analyte.

MB-12859-PFAS PFTTrDA and PFTeDA were detected above 1/2 LOQ. These analytes were not detected in the samples; therefore, the data is accepted without adverse impact.

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

Analyte(s) were detected in the method blank (MB) less than 1/2 LOQ. Any analytes detected in the samples with less than 10 times the amount detected in MB were notated with a B qualifier

Some labeled extraction standards 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 amount 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: The EDL is unique to isotope dilution methods and reflects the conditions of analysis at the time of analysis, including the equipment used. Where the MDL is a static value, the EDL is a dynamic value.
- EMPC – Estimated Maximum Possible Concentration: EMPC is specific to Dioxin/Furan tests to indicate the determined ion-abundance ratio was outside the allowed theoretical range (usually due to being near the detection limit, although it can very rarely be caused by a co-eluting interference). The EMPC concentration is adjusted to reflect the value at the theoretical ion-abundance ratio.
- IR – The ion ratio between the primary and secondary ions was observed to be outside the method criteria. The analyte concentration may be inaccurate due to interference.
- 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 Quantitation: 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 LOQ is adjusted for sample weight or volume.

## General Reporting Notes – Data Qualifiers

- <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.
- <LOQ() – Analyte was not found at a concentration high enough to be reported as above the QSM-defined LOQ or TNI defined Reporting Limit. It is reported as less than the LOQ, and the LOQ is given in the parentheses.
- 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 / Q – The labeled standard recovery is not within method control limits.
- X – Indicates the result is 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.
- R – Indicates a re-extraction of the sample.
- RJ – Indicates a reinjection of the sample extract.



## General Reporting Notes – Data Qualifiers

- S – Indicates a sample split. The number that follows the “S” indicates the split factor.
- SAT – Indicates an analyte saturated the detector.

PFAS Compound Acronym List		
Acronym	CAS #	Compound Name
<b>Target Analytes</b>		
<b>* Analyte is not accredited</b>		
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-chloroeicosafuoro-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
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
PFMOPra (PFMPA)	377-73-1	Perfluoro-3-methoxypropanoic acid
* PFMOAA	674-13-5	Perfluoro-2-methoxyacetic acid
* PFO2HxA	39492-88-1	Perfluoro (3,5-dioxaheptanoic) 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
* 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 (Nafion Byproduct * 4)	2416366-18-0	Perfluoro-4-(2-sulfoethoxy)pentanoic acid

PFAS Compound Acronym List		
Acronym	CAS #	Compound Name
<b>Target Analytes</b>		
<b>* Analyte is not accredited</b>		
* Hydrolyzed PSDA (Nafion Byproduct 5)	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 (Nafion Byproduct 6)	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
* PFOA	16517-11-6	Perfluorooctadecanoic acid
* 3:3 FTCA	356-02-5	2H,2H,3H,3H-Perfluorohexanoic acid
* 5:3 FTCA	914637-49-3	2H,2H,3H,3H-Perfluorooctanoic acid
* 7:3 FTCA	812-70-4	2H,2H,3H,3H-Perfluorodecanoic acid
* N-AP-FHxSA	50598-28-2	N-(3-(Dimethylamino)propyl)tridecafluoro-1-hexanesulfonamide
* N-CMAmP-6:2 FOSA	34455-29-3	N-(Carboxymethyl)-N,N-dimethyl-3-(((3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl)amino)1-propanaminium

# Sample Custody





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