

County of Brunswick

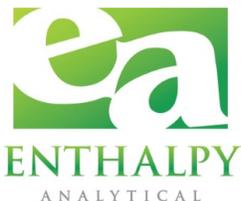
3954 Clearwell Dr NE
Leland, NC 28451

Northwest Water Plant

Leland, NC
Samples Received: 12/02/21

Analytical Report 1221-712

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.: 1221-712-1 PFAS by Isotope Dilution (non-potable water)

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

Summary

	Compound	CAS	120221-SO1 ng/L	120221-EO1 ng/L
Acids	PFBA	375-22-4	7.76	7.22
	PFPeA	2706-90-3	17.4	18.0
	PFHxA	307-24-4	13.7	14.1
	PFHpA	375-85-9	3.86	4.28
	PFOA	335-67-1	8.00	8.17
	PFNA	375-95-1	1.10	1.12
	PFDA	335-76-2	0.486	0.655
	PFUnDA	2058-94-8	ND U	0.0947 L
	PFDaDA	307-55-1	0.0870 LB	0.197 JB
	PFTTrDA	72629-94-8	0.0442 LB	0.212 JB
PFTeDA	376-06-7	0.0325 LB	0.129 LB	
Sulfonates	PFBS	375-73-5	9.25	7.20
	PFPeS	2706-91-4	0.917	1.02
	PFHxS	355-46-4	5.59	4.94
	PFHpS	375-92-8	0.299	0.432
	PFOS	1763-23-1	10.2	10.4
	PFNS	68259-12-1	ND U	0.0455 L
	PFDS	335-77-3	ND U	ND U
	4:2 FTS	757124-72-4	0.0551 LB	0.134 JB
6:2 FTS	27619-97-2	0.164 JB	0.278 B	
8:2 FTS	39108-34-4	0.126 L	ND U	
other	PFOSA	754-91-6	0.101 L	0.110 L
	N-MeFOSAA	2355-31-9	0.114 L	0.178 J
	N-EtFOSAA	2991-50-6	0.0440 L	0.0352 L
	HFPO-DA	13252-13-6	13.6	10.7
	PFMOAA	674-13-5	118	79.3
	PFMOPrA	377-73-1	0.211 L	0.306
	PFO2HxA	39492-88-1	8.04	8.56
	PFO3OA	39492-89-2	1.97	1.77
	PFO4DA	39492-90-5	ND U	0.720 L
	Nafion Byproduct 1	29311-67-9	ND U	ND U
	ADONA	919005-14-4	ND U	0.0413 L
	9Cl-PF3ONS	756426-58-1	0.00622 LB	0.0892 L
	11Cl-PF3OUdS	763051-92-9	0.0165 LB	0.0613 L
	10:2 FTS	120226-60-0	0.139 L	ND U
	EVE Acid	69087-46-3	0.00965 LB	ND U
	FBSA	30334-69-1	1.24	1.37
	Hydro-EVE Acid	773804-62-9	0.644 LB	0.557 LB
	Hydrolyzed PSDA	2416366-19-1	22.5	16.8
	Nafion Byproduct 2	749836-20-2	0.449	0.536
	N-EtFOSA	4151-50-2	ND U	ND U
	N-EtFOSE	1691-99-2	ND U	ND U
	NFDHA	151772-58-6	0.0561 LB	0.138 LB
	N-MeFOSA	31506-32-8	ND U	ND U
	N-MeFOSE	24448-09-7	ND U	ND U
	NVHOS	1132933-86-8	8.15	8.59
	PEPA	267239-61-2	5.66	ND U
	PFECA-G	801212-59-9	0.0717 LB	0.147 LB
	PFEESA	113507-82-7	ND U	0.0862 L
	PFHxDA	67905-19-5	ND U	0.136 L
	PFMOBA	863090-89-5	ND U	ND U
PFO5DA	39492-91-6	0.228 L	0.372 L	
PMPA	13140-29-9	8.99	6.43	
R-EVE	2416366-22-6	16.0	17.1	
R-PSDA	2416366-18-0	44.1	29.6	
R-PSDCA	2416366-21-5	0.0804 LB	0.0649 LB	

Detailed Results

Enthalpy Analytical

Job No.: 1221-712-1 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID	1221-712-001-1	Prep Batch	EU12681	Sample Vol (mL)	278.07
Sample Name	120221-SO1	Prep Date	2021-12-03 16:00	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2021-12-04 08:40	Dilution Factor	1
Sampling Date	20211202 00:00	Analyst	wicleve	Method Code	WM-026
Received Date	2021-12-02 03:00	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	5397.14	7.76	7.76	0.138	0.273			
	PFPeA	2706-90-3	12115.13	17.4	17.4	0.153	0.273			
	PFFHxA	307-24-4	9554.00	13.7	13.7	0.174	0.273			
	PFFHpA	375-85-9	2684.10	3.86	3.86	0.110	0.273			
	PFOA	335-67-1	5562.72	8.00	8.00	0.159	0.273			
	PFNA	375-95-1	762.51	1.10	1.10	0.0684	0.273			
	PFDA	335-76-2	337.57	0.486	0.486	0.0760	0.273			
	PFUnDA	2058-94-8	ND	ND	ND	0.166	0.273			U
	PFDoDA	307-55-1	60.45	0.0870	0.0870	0.182	0.273			LB
	PFFTrDA	72629-94-8	30.70	0.0442	0.0442	0.136	0.273			LB
PFTeDA	376-06-7	22.60	0.0325	0.0325	0.196	0.273			LB	
Sulfonates	PFBS	375-73-5	6432.55	9.25	9.25	0.319	0.319			
	PFFPeS	2706-91-4	637.77	0.917	0.917	0.185	0.257			
	PFFHxS	355-46-4	3888.25	5.59	5.59	0.172	0.250			
	PFFHpS	375-92-8	208.10	0.299	0.299	0.121	0.260			
	PFOS	1763-23-1	7121.35	10.2	10.2	0.144	0.253			
	PFNS	68259-12-1	ND	ND	ND	0.0777	0.263			U
	PFDS	335-77-3	ND	ND	ND	0.173	0.263			U
	4:2 FTS	757124-72-4	38.28	0.0551	0.0551	0.106	0.256			LB
	6:2 FTS	27619-97-2	113.82	0.164	0.164	0.104	0.260			JB
	8:2 FTS	39108-34-4	87.73	0.126	0.126	0.154	0.262			L
other	PFOSA	754-91-6	70.44	0.101	0.101	0.117	0.273			L
	N-MeFOSAA	2355-31-9	79.17	0.114	0.114	0.129	0.273			L
	N-EiFOSAA	2991-50-6	30.60	0.0440	0.0440	0.0980	0.273			L
	HFPO-DA	13252-13-6	9482.39	13.6	13.6	0.205	0.273			
	PFMOAA	674-13-5	81741.31	118	118	1.29	1.29			
	PFMOPrA	377-73-1	146.40	0.211	0.211	0.216	0.273			L
	PFO2HxA	39492-88-1	5591.13	8.04	8.04	1.29	1.29			
	PFO3OA	39492-89-2	1369.41	1.97	1.97	1.29	1.29			
	PFO4DA	39492-90-5	ND	ND	ND	1.37	1.37			U
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.273	0.273			U
	ADONA	919005-14-4	ND	ND	ND	0.108	0.259			U
	9Cl-PF3ONS	756426-58-1	4.32	0.00622	0.00622	0.108	0.255			LB
	11Cl-PF3OUdS	763051-92-9	11.50	0.0165	0.0165	0.108	0.257			LB
	10:2 FTS	120226-60-0	96.40	0.139	0.139	0.216	0.273			L
	EVE Acid	69087-46-3	6.71	0.00965	0.00965	1.29	1.29			LB
	FBSA	30334-69-1	862.95	1.24	1.24	0.216	0.273			
	Hydro-EVE Acid	773804-62-9	447.50	0.644	0.644	1.29	1.29			LB
	Hydrolyzed PSDA	2416366-19-1	15662.57	22.5	22.5	1.29	1.29			
	Nafion Byproduct 2	749836-20-2	311.88	0.449	0.449	0.273	0.273			
	N-EiFOSA	4151-50-2	ND	ND	ND	0.216	0.273			U
	N-EiFOSE	1691-99-2	ND	ND	ND	6.47	6.47			U
	NFDHA	151772-58-6	38.99	0.0561	0.0561	0.216	0.273			LB
	N-MeFOSA	31506-32-8	ND	ND	ND	0.216	0.273			U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.47	6.47			U
	NVHOS	1132933-86-8	5665.76	8.15	8.15	1.29	1.29			
	PEPA	267239-61-2	3933.30	5.66	5.66	1.29	1.29			
	PFECA-G	801212-59-9	49.84	0.0717	0.0717	0.273	1.29			LB
	PFEESA	113507-82-7	ND	ND	ND	0.216	0.273			U
	PFFHxDA	67905-19-5	ND	ND	ND	1.29	1.29			U
	PFFMOBA	863090-89-5	ND	ND	ND	1.29	1.29			U
PFO5DA	39492-91-6	158.34	0.228	0.228	1.37	1.37			L	
PMPA	13140-29-9	6248.28	8.99	8.99	1.29	1.29				
R-EVE	2416366-22-6	11133.16	16.0	16.0	1.29	1.29				
R-PSDA	2416366-18-0	30650.30	44.1	44.1	1.29	1.29				
R-PSDCA	2416366-21-5	55.92	0.0804	0.0804	1.29	1.29			LB	
ES	MPFBA	4443.08	6.39					20-150%	88.9%	
	M5PFPeA	7960.81	11.5					20-150%	159.2%	Q
	M3PFBS	10202.41	14.7					20-150%	204.0%	Q
	M2-4:2 FTS	9048.84	13.0					20-150%	181.0%	Q
	M5PFFHxA	4644.04	6.68					20-150%	92.9%	
	M3HFPO-DA	3581.22	5.15					20-150%	71.6%	
	M4PFFHpA	5012.96	7.21					20-150%	100.3%	
	M3PFFHxS	5142.61	7.40					20-150%	102.9%	
	M2-6:2 FTS	8019.02	11.5					20-150%	160.4%	Q
	M8PFOA	5217.94	7.51					20-150%	104.4%	
	M9PFNA	4725.37	6.80					20-150%	94.5%	
	M8PFOS	5197.30	7.48					20-150%	103.9%	
	M2-8:2 FTS	5768.34	8.30					20-150%	115.4%	
	M8FOSA-I	4613.55	6.64					20-150%	92.3%	
	M6PFDA	5681.03	8.17					20-150%	113.6%	
	d3-N-MeFOSAA	4229.04	6.08					20-150%	84.6%	
	d5-N-EiFOSAA	4891.98	7.04					20-150%	97.8%	
	M7PFUdA	5271.48	7.58					20-150%	105.4%	
	MPFDoA	4563.35	6.56					20-150%	91.3%	
	M2PFTeDA	3635.41	5.23					20-150%	72.7%	

Enthalpy Analytical

Job No.: 1221-712-1 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID	1221-712-002-1	Prep Batch	EU12681	Sample Vol (mL)	288.37
Sample Name	120221-EO1	Prep Date	2021-12-03 16:00	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2021-12-04 09:03	Dilution Factor	1
Sampling Date	20211202 00:00	Analyst	wicleve	Method Code	WM-026
Received Date	2021-12-02 03:00	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	5204.89	7.22	7.22	0.133	0.264			
	PFFeA	2706-90-3	12978.33	18.0	18.0	0.147	0.264			
	PFFHxA	307-24-4	10177.88	14.1	14.1	0.167	0.264			
	PFFHpA	375-85-9	3087.42	4.28	4.28	0.106	0.264			
	PFOA	335-67-1	5888.63	8.17	8.17	0.153	0.264			
	PFNA	375-95-1	805.05	1.12	1.12	0.0660	0.264			
	PFDA	335-76-2	472.35	0.655	0.655	0.0733	0.264			
	PFUnDA	2058-94-8	68.28	0.0947	0.0947	0.160	0.264			L
	PFDoDA	307-55-1	142.08	0.197	0.197	0.175	0.264			JB
	PFFTrDA	72629-94-8	152.83	0.212	0.212	0.131	0.264			JB
PFTeDA	376-06-7	93.23	0.129	0.129	0.189	0.264			LB	
Sulfonates	PFBS	375-73-5	5193.61	7.20	7.20	0.308	0.308			
	PFFPeS	2706-91-4	738.17	1.02	1.02	0.179	0.248			
	PFFHxS	355-46-4	3562.29	4.94	4.94	0.166	0.241			
	PFFHpS	375-92-8	311.74	0.432	0.432	0.117	0.251			
	PFOS	1763-23-1	7529.70	10.4	10.4	0.139	0.244			
	PFNS	68259-12-1	32.82	0.0455	0.0455	0.0749	0.254			L
	PFDS	335-77-3	ND	ND	ND	0.166	0.254			U
	4:2 FTS	757124-72-4	96.88	0.134	0.134	0.102	0.247			JB
	6:2 FTS	27619-97-2	200.59	0.278	0.278	0.101	0.251			B
	8:2 FTS	39108-34-4	ND	ND	ND	0.148	0.252			U
other	PFOSA	754-91-6	79.36	0.110	0.110	0.113	0.264			L
	N-MeFOSAA	2355-31-9	128.25	0.178	0.178	0.125	0.264			J
	N-EFOSAA	2991-50-6	25.36	0.0352	0.0352	0.0945	0.264			L
	HFPO-DA	13252-13-6	7725.26	10.7	10.7	0.198	0.264			
	PFMOAA	674-13-5	57168.49	79.3	79.3	1.25	1.25			
	PFMOPrA	377-73-1	220.65	0.306	0.306	0.208	0.264			
	PFO2HxA	39492-88-1	6174.12	8.56	8.56	1.25	1.25			
	PFO3OA	39492-89-2	1278.16	1.77	1.77	1.25	1.25			
	PFO4DA	39492-90-5	519.37	0.720	0.720	1.32	1.32			L
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.264	0.264			U
	ADONA	919005-14-4	29.74	0.0413	0.0413	0.104	0.250			L
	9Cl-PF3ONS	756426-58-1	64.30	0.0892	0.0892	0.104	0.246			L
	11Cl-PF3OUdS	763051-92-9	44.20	0.0613	0.0613	0.104	0.248			L
	10:2 FTS	120226-60-0	ND	ND	ND	0.208	0.264			U
	EVE Acid	69087-46-3	ND	ND	ND	1.25	1.25			U
	FBSA	30334-69-1	989.22	1.37	1.37	0.208	0.264			
	Hydro-EVE Acid	773804-62-9	401.80	0.557	0.557	1.25	1.25			LB
	Hydrolyzed PSDA	2416366-19-1	12136.75	16.8	16.8	1.25	1.25			
	Nafion Byproduct 2	749836-20-2	386.18	0.536	0.536	0.264	0.264			
	N-EFOSA	4151-50-2	ND	ND	ND	0.208	0.264			U
	N-EIFOSE	1691-99-2	ND	ND	ND	6.24	6.24			U
	NFDHA	151772-58-6	99.34	0.138	0.138	0.208	0.264			LB
	N-MeFOSA	31506-32-8	ND	ND	ND	0.208	0.264			U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.24	6.24			U
	NVHOS	1132933-86-8	6189.80	8.59	8.59	1.25	1.25			
	PEPA	267239-61-2	ND	ND	ND	1.25	1.25			U
	PFECA-G	801212-59-9	106.14	0.147	0.147	0.264	1.25			LB
	PFEESA	113507-82-7	62.13	0.0862	0.0862	0.208	0.264			L
	PFFHxDA	67905-19-5	98.35	0.136	0.136	1.25	1.25			L
	PFMOBA	863090-89-5	ND	ND	ND	1.25	1.25			U
PFO5DA	39492-91-6	268.08	0.372	0.372	1.32	1.32			L	
PMPA	13140-29-9	4634.23	6.43	6.43	1.25	1.25				
R-EVE	2416366-22-6	12344.22	17.1	17.1	1.25	1.25				
R-PSDA	2416366-18-0	21364.92	29.6	29.6	1.25	1.25				
R-PSDCA	2416366-21-5	46.78	0.0649	0.0649	1.25	1.25			LB	
ES	MPFBA		5750.12	7.98				20-150%	115.0%	
	M5PFFeA		7711.84	10.7				20-150%	154.2%	Q
	M3PFBS		10255.58	14.2				20-150%	205.1%	Q
	M2-4:2 FTS		9616.52	13.3				20-150%	192.3%	Q
	M5PFFHxA		4886.97	6.78				20-150%	97.7%	
	M3HFPO-DA		4059.09	5.63				20-150%	81.2%	
	M4PFFHpA		4929.24	6.84				20-150%	98.6%	
	M3PFFHxS		5002.62	6.94				20-150%	100.1%	
	M2-6:2 FTS		8384.75	11.6				20-150%	167.7%	Q
	M8PFOA		5204.67	7.22				20-150%	104.1%	
	M9PFNA		4929.53	6.84				20-150%	98.6%	
	M8PFOS		4793.93	6.65				20-150%	95.9%	
	M2-8:2 FTS		5083.00	7.05				20-150%	101.7%	
	M8FOSA-I		5031.94	6.98				20-150%	100.6%	
	M6PFDA		5034.70	6.98				20-150%	100.7%	
	d3-N-MeFOSAA		4840.57	6.71				20-150%	96.8%	
	d5-N-EFOSAA		4694.40	6.51				20-150%	93.9%	
	M7PFUdA		4619.00	6.41				20-150%	92.4%	
	MPFDoA		3752.50	5.21				20-150%	75.0%	
	M2PFTeDA		2975.30	4.13				20-150%	59.5%	

QC Data

Enthalpy Analytical

Job No.: 1221-712-1 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID	MB-12681-PFAS	Prep Batch	EU12681	Sample Vol (mL)	250
Sample Name	MB-12681-PFAS	Prep Date	2021-12-03 16:00	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2021-12-04 07:53	Dilution Factor	1
Sampling Date		Analyst	wicleve	Method Code	WM-026
Received Date	2021-12-03 16:00	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
	PFPeA	2706-90-3	ND	ND	ND	0.170	0.304			U
	PFHxA	307-24-4	36.13	0.0578	0.0578	0.193	0.304			L
	PFFHpA	375-85-9	2.30	0.00368	0.00368	0.122	0.304			L
	PFOA	335-67-1	0.93	0.00149	0.00149	0.177	0.304			L
	PFNA	375-95-1	9.36	0.0150	0.0150	0.0761	0.304			L
	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	36.87	0.0590	0.0590	0.202	0.304			L
	PFTeDA	72629-94-8	19.21	0.0307	0.0307	0.151	0.304			L
Sulfonates	PFTeDA	376-06-7	12.45	0.0199	0.0199	0.218	0.304			L
	PFBS	375-73-5	ND	ND	ND	0.355	0.355			U
	PFPeS	2706-91-4	ND	ND	ND	0.206	0.286			U
	PFHxS	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	46.25	0.0740	0.0740	0.118	0.285			L
	6:2 FTS	27619-97-2	29.63	0.0474	0.0474	0.116	0.290			L
other	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	ND	ND	ND	0.144	0.304			U
	N-EtFOSAA	2991-50-6	ND	ND	ND	0.109	0.304			U
	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	11.36	0.0182	0.0182	0.240	0.304			L
	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	39.52	0.0632	0.0632	0.304	0.304			L
	ADONA	919005-14-4	ND	ND	ND	0.120	0.288			U
	9Cl-PF3ONS	756426-58-1	1.08	0.00172	0.00172	0.120	0.283			L
	11Cl-PF3OUdS	763051-92-9	4.03	0.00644	0.00644	0.120	0.286			L
	10:2 FTS	120226-60-0	ND	ND	ND	0.240	0.304			U
	EVE Acid	69087-46-3	84.74	0.136	0.136	1.44	1.44			L
	FBSA	30334-69-1	ND	ND	ND	0.240	0.304			U
	Hydro-EVE Acid	773804-62-9	96.59	0.155	0.155	1.44	1.44			L
	Hydrolyzed PSDA	2416366-19-1	90.43	0.145	0.145	1.44	1.44			L
	Nafion Byproduct 2	749836-20-2	ND	ND	ND	0.304	0.304			U
	N-EtFOFA	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	44.69	0.0715	0.0715	0.240	0.304			L
	N-MeFOFA	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	61.58	0.0985	0.0985	1.44	1.44			L
	PEPA	267239-61-2	ND	ND	ND	1.44	1.44			U
	PFECA-G	801212-59-9	45.48	0.0728	0.0728	0.304	1.44			L
	PFEESA	113507-82-7	ND	ND	ND	0.240	0.304			U
	PFFHxDA	67905-19-5	ND	ND	ND	1.44	1.44			U
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	101.91	0.163	0.163	1.44	1.44			L	
ES	MPFBA		5270.23	8.43				20-150%	105.4%	
	M5PFPeA		5013.42	8.02				20-150%	100.3%	
	M3PFBS		4636.60	7.42				20-150%	92.7%	
	M2-4:2 FTS		6061.73	9.70				20-150%	121.2%	
	M5PFFHxA		4875.25	7.80				20-150%	97.5%	
	M3HFPO-DA		5052.37	8.08				20-150%	101.0%	
	M4PFFHpA		5035.66	8.06				20-150%	100.7%	
	M3PFFHxS		5198.31	8.32				20-150%	104.0%	
	M2-6:2 FTS		6476.40	10.4				20-150%	129.5%	
	M8PFOA		5311.95	8.50				20-150%	106.2%	
	M9PFNA		4838.71	7.74				20-150%	96.8%	
	M8PFOS		5227.10	8.36				20-150%	104.5%	
	M2-8:2 FTS		4940.75	7.91				20-150%	98.8%	
	M8FOSA-I		4773.80	7.64				20-150%	95.5%	
	M6PFDA		5536.37	8.86				20-150%	110.7%	
	d3-N-MeFOSAA		4362.52	6.98				20-150%	87.3%	
	d5-N-EtFOSAA		4786.82	7.66				20-150%	95.7%	
	M7PFUdA		4974.08	7.96				20-150%	99.5%	
	MPFDoA		4188.13	6.70				20-150%	83.8%	
	M2PFTeDA		2992.30	4.79				20-150%	59.8%	

Enthalpy Analytical

Job No.: 1221-712-1 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID	OPR-12681-PFAS	Prep Batch	EU12681	Sample Vol (mL)	250
Sample Name	OPR-12681-PFAS	Prep Date	2021-12-03 16:00	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2021-12-04 08:17	Dilution Factor	1
Sampling Date		Analyst	wicleve	Method Code	WM-026
Received Date	2021-12-03 16:00	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	9702.28	15.5	15.5	0.153	0.304	73-129%	77.6%	
	PFPeA	2706-90-3	9487.29	15.2	15.2	0.170	0.304	72-129%	75.9%	
	PFHxA	307-24-4	10379.21	16.6	16.6	0.193	0.304	72-129%	83.0%	
	PFHpA	375-85-9	8759.01	14.0	14.0	0.122	0.304	72-130%	70.1%	Q*
	PFOA	335-67-1	9787.54	15.7	15.7	0.177	0.304	71-133%	78.3%	
	PFNA	375-95-1	10306.08	16.5	16.5	0.0761	0.304	69-130%	82.4%	
	PFDA	335-76-2	9392.20	15.0	15.0	0.0845	0.304	71-129%	75.1%	
	PFUnDA	2058-94-8	10365.94	16.6	16.6	0.185	0.304	69-133%	82.9%	
	PFDoDA	307-55-1	11206.82	17.9	17.9	0.202	0.304	72-134%	89.7%	
	PFTTrDA	72629-94-8	14117.47	22.6	22.6	0.151	0.304	65-144%	112.9%	
PFTeDA	376-06-7	10665.82	17.1	17.1	0.218	0.304	71-132%	85.3%		
Sulfonates	PFBS	375-73-5	10169.85	16.3	16.3	0.355	0.355	72-134%	91.7%	
	PFPeS	2706-91-4	10457.39	16.7	16.7	0.206	0.286	71-127%	88.9%	
	PFHxS	355-46-4	9776.21	15.6	15.6	0.191	0.278	68-131%	85.6%	
	PFHpS	375-92-8	10874.61	17.4	17.4	0.135	0.290	69-134%	91.3%	
	PFOS	1763-23-1	10013.35	16.0	16.0	0.160	0.282	65-140%	86.3%	
	PFNS	68259-12-1	9858.99	15.8	15.8	0.0864	0.293	69-127%	82.0%	
	PFDS	335-77-3	9541.52	15.3	15.3	0.192	0.293	53-142%	79.1%	
	4:2 FTS	757124-72-4	9441.25	15.1	15.1	0.118	0.285	63-143%	80.6%	
6:2 FTS	27619-97-2	10309.67	16.5	16.5	0.116	0.290	64-140%	86.7%		
8:2 FTS	39108-34-4	8469.29	13.6	13.6	0.171	0.291	67-138%	70.6%		
Other	PFOSA	754-91-6	9327.17	14.9	14.9	0.130	0.304	67-137%	74.6%	
	N-MeFOSAA	2355-31-9	10864.62	17.4	17.4	0.144	0.304	65-136%	86.9%	
	N-EtFOSAA	2991-50-6	10217.82	16.3	16.3	0.109	0.304	61-135%	81.7%	
	HFPO-DA	13252-13-6	11905.92	19.0	19.0	0.228	0.304	70-130%	95.2%	
ES	MPFBA		5042.32	8.07				20-150%	100.8%	
	M5PFPeA		4741.70	7.59				20-150%	94.8%	
	M3PFBS		3837.52	6.14				20-150%	76.8%	
	M2-4:2 FTS		5720.42	9.15				20-150%	114.4%	
	M5PFHxA		4795.44	7.67				20-150%	95.9%	
	M3HFPO-DA		3566.57	5.71				20-150%	71.3%	
	M4PFHpA		5051.57	8.08				20-150%	101.0%	
	M3PFHxS		5353.14	8.57				20-150%	107.1%	
	M2-6:2 FTS		6626.93	10.6				20-150%	132.5%	
	M8PFOA		5196.99	8.32				20-150%	103.9%	
	M9PFNA		4689.21	7.50				20-150%	93.8%	
	M8PFOS		4951.99	7.92				20-150%	99.0%	
	M2-8:2 FTS		4449.97	7.12				20-150%	89.0%	
	M8FOSA-I		5453.72	8.73				20-150%	109.1%	
	M6PFDA		5288.21	8.46				20-150%	105.8%	
	d3-N-MeFOSAA		4638.23	7.42				20-150%	92.8%	
	d5-N-EtFOSAA		4764.85	7.62				20-150%	95.3%	
	M7PFUDa		4751.26	7.60				20-150%	95.0%	
MPFDaA		4257.17	6.81				20-150%	85.1%		
M2PFTeDA		3072.70	4.92				20-150%	61.5%		

* See the QC Notes Section in the Narrative.

Narrative Summary



Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	1221-712-1 PFAS by Isotope Dilution (non-potable water)
Client ID.	N/A Site: Northwest Water Plant, Leland, NC

1. Custody

Dallas King received the samples on December 02, 2021 at 2.9 °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
1221-712-001-1	120221-SO1	Aqueous
1221-712-002-1	120221-EO1	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 "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 were run in more than one sequence in order to analyze all analytes of interest.

4. Calibration

In the initial calibration, the reported analytes exhibited R^2 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.

5. QC Notes

QC sample analyses passed all method criteria.

Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	1221-712-1 PFAS by Isotope Dilution (non-potable water)
Client ID.	N/A Site: Northwest Water Plant, Leland, NC

*OPR-12681-PFAS PFHpA - Met method criteria. Recovery Limits are set to DoD QSM criteria but will follow SOP method criteria if the analytes fall outside QSM criteria but within SOP criteria.

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 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 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 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 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 / Q – 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	1,1,1,2,2-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.**