

County of Brunswick

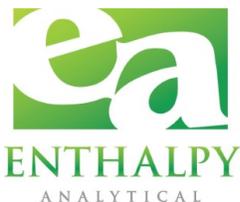
3954 Clearwell Dr NE
Leland, NC 28451

Northwest Water Plant

Leland, NC
Samples Received: 12/03/20

Analytical Report 1220-708

Isotope Dilution Method PFAS



Enthalpy Analytical, LLC – Ultratrace

Lindsay Boone
O: (910) 212-5855 / F: 910-212-5866
lboone@enthalpy.com / www.enthalpy.com
2714 Exchange Drive, Wilmington, NC 28405

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.: 1220-708-1 PFAS by Isotope Dilution (non-potable water)

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

Summary

	Compound	CAS	120320-S01 ng/L	120320-E01 ng/L
Acids	PFBA	375-22-4	ND U	ND U
	PFPeA	2706-90-3	ND U	ND U
	PFHxA	307-24-4	5.78	5.07
	PFHpA	375-85-9	3.40	2.97
	PFOA	335-67-1	5.21	5.17
	PFNA	375-95-1	0.769	0.710
	PFDA	335-76-2	0.343	0.439
	PFUnDA	2058-94-8	0.147 J	0.103 J
	PFDoDA	307-55-1	ND U	0.0600 J
	PFTTrDA	72629-94-8	ND U	ND U
	PFTeDA	376-06-7	ND U	ND U
Sulfonates	PFBS	375-73-5	4.86	4.02
	PFPeS	2706-91-4	0.743	0.768
	PFHxS	355-46-4	3.40	3.16
	PFHpS	375-92-8	0.269	0.186 J
	PFOS	1763-23-1	8.88	9.02
	PFNS	68259-12-1	ND U	ND U
	PFDS	335-77-3	ND U	ND U
	4:2 FTS	757124-72-4	ND U	ND U
	6:2 FTS	27619-97-2	0.156 J	0.140 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	0.0357 L	0.0673 J
	N-EtFOSAA	2991-50-6	0.0911 J	0.0919 J
	HFPO-DA	13252-13-6	5.03	10.4
	PFMOAA	674-13-5	23.2	36.1
	PFMOPrA	377-73-1	ND U	ND U
	PFO2HxA	39492-88-1	2.19	3.99
	PFO3OA	39492-89-2	3.80	6.56
	PFO4DA	39492-90-5	ND U	5.83
	Nafion Byproduct 1	29311-67-9	0.135 L	0.293
	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
	FBSA	30334-69-1	0.691	0.512
	N-EtFOSA	4151-50-2	ND U	ND U
	N-EtFOSE	1691-99-2	ND U	ND U
	N-MeFOSA	31506-32-8	ND U	ND U
	N-MeFOSE	24448-09-7	ND U	ND U
	Nafion Byproduct 2	749836-20-2	0.193 L	0.517 L
	NFDHA	151772-58-6	ND U	ND U
	PEPA		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 U	ND U
	PFMOBA	863090-89-5	ND U	ND U
	PFO5DA	39492-91-6	ND U	ND U
PMPA	13140-29-9	ND U	ND U	

Detailed Results

Enthalpy Analytical

Job No.: 1220-708-1 PFAS by Isotope Dilution (non-potable water)
 County of Brunswick Site: Northwest Water Plant, Leland, NC

Enthalpy ID 1220-708-001-1 Prep Batch EU11342 Sample Vol (mL) 293.08
 Sample Name 120320-S01 Prep Date 2020-12-04 11:08 Extract Vol (mL) 0.4
 Matrix Aqueous Analysis Date 2020-12-05 14:03 Dilution Factor 1
 Sampling Date 20201203 00:00

	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	0.134	0.251			U
	PFPeA	2706-90-3	ND	ND	ND	0.0766	0.251			U
	PFHxA	307-24-4	4231.48	5.78	5.78	0.134	0.251			
	PFHpA	375-85-9	2494.53	3.40	3.40	0.0593	0.251			
	PFOA	335-67-1	3815.97	5.21	5.21	0.0678	0.251			
	PFNA	375-95-1	563.31	0.769	0.769	0.0434	0.251			
	PFDA	335-76-2	251.53	0.343	0.343	0.107	0.251			
	PFUnDA	2058-94-8	107.63	0.147	0.147	0.0410	0.251			J
	PFDoDA	307-55-1	ND	ND	ND	0.0405	0.251			U
	PFTrDA	72629-94-8	ND	ND	ND	0.0635	0.251			U
PFTeDA	376-06-7	ND	ND	ND	0.0708	0.251			U	
Sulfonates	PFBS	375-73-5	3561.12	4.86	4.86	0.0708	0.222			
	PFPeS	2706-91-4	544.44	0.743	0.743	0.0844	0.236			
	PFHxS	355-46-4	2494.71	3.40	3.40	0.0705	0.229			
	PFHpS	375-92-8	196.92	0.269	0.269	0.0664	0.239			
	PFOS	1763-23-1	6505.11	8.88	8.88	0.0402	0.233			
	PFNS	68259-12-1	ND	ND	ND	0.0558	0.242			U
	PFDS	335-77-3	ND	ND	ND	0.115	0.243			U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0551	0.235			U
other	6:2 FTS	27619-97-2	113.98	0.156	0.156	0.0617	0.239			J
	8:2 FTS	39108-34-4	ND	ND	ND	0.0485	0.242			U
	PFOSA	754-91-6	ND	ND	ND	0.311	0.313			U
	N-MeFOSAA	2355-31-9	26.14	0.0357	0.0357	0.0464	0.251			L
	N-EiFOSAA	2991-50-6	66.72	0.0911	0.0911	0.0555	0.251			J
	HFPO-DA	13252-13-6	3686.62	5.03	5.03	0.0812	0.251			
	PFMOAA	674-13-5	16963.83	23.2	23.2	1.26	1.26			
	PFMOPrA	377-73-1	ND	ND	ND	0.205	0.251			U
	PFO2HxA	39492-88-1	1606.71	2.19	2.19	1.26	1.26			
	PFO3OA	39492-89-2	2781.43	3.80	3.80	1.26	1.26			
	PFO4DA	39492-90-5	ND	ND	ND	1.26	1.26			U
	Nafion Byproduct 1	29311-67-9	99.03	0.135	0.135	0.205	0.251			L
	ADONA	919005-14-4	ND	ND	ND	0.102	0.237			U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.102	0.235			U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.102	0.237			U
	10:2 FTS	120226-60-0	ND	ND	ND	0.205	0.251			U
	FBSA	30334-69-1	506.12	0.691	0.691	0.205	0.251			
	N-EiFOSA	4151-50-2	ND	ND	ND	0.205	0.251			U
	N-EiFOSE	1691-99-2	ND	ND	ND	6.14	6.14			U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.205	0.251			U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.14	6.14			U
	Nafion Byproduct 2	749836-20-2	141.05	0.193	0.193	1.26	1.26			L
	NFDHA	151772-58-6	ND	ND	ND	0.205	0.251			U
	PEPA	ND	ND	ND	ND	1.26	1.26			U
	PFECA-G	801212-59-9	ND	ND	ND	1.26	1.26			U
	PFEESA	113507-82-7	ND	ND	ND	0.205	0.251			U
	PFHxDA	67905-19-5	ND	ND	ND	1.26	1.26			U
	PFMOBA	863090-89-5	ND	ND	ND	1.26	1.26			U
	PFO5DA	39492-91-6	ND	ND	ND	2.57	2.57			U
	PMPA	13140-29-9	ND	ND	ND	1.26	1.26			U
ES	MPPFA		5157.03	7.04				20-150%	103.1%	
	M5PFPeA		15470.95	21.1				20-150%	309.4%	Q
	M3PFBS		24670.58	33.7				20-150%	493.4%	Q
	M2-4:2 FTS		61482.35	83.9				20-150%	1229.6%	Q
	M5PFPeA		3967.68	5.42				20-150%	79.4%	
	M3HFPO-DA		3739.72	5.10				20-150%	74.8%	
	M4PFPeA		4355.15	5.94				20-150%	87.1%	
	M3PFPeA		5419.91	7.40				20-150%	108.4%	
	M2-6:2 FTS		45739.28	62.4				20-150%	914.8%	Q
	M8PFOA		5026.31	6.86				20-150%	100.5%	
	M9PFNA		4653.20	6.35				20-150%	93.1%	
	M8PFOS		4719.45	6.44				20-150%	94.4%	
	M2-8:2 FTS		5426.68	7.41				20-150%	108.5%	
	M8FOSA-I		3302.07	4.51				20-150%	66.0%	
	M6PFDA		4469.20	6.10				20-150%	89.4%	
	d3-N-MeFOSAA		4271.81	5.83				20-150%	85.4%	
	d5-N-EiFOSAA		3949.18	5.39				20-150%	79.0%	
	M7PFUdA		3692.26	5.04				20-150%	73.8%	
	MPPFDoA		3208.35	4.38				20-150%	64.2%	
	M2PFPeDA		1557.39	2.13				20-150%	31.1%	

Enthalpy Analytical

Job No.: 1220-708-1 PFAS by Isotope Dilution (non-potable water)
 County of Brunswick Site: Northwest Water Plant, Leland, NC

Enthalpy ID 1220-708-002-1
 Sample Name 120320-E01
 Matrix Aqueous
 Sampling Date 20201203 00:00

Prep Batch EU11342
 Prep Date 2020-12-04 11:08
 Analysis Date 2020-12-05 14:26

Sample Vol (mL) 286.55
 Extract Vol (mL) 0.4
 Dilution Factor 1

	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	0.137	0.257			U
	PFPeA	2706-90-3	ND	ND	ND	0.0783	0.257			U
	PFHxA	307-24-4	3632.51	5.07	5.07	0.138	0.257			
	PFFHpA	375-85-9	2128.23	2.97	2.97	0.0606	0.257			
	PFOA	335-67-1	3705.29	5.17	5.17	0.0693	0.257			
	PFNA	375-95-1	508.75	0.710	0.710	0.0444	0.257			
	PFDA	335-76-2	314.53	0.439	0.439	0.109	0.257			
	PFUnDA	2058-94-8	73.85	0.103	0.103	0.0420	0.257			J
	PFDODA	307-55-1	42.98	0.0600	0.0600	0.0414	0.257			J
	PFTrDA	72629-94-8	ND	ND	ND	0.0650	0.257			U
PFTeDA	376-06-7	ND	ND	ND	0.0724	0.257			U	
Sulfonates	PFBS	375-73-5	2882.05	4.02	4.02	0.0724	0.228			
	PFPeS	2706-91-4	550.35	0.768	0.768	0.0864	0.241			
	PFFHxS	355-46-4	2263.99	3.16	3.16	0.0722	0.235			
	PFFHpS	375-92-8	133.25	0.186	0.186	0.0680	0.244			J
	PFOS	1763-23-1	6458.54	9.02	9.02	0.0411	0.239			
	PFNS	68259-12-1	ND	ND	ND	0.0571	0.247			U
	PFDS	335-77-3	ND	ND	ND	0.118	0.248			U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0564	0.240			U
	6:2 FTS	27619-97-2	99.98	0.140	0.140	0.0631	0.244			J
	8:2 FTS	39108-34-4	ND	ND	ND	0.0496	0.247			U
other	PFOSA	754-91-6	ND	ND	ND	0.318	0.320			U
	N-MeFOSAA	2355-31-9	48.23	0.0673	0.0673	0.0475	0.257			J
	N-EiFOSAA	2991-50-6	65.82	0.0919	0.0919	0.0568	0.257			J
	HFPO-DA	13252-13-6	7428.35	10.4	10.4	0.0830	0.257			
	PFMOAA	674-13-5	25877.36	36.1	36.1	1.29	1.29			
	PfMOPrA	377-73-1	ND	ND	ND	0.209	0.257			U
	PFO2HxA	39492-88-1	2862.1	3.99	3.99	1.29	1.29			
	PFO3OA	39492-89-2	4698.32	6.56	6.56	1.29	1.29			
	PFO4DA	39492-90-5	4179.86	5.83	5.83	1.29	1.29			
	Nafion Byproduct 1	29311-67-9	210.19	0.293	0.293	0.209	0.257			
	ADONA	919005-14-4	ND	ND	ND	0.105	0.243			U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.105	0.240			U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.105	0.243			U
	10:2 FTS	120226-60-0	ND	ND	ND	0.209	0.257			U
	FBSA	30334-69-1	366.54	0.512	0.512	0.209	0.257			
	N-EiFOSA	4151-50-2	ND	ND	ND	0.209	0.257			U
	N-EiFOSE	1691-99-2	ND	ND	ND	6.28	6.28			U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.209	0.257			U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.28	6.28			U
	Nafion Byproduct 2	749836-20-2	370.17	0.517	0.517	1.29	1.29			L
NFDHA	151772-58-6	ND	ND	ND	0.209	0.257			U	
PEPA		ND	ND	ND	1.29	1.29			U	
PFECA-G	801212-59-9	ND	ND	ND	1.29	1.29			U	
PFEESA	113507-82-7	ND	ND	ND	0.209	0.257			U	
PFFHxDA	67905-19-5	ND	ND	ND	1.29	1.29			U	
PfMOBA	863090-89-5	ND	ND	ND	1.29	1.29			U	
PFO5DA	39492-91-6	ND	ND	ND	2.62	2.62			U	
PMPA	13140-29-9	ND	ND	ND	1.29	1.29			U	
ES	MPFBA		4952.75	6.91				20-150%	99.1%	
	M5PFPeA		16403.94	22.9				20-150%	328.1%	Q
	M3PFBS		26948.60	37.6				20-150%	539.0%	Q
	M2-4:2 FTS		62869.45	87.8				20-150%	1257.4%	Q
	M5PFFHxA		4122.63	5.75				20-150%	82.5%	
	M3HFPO-DA		3944.30	5.51				20-150%	78.9%	
	M4PFFHpA		4513.37	6.30				20-150%	90.3%	
	M3PFFHxS		5157.44	7.20				20-150%	103.1%	
	M2-6:2 FTS		57964.07	80.9				20-150%	1159.3%	Q
	M8PFOA		5328.83	7.44				20-150%	106.6%	
	M9PFNA		5465.52	7.63				20-150%	109.3%	
	M8PFOS		5229.80	7.30				20-150%	104.6%	
	M2-8:2 FTS		6091.00	8.50				20-150%	121.8%	
	M8FOSA-I		3353.42	4.68				20-150%	67.1%	
	M6PFDA		4791.71	6.69				20-150%	95.8%	
	d3-N-MeFOSAA		4919.39	6.87				20-150%	98.4%	
	d5-N-EiFOSAA		4492.12	6.27				20-150%	89.8%	
	M7PFUdA		4490.76	6.27				20-150%	89.8%	
	MPFDOA		3539.92	4.94				20-150%	70.8%	
	M2PFTeDA		2839.38	3.96				20-150%	56.8%	

QC Data

Enthalpy Analytical

Job No.: 1220-708-1 PFAS by Isotope Dilution (non-potable water)
 County of Brunswick Site: Northwest Water Plant, Leland, NC

Enthalpy ID MB_11342_PFAS Prep Batch EU11342 Sample Vol (mL) 250
 Sample Name MB_11342_PFAS Prep Date 2020-12-04 11:08 Extract Vol (mL) 0.4
 Matrix Aqueous Analysis Date 2020-12-05 12:54 Dilution Factor 1
 Sampling Date

	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	0.157	0.294			U
	PFFeA	2706-90-3	ND	ND	ND	0.0898	0.294			U
	PFHxA	307-24-4	ND	ND	ND	0.158	0.294			U
	PFHpA	375-85-9	ND	ND	ND	0.0695	0.294			U
	PFOA	335-67-1	33.71	0.0539	0.0539	0.0795	0.294			L
	PFNA	375-95-1	ND	ND	ND	0.0509	0.294			U
	PFDA	335-76-2	ND	ND	ND	0.125	0.294			U
	PFUnDA	2058-94-8	ND	ND	ND	0.0481	0.294			U
	PFDoDA	307-55-1	ND	ND	ND	0.0475	0.294			U
	PFTrDA	72629-94-8	ND	ND	ND	0.0745	0.294			U
Sulfonates	PFTeDA	376-06-7	ND	ND	ND	0.0830	0.294			U
	PFBS	375-73-5	ND	ND	ND	0.0830	0.261			U
	PFFeS	2706-91-4	ND	ND	ND	0.0990	0.277			U
	PFHxS	355-46-4	ND	ND	ND	0.0827	0.269			U
	PFHpS	375-92-8	ND	ND	ND	0.0779	0.280			U
	PFOS	1763-23-1	ND	ND	ND	0.0471	0.274			U
	PFNS	68259-12-1	ND	ND	ND	0.0654	0.283			U
	PFDS	335-77-3	ND	ND	ND	0.135	0.285			U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0646	0.275			U
	6:2 FTS	27619-97-2	ND	ND	ND	0.0723	0.280			U
other	8:2 FTS	39108-34-4	ND	ND	ND	0.0569	0.283			U
	PFOSA	754-91-6	ND	ND	ND	0.365	0.366			U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.0544	0.294			U
	N-EiFOSAA	2991-50-6	ND	ND	ND	0.0651	0.294			U
	HFPO-DA	13252-13-6	ND	ND	ND	0.0951	0.294			U
	PFMOA	674-13-5	ND	ND	ND	1.48	1.48			U
	PFMOPrA	377-73-1	ND	ND	ND	0.240	0.294			U
	PFO2HxA	39492-88-1	ND	ND	ND	1.48	1.48			U
	PFO3OA	39492-89-2	ND	ND	ND	1.48	1.48			U
	PFO4DA	39492-90-5	ND	ND	ND	1.48	1.48			U
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.240	0.294			U
	ADONA	919005-14-4	ND	ND	ND	0.120	0.278			U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.120	0.275			U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.120	0.278			U
	10:2 FTS	120226-60-0	ND	ND	ND	0.240	0.294			U
	FBSA	30334-69-1	ND	ND	ND	0.240	0.294			U
	N-EiFOSA	4151-50-2	ND	ND	ND	0.240	0.294			U
	N-EiFOSE	1691-99-2	ND	ND	ND	7.20	7.20			U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.240	0.294			U
	N-MeFOSE	24448-09-7	ND	ND	ND	7.20	7.20			U
Nafion Byproduct 2	749836-20-2	ND	ND	ND	1.48	1.48			U	
NFDHA	151772-58-6	ND	ND	ND	0.240	0.294			U	
ES	PEPA		ND	ND	ND	1.48	1.48			U
	PFECA-G	801212-59-9	ND	ND	ND	1.48	1.48			U
	PFEESA	113507-82-7	ND	ND	ND	0.240	0.294			U
	PFHxDA	67905-19-5	ND	ND	ND	1.48	1.48			U
	PFMOBA	863090-89-5	ND	ND	ND	1.48	1.48			U
	PFO5DA	39492-91-6	ND	ND	ND	3.01	3.01			U
	PMPA	13140-29-9	ND	ND	ND	1.48	1.48			U
	MPPFA		5187.95	8.30				20-150%	103.8%	
	M5PFFeA		6114.25	9.78				20-150%	122.3%	
	M3PFBS		6104.36	9.77				20-150%	122.1%	
	M2-4:2 FTS		5005.36	8.01				20-150%	100.1%	
	M5PFHxA		4181.18	6.69				20-150%	83.6%	
	M3HFPO-DA		4109.98	6.58				20-150%	82.2%	
	M4PFHpA		4577.70	7.32				20-150%	91.6%	
	M3PFHxS		5614.71	8.98				20-150%	112.3%	
	M2-6:2 FTS		9508.31	15.2				20-150%	190.2%	Q
	M8PFOA		5355.91	8.57				20-150%	107.1%	
	M9PFNA		5476.94	8.76				20-150%	109.5%	
	M8PFOS		5178.13	8.29				20-150%	103.6%	
	M2-8:2 FTS		5769.76	9.23				20-150%	115.4%	
M8FOSA-I		3526.37	5.64				20-150%	70.5%		
M6PFDA		4760.42	7.62				20-150%	95.2%		
d3-N-MeFOSAA		5107.69	8.17				20-150%	102.2%		
d5-N-EiFOSAA		5053.71	8.09				20-150%	101.1%		
M7PFUdA		5169.73	8.27				20-150%	103.4%		
MPPFDa		5010.71	8.02				20-150%	100.2%		
M2PFTeDA		4028.55	6.45				20-150%	80.6%		

Enthalpy Analytical

Job No.: 1220-708-1 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID	OPR_11342_PFAS	Prep Batch	EU11342	Sample Vol (mL)	250
Sample Name	OPR_11342_PFAS	Prep Date	2020-12-04 11:08	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2020-12-05 13:17	Dilution Factor	1
Sampling Date					

	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	10643.14	17.0	17.0	0.157	0.294		85.1%	
	PFPeA	2706-90-3	10415.75	16.7	16.7	0.0898	0.294		83.3%	
	PFHxA	307-24-4	10003.42	16.0	16.0	0.158	0.294		80.0%	
	PFHpA	375-85-9	10182.87	16.3	16.3	0.0695	0.294		81.5%	
	PFOA	335-67-1	9339.76	14.9	14.9	0.0795	0.294		74.7%	
	PFNA	375-95-1	10322.97	16.5	16.5	0.0509	0.294		82.6%	
	PFDA	335-76-2	10624.69	17.0	17.0	0.125	0.294		85.0%	
	PFUnDA	2058-94-8	10202.33	16.3	16.3	0.0481	0.294		81.6%	
	PFDoDA	307-55-1	10167.37	16.3	16.3	0.0475	0.294		81.3%	
	PFTTrDA	72629-94-8	12651.18	20.2	20.2	0.0745	0.294		101.2%	
PFTeDA	376-06-7	10442.14	16.7	16.7	0.0830	0.294		83.5%		
Sulfonates	PFBS	375-73-5	9088.29	14.5	14.5	0.0830	0.261		82.0%	
	PFPeS	2706-91-4	8829.25	14.1	14.1	0.0990	0.277		75.1%	
	PFHxS	355-46-4	9040.92	14.5	14.5	0.0827	0.269		79.1%	
	PFHpS	375-92-8	9240.88	14.8	14.8	0.0779	0.280		77.6%	
	PFOS	1763-23-1	8529.41	13.6	13.6	0.0471	0.274		73.5%	
	PFNS	68259-12-1	8751.53	14.0	14.0	0.0654	0.283		72.8%	
	PFDS	335-77-3	12838.10	20.5	20.5	0.135	0.285		106.4%	
	4:2 FTS	757124-72-4	8620.04	13.8	13.8	0.0646	0.275		73.6%	
6:2 FTS	27619-97-2	10047.99	16.1	16.1	0.0723	0.280		84.5%		
8:2 FTS	39108-34-4	9262.43	14.8	14.8	0.0569	0.283		77.2%		
Other	PFOSA	754-91-6	10101.08	16.2	16.2	0.365	0.366		80.8%	
	N-MeFOSAA	2355-31-9	9469.26	15.2	15.2	0.0544	0.294		75.8%	
	N-EtFOSAA	2991-50-6	9471.61	15.2	15.2	0.0651	0.294		75.8%	
	HFPO-DA	13252-13-6	8871.40	14.2	14.2	0.0951	0.294		71.0%	
ES	MPFBA		5206.11	8.33				20-150%	104.1%	
	M5PFPeA		5576.58	8.92				20-150%	111.5%	
	M3PFBS		5953.94	9.53				20-150%	119.1%	
	M2-4:2 FTS		5537.60	8.86				20-150%	110.8%	
	M5PFHxA		4907.34	7.85				20-150%	98.1%	
	M3HFPO-DA		4712.65	7.54				20-150%	94.3%	
	M4PFHpA		4940.37	7.90				20-150%	98.8%	
	M3PFHxS		5343.34	8.55				20-150%	106.9%	
	M2-6:2 FTS		7454.95	11.9				20-150%	149.1%	
	M8PFOA		5655.96	9.05				20-150%	113.1%	
	M9PFNA		5552.73	8.88				20-150%	111.1%	
	M8PFOS		5444.40	8.71				20-150%	108.9%	
	M2-8:2 FTS		5819.95	9.31				20-150%	116.4%	
	M8FOSA-I		3406.72	5.45				20-150%	68.1%	
	M6PFDA		5271.27	8.43				20-150%	105.4%	
	d3-N-MeFOSAA		5141.55	8.23				20-150%	102.8%	
	d5-N-EtFOSAA		4902.47	7.84				20-150%	98.0%	
	M7PFUdA		5317.00	8.51				20-150%	106.3%	
MPFDoA		4945.91	7.91				20-150%	98.9%		
M2PFTeDA		3896.74	6.23				20-150%	77.9%		

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	1220-708-1 PFAS by Isotope Dilution (non-potable water)
Client ID.	Site: Northwest Water Plant, Leland, NC

1. Custody

Anthony Stokes received the samples on December 03, 2020 at 3.0 °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
1220-708-001-1	120320-S01	Aqueous
1220-708-002-1	120320-E01	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	PFAS - Full 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.

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 30% accuracy criterion for native analytes.

Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	1220-708-1 PFAS by Isotope Dilution (non-potable water)
Client ID.	Site: Northwest Water Plant, Leland, NC

5. QC Notes

The QC sample analyses passed all method 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 standards in the samples fell outside the limits for ES recoveries, as notated by the Q qualifier. The target analytes are quantified based on their ratio to the labeled standards, therefore, undergo the same losses as the labeled standards. As a result, low or high recoveries do not cause any change to ratios or contribute any additional error in the measurement of the target analytes. Therefore, the data are considered acceptable.

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	Compound Name	CAS #
Target Analytes		
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
PFHxA	Perfluorohexanoic Acid	307-24-4
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFOA	Perfluorooctanoic Acid	335-67-1
PFNA	Perfluorononanoic Acid	375-95-1
PFDA	Perfluorodecanoic acid	335-76-2
PFUnA (PFUnDA)	Perfluoroundecanoic acid	2058-94-8
PFDoA (PFDoDA)	Perfluorododecanoic acid	307-55-1
PFTriA (PFTriA)	Perfluorotridecanoic acid	72629-94-8
PFTeDA (PFTA)	Perfluorotetradecanoic acid	376-06-7
PFBS	Perfluorobutane sulfonic acid	375-73-5
PFPeS	Perfluoropentane sulfonic acid	2706-91-4
PFHxS	Perfluorohexane sulfonic acid	355-46-4
PFHpS	Perfluoroheptane sulfonic acid	375-92-8
PFOS	Perfluorooctane sulfonic acid	1763-23-1
PFNS	Perfluorononane sulfonic acid	68259-12-1
PFDS	Perfluorodecane sulfonic acid	757124-72-4
4:2 FTS	4:2 fluorotelomer sulfonic acid	27619-97-2
6:2 FTS	6:2 fluorotelomer sulfonic acid	39108-34-4
8:2 FTS	8:2 fluorotelomer sulfonic acid	13252-13-6
PFOSA (FOSA)	Perfluorooctane sulfonamide	754-91-6
N-MeFOSAA	N-methyl perfluorooctane sulfonamido acetic acid	2355-31-9
N-EtFOSAA	N-ethyl perfluorooctane sulfonamido acetic acid	2991-50-6
* HFPO-DA	2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)-propanoic acid (Gen-X)	13252-13-6
* 11CI-PF3OUdS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	674-13-5
* 9CI-PF3ONS	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	919005-14-4
* ADONA	4,8-dioxa-3H-perfluorononanoic acid	756426-58-1
* PFMOAA	Perfluoro-2-methoxyacetic acid	763051-92-9
* PFMOPrA	Perfluoro-3-methoxypropanoic acid	377-73-1
* PFO2HxA	Perfluoro (3,5-dioxahexanoic) acid	39492-88-1
* PFO3OA	Perfluoro (3,5,7-trioxaoctanoic) acid	39492-89-2
* PFO4DA	Perfluoro (3,5,7,9-tetraoxadecanoic) acid	39492-90-5
* PFO5DA	Perfluoro(3,5,7,9,11-pentaoxadodecanoic) acid	39492-91-6
* Nafion Byproduct 1	Nafion Byproduct 1	29311-67-9
* Nafion Byproduct 2	Nafion Byproduct 2	749836-20-2
* PFEESA	Perfluoro(2-ethoxyethane)sulphonic acid	113507-82-7
* PFMOBA	Perfluoro-4-methoxybutanic acid	863090-89-5
* PEPA	Perfluoro-2-ethoxypropanoic acid	N/A
* PMPA	Perfluoro-2-methoxypropanoic acid	13140-29-9
* 10:2 FTS	Fluorotelomer sulfonate 10:2	120226-60-0
* N-EtFOSA	N-ethylperfluoro-1-octanesulfonamide	4151-50-2
* N-EtFOSE	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol	1691-99-2
* N-MeFOSA	N-methylperfluoro-1-octanesulfonamide	31506-32-8
* N-MeFOSE	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol	24448-09-7
* PFECA-G	4-(Heptafluoroisopropoxy)hexafluorobutanoic acid	801212-59-9
* PFHxDA	Perfluorohexadecanoic acid	67905-19-5

Extraction Standards		
MPFBA	Perfluoro-n-[13C4]butanoic acid	
M5PFPeA	Perfluoro-n-[13C5]pentanoic acid	
M3PFBS	Sodium perfluoro-1-[2,3,4-13C3]-butanesulfonic acid	
M2-4:2 FTS	Sodium 1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid	
M5PFHxA	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid	
M3HFPO-DA	2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)-13C3-propanoic acid	
M4PFHpA	Perfluoro-n-[1,2,3,4-13C4]heptanoic acid	
M3PFHxS	Sodium perfluoro-1-[1,2,3-13C3]-hexanesulfonic acid	
M2-6:2 FTS	Sodium 1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid	
M8PFOA	Perfluoro-n-[13C8]octanoic acid	
M9PFNA	Perfluoro-n-[13C9]nonanoic acid	
M8PFOS	Sodium perfluoro-1-[13C8]-octanesulfonic acid	
M2-8:2 FTS	Sodium 1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid	
M8FOSA	Perfluoro-1-[13C8]octanesulfonamide	
M6PFDA	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid	
d3-N-MeFOSAA	N-methyl-d3-perfluoro-1-octanesulfonamide	
d5-N-EtFOSAA	N-ethyl-d5-perfluoro-1-octanesulfonamide	
M7PFUnDA (M7PFUdA)	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid	
MPFDoA	Perfluoro-n-[1,2-13C2]dodecanoic acid	
M2PFTeDA	Perfluoro-n-[1,2-13C2]tetradecanoic acid	
Injection Standards		
M3PFBA	Perfluoro-n-[2,3,4-13C3]butanoic acid	
M2PFOA	Perfluoro-n-[1,2-13C2]octanoic acid	
MPFDA	Perfluoro-n-[1,2-13C2]decanoic acid	
MPFOS	Sodium perfluoro-1-[1,2,3,4-13C4]-octanesulfonic acid	

* Analytes are currently not accredited under TNI Standard. Accreditation pending.

Sample Custody

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