

County of Brunswick

3954 Clearwell Dr NE
Leland, NC 28451

NW Plant

Leland, NC
Samples Received: 08/21/20

Analytical Report 0820-755

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.: 0820-755 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: N.W. Plant, Leland, NC

Summary

	Compound	CAS	082120-S01 ng/L	082120-E01 ng/L
Acids	PFBA	375-22-4	ND U	ND U
	PFPeA	2706-90-3	ND U	ND U
	PFHxA	307-24-4	4.35	3.32
	PFHpA	375-85-9	2.26	1.92
	PFOA	335-67-1	3.51	2.86
	PFNA	375-95-1	0.672	0.559
	PFDA	335-76-2	0.387	0.417
	PFUnDA	2058-94-8	0.106 J	0.126 J
	PFDoDA	307-55-1	ND U	ND U
	PFTTrDA	72629-94-8	ND U	ND U
	PFTeDA	376-06-7	ND U	ND U
Sulfonates	PFBS	375-73-5	2.48	2.22
	PFPeS	2706-91-4	0.522	0.416
	PFHxS	355-46-4	2.66	2.14
	PFHpS	375-92-8	0.266	0.204 J
	PFOS	1763-23-1	6.88	5.86
	PFNS	68259-12-1	ND U	ND U
	PFDS	335-77-3	ND U	ND U
	4:2 FTS	757124-72-4	ND U	ND U
	6:2 FTS	27619-97-2	0.0454 L	0.161 J
other	8:2 FTS	39108-34-4	ND U	ND U
	PFOSA	754-91-6	ND U	ND U
	N-MeFOSAA	2355-31-9	ND U	ND U
	N-EtFOSAA	2991-50-6	ND U	ND U
	HFPO-DA	13252-13-6	4.20	4.06
	PFMOAA	674-13-5	25.5	22.4
	PFMOPrA	377-73-1	ND U	ND U
	PFO2HxA	39492-88-1	1.41	1.95
	PFO3OA	39492-89-2	1.68	ND U
	PFO4DA	39492-90-5	ND U	1.40
	Nafion Byproduct 1	29311-67-9	ND U	ND U
	ADONA	919005-14-4	ND U	ND U
	9Cl-PF3ONS	756426-58-1	ND U	ND U
	11Cl-PF3OUdS	763051-92-9	ND U	ND U
	10:2 FTS	120226-60-0	ND U	ND U
	FBSA	30334-69-1	0.234 J	0.257
	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	0.449 L	0.398 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.: 0820-755 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: N.W. Plant, Leland, NC

Enthalpy ID	0820-755-001-1	Prep Batch	EU11114	Sample Vol (mL)	280.79
Sample Name	082120-S01	Prep Date	2020-08-27	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2020-08-31	Dilution Factor	1
Sampling Date	20200821 00:00				

	Compound	CAS	Extract Concentration ng/L	Sample Concentration ng/L	Formatted Result ng/L	LOD ng/L	LOQ ng/L	Recovery	Flags
Acids	PFBA	375-22-4	ND	ND	ND	0.140	0.262		U
	PFPeA	2706-90-3	ND	ND	ND	0.0799	0.262		U
	PFHxA	307-24-4	3056.15	4.35	4.35	0.140	0.262		
	PFHpA	375-85-9	1589.36	2.26	2.26	0.0619	0.262		
	PFOA	335-67-1	2463.10	3.51	3.51	0.0707	0.262		
	PFNA	375-95-1	471.98	0.672	0.672	0.0453	0.262		
	PFDA	335-76-2	271.47	0.387	0.387	0.111	0.262		
	PFUnDA	2058-94-8	74.59	0.106	0.106	0.0428	0.262		J
	PFDoDA	307-55-1	ND	ND	ND	0.0423	0.262		U
	PFTriDA	72629-94-8	ND	ND	ND	0.0663	0.262		U
Sulfonates	PFTeDA	376-06-7	ND	ND	ND	0.0739	0.262		U
	PFBS	375-73-5	1740.38	2.48	2.48	0.0739	0.262		
	PFPeS	2706-91-4	366.20	0.522	0.522	0.0881	0.262		
	PFHxS	355-46-4	1870.70	2.66	2.66	0.0736	0.262		
	PFHpS	375-92-8	186.93	0.266	0.266	0.0694	0.262		
	PFOS	1763-23-1	4827.18	6.88	6.88	0.0419	0.262		
	PFNS	68259-12-1	ND	ND	ND	0.0582	0.262		U
	PFDS	335-77-3	ND	ND	ND	0.120	0.262		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0575	0.262		U
	6:2 FTS	27619-97-2	31.88	0.0454	0.0454	0.0644	0.262		L
other	8:2 FTS	39108-34-4	ND	ND	ND	0.0507	0.262		U
	PFOSA	754-91-6	ND	ND	ND	0.325	0.326		U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.0484	0.262		U
	N-EiFOSAA	2991-50-6	ND	ND	ND	0.0580	0.262		U
	HFPO-DA	13252-13-6	2951.01	4.20	4.20	0.0847	0.262		
	PFMOAA	674-13-5	17911.46	25.5	25.5	1.32	1.32		
	PFMOPrA	377-73-1	ND	ND	ND	0.214	0.262		U
	PFO2HxA	39492-88-1	995.97	1.41	1.41	1.32	1.32		
	PFO3OA	39492-89-2	1182.74	1.68	1.68	1.32	1.32		
	PFO4DA	39492-90-5	ND	ND	ND	1.32	1.32		U
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.214	0.262		U
	ADONA	919005-14-4	ND	ND	ND	0.107	0.262		U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.107	0.262		U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.107	0.262		U
	10:2 FTS	120226-60-0	ND	ND	ND	0.214	0.262		U
	FBSA	30334-69-1	164.43	0.234	0.234	0.214	0.262		J
	N-EiFOSA	4151-50-2	ND	ND	ND	0.214	0.262		U
	N-EiFOSE	1691-99-2	ND	ND	ND	6.41	6.41		U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.214	0.262		U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.41	6.41		U
	Nafion Byproduct 2	749836-20-2	315.05	0.449	0.449	1.32	1.32		L
	NFDHA	151772-58-6	ND	ND	ND	0.214	0.262		U
	PEPA		ND	ND	ND	1.32	1.32		U
	PFECA-G	801212-59-9	ND	ND	ND	1.32	1.32		U
	PFEEA	113507-82-7	ND	ND	ND	0.214	0.262		U
	PFHxDA	67905-19-5	ND	ND	ND	1.32	1.32		U
	PFMOBA	863090-89-5	ND	ND	ND	1.32	1.32		U
	PFO5DA	39492-91-6	ND	ND	ND	2.68	2.68		U
	PMPA	13140-29-9	ND	ND	ND	1.32	1.32		U
ES	MPFBA		4604.88	6.56				13.4%	Q
	M5PFPeA		12125.85	17.3				36.6%	
	M3PFBS		32394.19	46.1				95.5%	
	M2-4:2 FTS		72652.30	103				244.0%	Q
	M5PFHxA		3700.49	5.27				87.1%	
	M3HFPO-DA		4353.74	6.20				110.9%	
	M4PFHpA		4810.58	6.85				110.4%	
	M3PFHxS		4846.96	6.90				120.6%	
	M2-6:2 FTS		62276.48	88.7				205.2%	Q
	M8PFOA		5417.05	7.72				125.3%	
	M9PFNA		5595.29	7.97				129.8%	
	M8PFOS		4637.85	6.61				117.3%	
	M2-8:2 FTS		8238.08	11.7				229.9%	Q
	M8FOSA-I		2595.75	3.70				67.3%	
	M6PFDA		5294.18	7.54				135.5%	
	d3-N-MeFOSAA		2947.77	4.20				77.7%	
	d5-N-EiFOSAA		2967.16	4.23				77.5%	
	M7PFUDa		4425.08	6.30				117.2%	
	MPFDoA		3262.40	4.65				82.8%	
	M2PFTeDA		1735.22	2.47				42.6%	

Enthalpy Analytical

Job No.: 0820-755 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: N.W. Plant, Leland, NC

Enthalpy ID	0820-755-002-1	Prep Batch	EU11114	Sample Vol (mL)	293.08
Sample Name	082120-E01	Prep Date	2020-08-27	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2020-08-31	Dilution Factor	1
Sampling Date	20200821 00:00				

	Compound	CAS	Extract Concentration ng/L	Sample Concentration ng/L	Formatted Result ng/L	LOD ng/L	LOQ ng/L	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	2435.01	3.32	3.32	0.134	0.251		
	PFHpA	375-85-9	1406.74	1.92	1.92	0.0593	0.251		
	PFOA	335-67-1	2097.89	2.86	2.86	0.0678	0.251		
	PFNA	375-95-1	409.31	0.559	0.559	0.0434	0.251		
	PFDA	335-76-2	305.73	0.417	0.417	0.107	0.251		
	PFUnDA	2058-94-8	92.28	0.126	0.126	0.0410	0.251		J
	PFDoDA	307-55-1	ND	ND	ND	0.0405	0.251		U
	PFTriDA	72629-94-8	ND	ND	ND	0.0635	0.251		U
Sulfonates	PFTeDA	376-06-7	ND	ND	ND	0.0708	0.251		U
	PFBS	375-73-5	1626.69	2.22	2.22	0.0708	0.251		
	PFPeS	2706-91-4	304.70	0.416	0.416	0.0844	0.251		
	PFHxS	355-46-4	1570.79	2.14	2.14	0.0705	0.251		
	PFHpS	375-92-8	149.56	0.204	0.204	0.0664	0.251		J
	PFOS	1763-23-1	4293.04	5.86	5.86	0.0402	0.251		
	PFNS	68259-12-1	ND	ND	ND	0.0558	0.251		U
	PFDS	335-77-3	ND	ND	ND	0.115	0.251		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0551	0.251		U
	6:2 FTS	27619-97-2	117.85	0.161	0.161	0.0617	0.251		J
other	8:2 FTS	39108-34-4	ND	ND	ND	0.0485	0.251		U
	PFOSA	754-91-6	ND	ND	ND	0.311	0.313		U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.0464	0.251		U
	N-EiFOSAA	2991-50-6	ND	ND	ND	0.0555	0.251		U
	HFPO-DA	13252-13-6	2972.50	4.06	4.06	0.0812	0.251		
	PFMOAA	674-13-5	16418.64	22.4	22.4	1.26	1.26		
	PFMOPrA	377-73-1	ND	ND	ND	0.205	0.251		U
	PFO2HxA	39492-88-1	1430.52	1.95	1.95	1.26	1.26		
	PFO3OA	39492-89-2	ND	ND	ND	1.26	1.26		U
	PFO4DA	39492-90-5	1026.26	1.40	1.40	1.26	1.26		
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.205	0.251		U
	ADONA	919005-14-4	ND	ND	ND	0.102	0.251		U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.102	0.251		U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.102	0.251		U
	10:2 FTS	120226-60-0	ND	ND	ND	0.205	0.251		U
	FBSA	30334-69-1	187.95	0.257	0.257	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	291.41	0.398	0.398	1.26	1.26		L
	NFDHA	151772-58-6	ND	ND	ND	0.205	0.251		U
	PEPA		ND	ND	ND	1.26	1.26		U
	PFECA-G	801212-59-9	ND	ND	ND	1.26	1.26		U
	PFEEA	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	MPFBA		5258.90	7.18				17.2%	Q
	M5PFPeA		13049.42	17.8				44.2%	
	M3PFBS		30040.41	41.0				99.4%	
	M2-4:2 FTS		61460.00	83.9				231.9%	Q
	M5PFHxA		3993.47	5.45				88.6%	
	M3HFPO-DA		3905.91	5.33				93.7%	
	M4PFHpA		4790.92	6.54				103.5%	
	M3PFHxS		5187.87	7.08				117.4%	
	M2-6:2 FTS		42109.51	57.5				155.9%	Q
	M8PFOA		5522.99	7.54				120.3%	
	M9PFNA		5431.45	7.41				118.6%	
	M8PFOS		4932.57	6.73				113.4%	
	M2-8:2 FTS		7737.50	10.6				196.3%	Q
	M8FOSA-I		2866.62	3.91				67.5%	
	M6PFDA		4838.81	6.60				120.5%	
	d3-N-MeFOSAA		3447.28	4.70				82.6%	
	d5-N-EiFOSAA		3291.50	4.49				78.2%	
	M7PFUDa		4147.01	5.66				106.9%	
	MPFDoA		4122.89	5.63				101.9%	
	M2PFTeDA		2885.75	3.94				68.9%	

QC Data

Enthalpy Analytical

Job No.: 0820-755 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: N.W. Plant, Leland, NC

Enthalpy ID	MB-11114-PFAS	Prep Batch	EU11114	Sample Vol (mL)	250
Sample Name	MB-11114-PFAS	Prep Date	2020-08-27	Extract Vol (mL)	0.4
Matrix		Analysis Date	2020-08-31	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	Flags
Acids	PFBA	375-22-4	ND	ND	ND	0.157	0.294		U
	PFPeA	2706-90-3	ND	ND	ND	0.0898	0.294		U
	PfHxA	307-24-4	54.37	0.0870	0.0870	0.158	0.294		L
	PFHpA	375-85-9	ND	ND	ND	0.0695	0.294		U
	PFOA	335-67-1	ND	ND	ND	0.0795	0.294		U
	PFNA	375-95-1	ND	ND	ND	0.0509	0.294		U
	PFDA	335-76-2	27.77	0.0444	0.0444	0.125	0.294		L
	PFUnDA	2058-94-8	ND	ND	ND	0.0481	0.294		U
	PFDoDA	307-55-1	ND	ND	ND	0.0475	0.294		U
	PFTriDA	72629-94-8	ND	ND	ND	0.0745	0.294		U
	PFTeDA	376-06-7	ND	ND	ND	0.0830	0.294		U
Sulfonates	PFBS	375-73-5	ND	ND	ND	0.0830	0.294		U
	PFPeS	2706-91-4	ND	ND	ND	0.0990	0.294		U
	PFHxS	355-46-4	ND	ND	ND	0.0827	0.294		U
	PFHpS	375-92-8	ND	ND	ND	0.0779	0.294		U
	PFOS	1763-23-1	ND	ND	ND	0.0471	0.294		U
	PFNS	68259-12-1	ND	ND	ND	0.0654	0.294		U
	PFDS	335-77-3	ND	ND	ND	0.135	0.294		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0646	0.294		U
	6:2 FTS	27619-97-2	54.60	0.0874	0.0874	0.0723	0.294		J
	8:2 FTS	39108-34-4	ND	ND	ND	0.0569	0.294		U
other	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
	PFMOAA	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	0.294		U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.120	0.294		U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.120	0.294		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
	PEPA		ND	ND	ND	1.48	1.48		U
	PFECA-G	801212-59-9	ND	ND	ND	1.48	1.48		U
	PFEEA	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
ES	MPFBA		5215.64	8.35				70.3%	
	M5PFPeA		5927.73	9.48				82.9%	
	M3PFBS		6494.89	10.4				88.7%	
	M2-4:2 FTS		4526.65	7.24				70.5%	
	M5PFHxA		5321.48	8.51				81.5%	
	M3HFPO-DA		8681.46	13.9				143.8%	
	M4PFHpA		5510.15	8.82				82.2%	
	M3PFHxS		5176.10	8.28				90.5%	
	M2-6:2 FTS		5524.46	8.84				84.4%	
	M8PFOA		5274.91	8.44				79.3%	
	M9PFNA		6103.87	9.77				92.0%	
	M8PFOS		4958.63	7.93				88.1%	
	M2-8:2 FTS		6767.47	10.8				132.7%	
	M8FOSA-I		2745.00	4.39				50.0%	
	M6PFDA		4984.30	7.97				86.0%	
	d3-N-MeFOSAA		2668.33	4.27				49.4%	
	d5-N-EiFOSAA		2894.65	4.63				53.1%	
	M7PFUdA		3985.78	6.38				71.2%	
	MPFDoA		2799.90	4.48				47.9%	
	M2PFTeDA		1613.86	2.58				26.7%	

Enthalpy Analytical

Job No.: 0820-755 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: N.W. Plant, Leland, NC

Enthalpy ID OPR-11114-PFAS

Prep Batch EU11114

Sample Vol (mL) 250

Sample Name OPR-11114-PFAS

Prep Date 2020-08-27

Extract Vol (mL) 0.4

Matrix

Analysis Date 2020-08-31

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	Flags
Acids	PFBA	375-22-4	9999.50	16.0	16.0	0.157	0.294	80.0%	
	PFPeA	2706-90-3	10371.79	16.6	16.6	0.0898	0.294	83.0%	
	PFHxA	307-24-4	10319.33	16.5	16.5	0.158	0.294	82.6%	
	PFHpA	375-85-9	10617.92	17.0	17.0	0.0695	0.294	84.9%	
	PFOA	335-67-1	10411.18	16.7	16.7	0.0795	0.294	83.3%	
	PFNA	375-95-1	9700.17	15.5	15.5	0.0509	0.294	77.6%	
	PFDA	335-76-2	9716.65	15.5	15.5	0.125	0.294	77.7%	
	PFUnDA	2058-94-8	9743.10	15.6	15.6	0.0481	0.294	77.9%	
	PFDoDA	307-55-1	11323.06	18.1	18.1	0.0475	0.294	90.6%	
	PFTTrDA	72629-94-8	11032.57	17.7	17.7	0.0745	0.294	88.3%	
	PFTeDA	376-06-7	10653.03	17.0	17.0	0.0830	0.294	85.2%	
Sulfonates	PFBS	375-73-5	7390.02	11.8	11.8	0.0830	0.294	66.7%	
	PFPeS	2706-91-4	9286.38	14.9	14.9	0.0990	0.294	78.9%	
	PFHxS	355-46-4	9158.23	14.7	14.7	0.0827	0.294	80.2%	
	PFHpS	375-92-8	8586.45	13.7	13.7	0.0779	0.294	72.1%	
	PFOS	1763-23-1	8729.23	14.0	14.0	0.0471	0.294	75.3%	
	PFNS	68259-12-1	8708.93	13.9	13.9	0.0654	0.294	72.4%	
	PFDS	335-77-3	13626.86	21.8	21.8	0.135	0.294	113.0%	
	4:2 FTS	757124-72-4	8775.09	14.0	14.0	0.0646	0.294	74.9%	
	6:2 FTS	27619-97-2	11214.87	17.9	17.9	0.0723	0.294	94.3%	
Other	8:2 FTS	39108-34-4	9958.22	15.9	15.9	0.0569	0.294	83.0%	
	PFOSA	754-91-6	9556.44	15.3	15.3	0.365	0.366	76.5%	
	N-MeFOSAA	2355-31-9	9717.93	15.5	15.5	0.0544	0.294	77.7%	
	N-EtFOSAA	2991-50-6	9607.99	15.4	15.4	0.0651	0.294	76.9%	
ES	HFPO-DA	13252-13-6	8961.48	14.3	14.3	0.0951	0.294	71.7%	
	MPFBA		4782.93	7.65				60.6%	
	M5PFPeA		6687.60	10.7				87.9%	
	M3PFBS		7328.19	11.7				94.1%	
	M2-4:2 FTS		5200.59	8.32				76.1%	
	M5PFHxA		4426.54	7.08				82.6%	
	M3HFPO-DA		5479.13	8.77				110.6%	
	M4PFHpA		4575.54	7.32				83.2%	
	M3PFHxS		4370.48	6.99				93.5%	
	M2-6:2 FTS		5826.43	9.32				83.6%	
	M8PFOA		4550.36	7.28				83.4%	
	M9PFNA		5563.53	8.90				102.2%	
	M8PFOS		4774.47	7.64				103.9%	
	M2-8:2 FTS		6920.15	11.1				166.1%	Q
	M8FOSA-I		3225.97	5.16				71.9%	
	M6PFDA		4625.00	7.40				94.7%	
	d3-N-MeFOSAA		2934.96	4.70				66.5%	
	d5-N-EtFOSAA		3014.46	4.82				67.7%	
	M7PFUDa		4236.25	6.78				89.7%	
	MPFDoA		4120.28	6.59				83.7%	
	M2PFTeDA		3847.40	6.16				75.5%	

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	0820-755 PFAS by Isotope Dilution (non-potable water)
Client ID.	Site: N.W. Plant, Leland, NC

1. Custody

Caity Hayes received the samples on 08/21/20 at 5.2°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
0820-755-002-1	082120-E01	Aqueous
0820-755-001-1	082120-S01	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

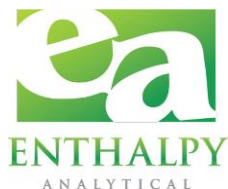
EU Method	Analytes	Cleanup Method
EU-047	PFAS - Full List	ENVI-Carb

3. Analysis

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

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.

Cleanup procedures were performed on the supernatant and then extracted via SPE. Each final sample extract was transferred to an autosampler vial and spiked with 400µL of Injection Standard (IS), prior to analysis.



Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	0820-755 PFAS by Isotope Dilution (non-potable water)
Client ID.	Site: N.W. Plant, Leland, NC

4. Calibration

In the initial calibration, the analytes exhibited R^2 of ≥ 0.99 . The calibration standard analytes, continuing calibration (concal) and Initial Calibration Verification (ICV) met the 30% criterion for native analytes.

5. QC Notes

The QC sample analyses passed all method criteria, except as noted below.

The analyte PFBS in the OPR/LCS was recovered below the lower limit; however it met marginal exceedance acceptance limits. Therefore, the data are accepted..

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.

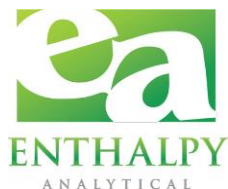
6. Reporting Notes

Some labeled standards in the samples fell outside the limits for ES recoveries. 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.

Brunswick County PFAS Analyte List

	PFAS Analyte	CAS #
*	Perfluoro(2-ethoxyethane)sulphonic acid (PFEESA)	113507-82-7
*	Hexafluoropropylene Oxide Dimer Acid (HFPOA-DA/Gen X)	13252-13-6(b)
*	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	151772-58-6
	Perfluorooctanesulfonate (PFOS)	1763-23-1
	Perfluoroundecanoic acid (PFUdA)	2058-94-8
	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)	2355-31-9
	Perfluoropentanoic acid (PFPeA)	2706-90-3
	Perfluoropentanesulfonate (PFPeS)	2706-91-4
	Fluorotelomer sulfonate 6:2 (6:2 FTS)	27619-97-2
	Perfluorodecanesulfonate (PFDS)	2806-15-7
	Nafion Byproduct 1	29311-67-9
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)	2991-50-6
	Perfluorohexanoic acid (PFHxA)	307-24-4
	Perfluorododecanoic acid (PFDoA)	307-55-1
	Perfluorooctanoic acid (PFOA)	335-67-1
	Perfluorodecanoic acid (PFDA)	335-76-2
	Perfluorohexanesulfonate (PFHxS)	355-46-4
	Perfluorobutyric acid (PFBA)	375-22-4
	Perfluorobutanesulfonate (PFBS)	375-73-5
	Perfluoroheptanoic acid (PFHpA)	375-85-9
	Perfluoroheptanesulfonate (PFHpS)	375-92-8
	Perfluorononanoic acid (PFNA)	375-95-1
	Perfluorotetradecanoic acid (PFTeDA)	376-06-7
*	Perfluoro-3-methoxypropanoic acid (PFMOPrA)	377-73-1
	Fluorotelomer sulfonate 8:2 (8:2 FTS)	39108-34-4
*	Perfluoro(3,5-dioxahexanoic) acid (PFO2HxA)	39492-88-1
*	Perfluoro(3,5,7-trioxaoctanoic) acid (PFO3OA)	39492-89-2
*	Perfluoro(3,5,7,9-tetraoxadecanoic) acid (PFO4DA)	39492-90-5
*	Perfluoro(3,5,7,9,11-pentaoxadodecanoic) acid (PFO5DA)	39492-91-6
	Perfluorononanesulfonate (PFNS)	474511-07-4
*	Perfluoro-2-methoxyacetic acid (PFMOAA)	674-13-5
	Perfluorotridecanoic acid (PFTrDA)	72629-94-8
*	Nafion Byproduct 2	749836-20-2
	Perfluorooctanesulfonamide (PFOSA)	754-91-6
*	9-chlorohexadecafluoro-3-oxanonane-1-sulfonate (9Cl-PF3PONS)	756426-58-1 (d)
	Fluorotelomer sulfonate 4:2 (4:2 FTS)	757124-72-4
*	11-chloroeicosafluoro-3-oxaundecane-1-sulfonate (11Cl-PF3OUdS)	763051-92-9 (c)
*	Perfluoro-4-methoxybutanic acid (PFMOBA)	863090-89-5
	Sodium dodecafluoro-3H-4,8-dioxanonanoate (ADONA)	919005-14-4(e)
*	Perfluoro-2-ethoxypropanoic acid (PEPA)	N/A
*	Perfluoro-2-methoxypropanoic acid (PMPA)	13140-29-9

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

Sample Custody



Enthalpy Ultratrace Job#: _____ COC Page _____ of _____

☒ Standard Turn Around Time☐ Rush Turn Around Time -- Date Needed

• All Fast TATs Subject to Approval by Enthalpy Analytical, Inc.

• All Samples Disposed of After 6 months Unless Otherwise Instructed.

Enthalpy Analytical-Wilmington, NC has added enhancements to standard methods to improve accuracy, precision and permit an assessment of laboratory performance in the context of your specific data needs. For more information email Cindy.James@enthalpy.com.

Client Name: Brunswick County Utilities

Project Manager: GLENN WALKER

Report To: SAME

Project Number: _____

Site Name: N.W. PLANT

Location: LELAND

PO#:

Telephone#:

Email:

This Chain of Custody is applicable to Non-Air samples. Standard TAT differ per analysis and are provided by request.

Client Special Instructions:

Matrix: GW-Groundwater, WW-Wastewater, NW-Non-Potable Water, DW-Drinking Water, S-Soil, SL-Sludge, BT-Biological Tissue, O-Other

Type: G=Grab C=Composite Q=Quality Control

[illegible]

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courier, on ice, NO seal, good condition

CH 8/21/20

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