

County of Brunswick

3954 Clearwell Dr NE
Leland, NC 28451

NW Plant

Leland, NC
Samples Received: 08/06/20

Analytical Report 0820-710

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.: 0820-710 PFAS by Isotope Dilution (non-potable water)

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

Summary

	Compound	CAS	080620-S01 ng/L	080620-E01 ng/L
Acids	PFBA	375-22-4	6.18	ND U
	PFPeA	2706-90-3	8.75	7.51
	PFHxA	307-24-4	6.79	5.86
	PFHpA	375-85-9	3.81	3.31
	PFOA	335-67-1	5.89	4.10
	PFNA	375-95-1	0.964	0.917
	PFDA	335-76-2	0.494	0.556
	PFUnDA	2058-94-8	0.128 J	0.191 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	ND U	ND U
	PFPeS	2706-91-4	0.818	0.636
	PFHxS	355-46-4	3.75	3.36
	PFHpS	375-92-8	0.209 J	0.279
	PFOS	1763-23-1	9.11	9.09
	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	ND U	0.267
	8:2 FTS	39108-34-4	ND U	ND U
	PFOSA	754-91-6	ND U	ND U
other	N-MeFOSAA	2355-31-9	ND U	ND U
	N-EtFOSAA	2991-50-6	ND U	ND U
	HFPO-DA	13252-13-6	9.70	9.12
	PFMOAA	674-13-5	74.9	65.4
	PFMOPrA	377-73-1	ND U	ND U
	PFO2HxA	39492-88-1	6.02	5.29
	PFO3OA	39492-89-2	3.42	3.47
	PFO4DA	39492-90-5	2.27	1.84
	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
other	11Cl-PF3OUdS	763051-92-9	ND U	ND U
	10:2 FTS	120226-60-0	ND U	ND U
	FBSA	30334-69-1	0.616	0.362
	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	0.657 L	0.694 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.: 0820-710 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID 0820-710-001-1

Prep Batch EU11069

Sample Vol (mL) 286.85

Sample Name 080620-S01

Prep Date 2020-08-13

Extract Vol (mL) 0.4

Matrix Aqueous

Analysis Date 2020-08-14

Dilution Factor 1

Sampling Date 20200806 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	PFPeA	2706-90-3	6272.71	8.75	8.75	0.0782	0.257		
	PFHxA	307-24-4	4872.73	6.79	6.79	0.137	0.257		
	PFHpA	375-85-9	2732.82	3.81	3.81	0.0606	0.257		
	PFNA	375-95-1	691.54	0.964	0.964	0.0444	0.257		
	PFDA	335-76-2	354.11	0.494	0.494	0.109	0.257		
	PFUnDA	2058-94-8	91.93	0.128	0.128	0.0419	0.257		J
	PFDaDA	307-55-1	ND	ND	ND	0.0414	0.257		U
	PFTriDA	72629-94-8	ND	ND	ND	0.0649	0.257		U
	PFTeDA	376-06-7	ND	ND	ND	0.0723	0.257		U
	PFBS	375-73-5	ND	ND	ND	0.0723	0.257		U
Sulfonates	PFPeS	2706-91-4	586.31	0.818	0.818	0.0863	0.257		
	PFHxS	355-46-4	2690.42	3.75	3.75	0.0721	0.257		
	PFHpS	375-92-8	149.95	0.209	0.209	0.0679	0.257		J
	PFOS	1763-23-1	6529.90	9.11	9.11	0.0410	0.257		
	PFNS	68259-12-1	ND	ND	ND	0.0570	0.257		U
	PFDS	335-77-3	ND	ND	ND	0.118	0.257		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0563	0.257		U
	6:2 FTS	27619-97-2	ND	ND	ND	0.0630	0.257		U
	8:2 FTS	39108-34-4	ND	ND	ND	0.0496	0.257		U
	PFOSA	754-91-6	ND	ND	ND	0.318	0.319		U
other	N-MeFOSAA	2355-31-9	ND	ND	ND	0.0474	0.257		U
	N-EiFOSAA	2991-50-6	ND	ND	ND	0.0567	0.257		U
	HFPO-DA	13252-13-6	6952.72	9.70	9.70	0.0829	0.257		
	PFMOAA	674-13-5	53744.64	74.9	74.9	1.29	1.29		
	PFMOPrA	377-73-1	ND	ND	ND	0.209	0.257		U
	PFO2HxA	39492-88-1	4323.65	6.02	6.02	1.29	1.29		
	PFO3OA	39492-89-2	2452.05	3.42	3.42	1.29	1.29		
	PFO4DA	39492-90-5	1627.76	2.27	2.27	1.29	1.29		
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.209	0.257		U
	ADONA	919005-14-4	ND	ND	ND	0.105	0.257		U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.105	0.257		U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.105	0.257		U
	10:2 FTS	120226-60-0	ND	ND	ND	0.209	0.257		U
	FBSA	30334-69-1	441.47	0.616	0.616	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	471.43	0.657	0.657	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
	PFHxDA	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		5123.85	7.14				23.5%	
	M5PFPeA		11844.33	16.5				51.1%	
	M3PFBS		18574.74	25.9				86.4%	
	M2-4:2 FTS		36222.31	50.5				185.4%	Q
	M5PFHxA		4320.90	6.03				81.2%	
	M3HFPO-DA		4241.67	5.91				90.9%	
	M4PFHpA		4369.90	6.09				81.9%	
	M3PFHxS		4529.44	6.32				83.5%	
	M2-6:2 FTS		17517.90	24.4				79.1%	
	M8PFOA		4307.79	6.01				81.2%	
	M9PFNA		3926.72	5.48				73.3%	
	M8PFOS		3570.64	4.98				72.3%	
	M2-8:2 FTS		2858.59	3.99				57.0%	
	M8FOSA-I		2116.04	2.95				41.8%	
	M6PFDA		3184.18	4.44				65.1%	
	d3-N-MeFOSAA		2664.98	3.72				52.5%	
	d5-N-EiFOSAA		2502.42	3.49				46.4%	
	M7PFUdA		2421.43	3.38				53.3%	
	MPFDaA		1543.64	2.15				34.3%	
	M2PFTeDA		519.96	0.725				10.8%	Q

Enthalpy Analytical

Job No.: 0820-710 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID	0820-710-001-2	Prep Batch	EU11104	Sample Vol (mL)	273.88
Sample Name	080620-S01	Prep Date	2020-08-26	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2020-08-26	Dilution Factor	1
Sampling Date	20200806 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	4234.02	6.18	6.18	0.144	0.269		
	PFOA	335-67-1	4031.43	5.89	5.89	0.0725	0.269		
ES	MPFBA		5980.93	8.74				35.7%	
	M8PFOA		3861.39	5.64				76.5%	

Enthalpy Analytical

Job No.: 0820-710 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID 0820-710-002-1

Prep Batch EU11069

Sample Vol (mL) 294.98

Sample Name 080620-E01

Prep Date 2020-08-13

Extract Vol (mL) 0.4

Matrix Aqueous

Analysis Date 2020-08-14

Dilution Factor 1

Sampling Date 20200806 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	PFPeA	2706-90-3	5540.61	7.51	7.51	0.0761	0.250		
	PFHxA	307-24-4	4318.77	5.86	5.86	0.134	0.250		
	PFHpA	375-85-9	2441.78	3.31	3.31	0.0589	0.250		
	PFNA	375-95-1	676.06	0.917	0.917	0.0431	0.250		
	PFDA	335-76-2	409.74	0.556	0.556	0.106	0.250		
	PFUnDA	2058-94-8	140.52	0.191	0.191	0.0408	0.250		J
	PFDoDA	307-55-1	ND	ND	ND	0.0403	0.250		U
	PFTeDA	72629-94-8	ND	ND	ND	0.0631	0.250		U
	PFTeDA	376-06-7	ND	ND	ND	0.0703	0.250		U
	PFTeDA	375-73-5	ND	ND	ND	0.0703	0.250		U
Sulfonates	PFPeS	2706-91-4	468.82	0.636	0.636	0.0839	0.250		
	PFHxS	355-46-4	2474.66	3.36	3.36	0.0701	0.250		
	PFHpS	375-92-8	205.67	0.279	0.279	0.0660	0.250		
	PFOS	1763-23-1	6705.37	9.09	9.09	0.0399	0.250		
	PFNS	68259-12-1	ND	ND	ND	0.0554	0.250		U
	PFDS	335-77-3	ND	ND	ND	0.114	0.250		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0547	0.250		U
	6:2 FTS	27619-97-2	196.68	0.267	0.267	0.0613	0.250		
	8:2 FTS	39108-34-4	ND	ND	ND	0.0482	0.250		U
	8:2 FTS	27619-97-2	196.68	0.267	0.267	0.0613	0.250		
other	PFOSA	754-91-6	ND	ND	ND	0.309	0.311		U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.0461	0.250		U
	N-EtFOSAA	2991-50-6	ND	ND	ND	0.0552	0.250		U
	HFPO-DA	13252-13-6	6726.05	9.12	9.12	0.0806	0.250		
	PFMOA	674-13-5	48198.75	65.4	65.4	1.25	1.25		
	PFMOPrA	377-73-1	ND	ND	ND	0.203	0.250		U
	PFO2HxA	39492-88-1	3902.51	5.29	5.29	1.25	1.25		
	PFO3OA	39492-89-2	2561.55	3.47	3.47	1.25	1.25		
	PFO4DA	39492-90-5	1353.29	1.84	1.84	1.25	1.25		
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.203	0.250		U
	ADONA	919005-14-4	ND	ND	ND	0.102	0.250		U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.102	0.250		U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.102	0.250		U
	10:2 FTS	120226-60-0	ND	ND	ND	0.203	0.250		U
	FBSA	30334-69-1	266.84	0.362	0.362	0.203	0.250		
	N-EtFOSA	4151-50-2	ND	ND	ND	0.203	0.250		U
	N-EtFOSE	1691-99-2	ND	ND	ND	6.10	6.10		U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.203	0.250		U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.10	6.10		U
	Nafion Byproduct 2	749836-20-2	511.73	0.694	0.694	1.25	1.25		L
	NFDHA	151772-58-6	ND	ND	ND	0.203	0.250		U
	PEPA		ND	ND	ND	1.25	1.25		U
	PFECA-G	801212-59-9	ND	ND	ND	1.25	1.25		U
	PFESA	113507-82-7	ND	ND	ND	0.203	0.250		U
	PFHxDA	67905-19-5	ND	ND	ND	1.25	1.25		U
	PFMOBA	863090-89-5	ND	ND	ND	1.25	1.25		U
	PFO5DA	39492-91-6	ND	ND	ND	2.55	2.55		U
	PMPA	13140-29-9	ND	ND	ND	1.25	1.25		U
ES	MPFBA		4095.58	5.55				23.9%	
	M5PFPeA		11691.89	15.9				64.3%	
	M3PFBS		19188.80	26.0				113.6%	
	M2-4:2 FTS		36792.80	49.9				239.8%	Q
	M5PFHxA		4183.63	5.67				101.9%	
	M3HFPO-DA		4577.91	6.21				127.2%	
	M4PFHpA		4306.83	5.84				104.6%	
	M3PFHxS		4219.05	5.72				106.6%	
	M2-6:2 FTS		19406.23	26.3				111.6%	
	M8PFOA		4205.31	5.70				102.8%	
	M9PFNA		3433.85	4.66				83.1%	
	M8PFOS		2862.02	3.88				79.4%	
	M2-8:2 FTS		2179.43	2.96				59.6%	
	M8FOSA-I		2055.04	2.79				55.7%	
	M6PFDA		2554.92	3.46				65.8%	
	d3-N-MeFOSAA		2260.28	3.07				61.1%	
	d5-N-EtFOSAA		2161.48	2.93				54.9%	
	M7PFUDa		2131.47	2.89				59.1%	
	MPFDoA		1621.99	2.20				45.4%	
	M2PFTeDA		1247.14	1.69				32.8%	

Enthalpy Analytical

Job No.: 0820-710 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID	0820-710-002-2	Prep Batch	EU11104	Sample Vol (mL)	276.43
Sample Name	080620-E01	Prep Date	2020-08-26	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2020-08-26	Dilution Factor	1
Sampling Date	20200806 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	0.142	0.266		U
	PFOA	335-67-1	2830.15	4.10	4.10	0.0719	0.266		
ES	MPFBA		4972.27	7.19				46.2%	
	M8PFOA		5480.72	7.93				107.1%	

QC Data

Enthalpy Analytical

Job No.: 0820-710 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID MB-11069-PFAS

Prep Batch EU11069

Sample Vol (mL) 250

Sample Name MB-11069-PFAS

Prep Date 2020-08-13

Extract Vol (mL) 0.4

Matrix

Analysis Date 2020-08-14

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	PFPeA	2706-90-3	ND	ND	ND	0.0898	0.294		U
	PFHxA	307-24-4	35.90	0.0574	0.0574	0.158	0.294		L
	PFHpA	375-85-9	ND	ND	ND	0.0695	0.294		U
	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
	PFTeDA	72629-94-8	ND	ND	ND	0.0745	0.294		U
	PFTeDA	376-06-7	ND	ND	ND	0.0830	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	ND	ND	ND	0.0723	0.294		U
	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-EtFOSAA	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	0.294		U
	9CI-PF3ONS	756426-58-1	ND	ND	ND	0.120	0.294		U
	11CI-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-EtFOSA	4151-50-2	ND	ND	ND	0.240	0.294		U
	N-EtFOSE	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
	PFCEA-G	801212-59-9	ND	ND	ND	1.48	1.48		U
	PFESA	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		4669.27	7.47				87.2%	
	M5PFPeA		4671.70	7.47				82.2%	
	M3PFBS		3764.09	6.02				71.3%	
	M2-4:2 FTS		3482.27	5.57				72.7%	
	M5PFHxA		5300.17	8.48				80.1%	
	M3HFPO-DA		5847.87	9.36				100.8%	
	M4PFHpA		4917.12	7.87				74.1%	
	M3PFHxS		4660.02	7.46				67.6%	
	M2-6:2 FTS		2811.15	4.50				51.7%	
	M8PFOA		4792.28	7.67				72.7%	
	M9PFNA		4265.73	6.83				64.1%	
	M8PFOS		3819.01	6.11				60.8%	
	M2-8:2 FTS		3011.03	4.82				47.3%	
	M8FOSA-I		2827.75	4.52				44.0%	
	M6PFDA		3623.61	5.80				57.9%	
	d3-N-MeFOSAA		3155.47	5.05				48.9%	
	d5-N-EtFOSAA		3141.92	5.03				45.8%	
	M7PFUDa		2824.70	4.52				48.6%	
	MPFDoA		2094.55	3.35				36.3%	
	M2PFTeDA		1370.48	2.19				22.3%	

Enthalpy Analytical

Job No.: 0820-710 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID	MB-11104-PFAS	Prep Batch	EU11104	Sample Vol (mL)	250
Sample Name	MB-11104-PFAS	Prep Date	2020-08-26	Extract Vol (mL)	0.4
Matrix		Analysis Date	2020-08-26	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
	PFOA	335-67-1	62.48	0.1000	0.1000	0.0795	0.294		J
ES	MPFBA		5489.86	8.78				149.2%	
	M8PFOA		5732.93	9.17				99.7%	

Enthalpy Analytical

Job No.: 0820-710 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID	OPR-11069-PFAS	Prep Batch	EU11069	Sample Vol (mL)	250
Sample Name	OPR-11069-PFAS	Prep Date	2020-08-13	Extract Vol (mL)	0.4
Matrix		Analysis Date	2020-08-14	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	PFPeA	2706-90-3	12309.64	19.7	19.7	0.0898	0.294	98.5%	
	PFHxA	307-24-4	13030.60	20.8	20.8	0.158	0.294	104.2%	
	PFHpA	375-85-9	14517.50	23.2	23.2	0.0695	0.294	116.1%	
	PFNA	375-95-1	12545.83	20.1	20.1	0.0509	0.294	100.4%	
	PFDA	335-76-2	14086.53	22.5	22.5	0.125	0.294	112.7%	
	PFUnDA	2058-94-8	13156.90	21.1	21.1	0.0481	0.294	105.3%	
	PFDoDA	307-55-1	13955.37	22.3	22.3	0.0475	0.294	111.6%	
	PFTTrDA	72629-94-8	13341.24	21.3	21.3	0.0745	0.294	106.7%	
	PFTeDA	376-06-7	14257.67	22.8	22.8	0.0830	0.294	114.1%	
Sulfonates	PFBS	375-73-5	11555.24	18.5	18.5	0.0830	0.294	104.2%	
	PFPeS	2706-91-4	12950.09	20.7	20.7	0.0990	0.294	110.1%	
	PFHxS	355-46-4	11103.60	17.8	17.8	0.0827	0.294	97.2%	
	PFHpS	375-92-8	11809.05	18.9	18.9	0.0779	0.294	99.1%	
	PFOS	1763-23-1	10826.44	17.3	17.3	0.0471	0.294	93.3%	
	PFNS	68259-12-1	11329.91	18.1	18.1	0.0654	0.294	94.2%	
	PFDS	335-77-3	13706.02	21.9	21.9	0.135	0.294	113.6%	
	4:2 FTS	757124-72-4	12122.37	19.4	19.4	0.0646	0.294	103.5%	
	6:2 FTS	27619-97-2	13131.42	21.0	21.0	0.0723	0.294	110.5%	
	8:2 FTS	39108-34-4	13338.20	21.3	21.3	0.0569	0.294	111.2%	
Other	PFOSA	754-91-6	13735.22	22.0	22.0	0.365	0.366	109.9%	
	N-MeFOSAA	2355-31-9	14160.05	22.7	22.7	0.0544	0.294	113.3%	
	N-EtFOSAA	2991-50-6	13750.32	22.0	22.0	0.0651	0.294	110.0%	
	HFPO-DA	13252-13-6	13359.05	21.4	21.4	0.0951	0.294	106.9%	
ES	MPFBA		4760.30	7.62				102.7%	
	M5PFPeA		4938.37	7.90				100.4%	
	M3PFBS		3809.19	6.09				83.4%	
	M2-4:2 FTS		3469.27	5.55				83.6%	
	M5PFHxA		5177.08	8.28				95.9%	
	M3HFPO-DA		6007.17	9.61				126.9%	
	M4PFHpA		4578.12	7.32				84.6%	
	M3PFHxS		4587.68	7.34				85.2%	
	M2-6:2 FTS		2935.48	4.70				62.4%	
	M8PFOA		4761.44	7.62				88.6%	
	M9PFNA		4832.16	7.73				89.0%	
	M8PFOS		4520.60	7.23				92.2%	
	M2-8:2 FTS		3519.92	5.63				70.8%	
	M8FOSA-I		3557.49	5.69				70.8%	
	M6PFDA		4378.99	7.01				83.5%	
	d3-N-MeFOSAA		4071.61	6.51				80.9%	
	d5-N-EtFOSAA		4242.60	6.79				79.2%	
	M7PFUdA		4339.60	6.94				89.1%	
	MPFDoA		3822.46	6.12				79.1%	
	M2PFTeDA		2457.00	3.93				47.8%	

Enthalpy Analytical

Job No.: 0820-710 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID	OPR-11104-PFAS	Prep Batch	EU11104	Sample Vol (mL)	250
Sample Name	OPR-11104-PFAS	Prep Date	2020-08-26	Extract Vol (mL)	0.4
Matrix		Analysis Date	2020-08-26	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	10221.65	16.4	16.4	0.157	0.294	81.8%	
	PFOA	335-67-1	9994.58	16.0	16.0	0.0795	0.294	80.0%	
ES	MPFBA		5474.71	8.76				140.2%	
	M8PFOA		5223.24	8.36				93.2%	

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	0820-710 PFAS by Isotope Dilution (non-potable water)
Client ID.	Site: N.W. Plant, Leland

1. Custody

Caity Hayes received the samples on 08/06/20 at 4.9°C after being relinquished by County of Brunswick. The samples were received in good condition.

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

Table 1 - Sample Inventory

EU Lab Sample ID	Client Sample ID	Matrix
0820-710-002-1, 0820-710-002-2	080620-E01	Aqueous
0820-710-001-1, 0820-710-001-2	080620-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 "Kili") and 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.

The samples were initially extracted on August 7, 2020. Due to PFBA and PFOA contamination in the method blank associated with the initial extraction, the samples and were reextracted for PFBA and PFOA on August 25, 2020.



Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	0820-710 PFAS by Isotope Dilution (non-potable water)
Client ID.	Site: N.W. Plant, Leland

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 previously stated.

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

The results for PFBA and PFOA were reported from the analysis of the second extract.

A few ES compounds were recovered outside of the acceptance limits. As the native analytes are quantified using isotope dilution, which corrects for recovery fluctuations, the data are not impacted and, therefore, accepted.

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 – 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 _____

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.V. 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]

Relinquished By:

Date: _____

Received By:

Date: _____

Time:

Sample Temperature Upon Receipt:

☒ Iced ☐ Ambient °C 4.9°C TS

☐ Iced ☐ Ambient °C☐ Iced ☐ Ambient °C

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EU#0820-710 Page 22 of 23

currier. iced, no seals, good condition. EU#0820-710
Ctt 8/6/20

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Of This Report.**