

County of Brunswick

3954 Clearwell Dr NE
Leland, NC 28451

NW Plant

Leland, NC
Samples Received: 08/13/20

Analytical Report 0820-725

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.: 0820-725 PFAS by Isotope Dilution (non-potable water)

County of Brunswick

Site: NW Plant Lab, Leland

Summary

	Compound	CAS	81320 S01 ng/L	81320 E01 ng/L
Acids	PFBA	375-22-4	ND U	ND U
	PFPeA	2706-90-3	ND U	ND U
	PFHxA	307-24-4	5.74	5.27
	PFHpA	375-85-9	2.66	2.56
	PFOA	335-67-1	3.98	4.81
	PFNA	375-95-1	0.754	0.786
	PFDA	335-76-2	0.394	0.434
	PFUnDA	2058-94-8	0.273	0.128 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	3.12	3.13
	PFPeS	2706-91-4	0.457	0.601
	PFHxS	355-46-4	2.91	2.81
	PFHpS	375-92-8	0.290	0.196 J
	PFOS	1763-23-1	8.06	8.01
	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	0.170 J	ND U
	8:2 FTS	39108-34-4	ND U	ND U
other	PFOSA	754-91-6	ND U	ND U
	N-MeFOSAA	2355-31-9	ND U	ND U
	N-EtFOSAA	2991-50-6	ND U	ND U
	HFPO-DA	13252-13-6	8.38	5.69
	PFMOAA	674-13-5	40.7	42.2
	PFMOPrA	377-73-1	ND U	ND U
	PFO2HxA	39492-88-1	5.69	4.40
	PFO3OA	39492-89-2	2.85	ND U
	PFO4DA	39492-90-5	1.77	ND U
	Nafion Byproduct 1	29311-67-9	0.136 L	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	0.607	0.455
	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	0.516 L	ND U
	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	0.0606 L	ND U
	PFMOBA	863090-89-5	ND U	ND U
	PFO5DA	39492-91-6	ND U	0.634 L
	PMPA	13140-29-9	ND U	ND U

Detailed Results

Enthalpy Analytical

Job No.: 0820-725 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: NW Plant Lab, Leland

Enthalpy ID 0820-725-001-1

Prep Batch EU11085

Sample Vol (mL) 285.23

Sample Name 81320 S01

Prep Date 2020-08-21

Extract Vol (mL) 0.4

Matrix Aqueous

Analysis Date 2020-08-23

Dilution Factor 1

Sampling Date 20200813 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	0.138	0.258		U
	PFPeA	2706-90-3	ND	ND	ND	0.0787	0.258		U
	PFHxA	307-24-4	4094.84	5.74	5.74	0.138	0.258		
	PFHpA	375-85-9	1897.80	2.66	2.66	0.0609	0.258		
	PFOA	335-67-1	2841.28	3.98	3.98	0.0696	0.258		
	PFNA	375-95-1	537.74	0.754	0.754	0.0446	0.258		
	PFDA	335-76-2	281.05	0.394	0.394	0.110	0.258		
	PFUnDA	2058-94-8	194.52	0.273	0.273	0.0422	0.258		
	PFDoDA	307-55-1	ND	ND	ND	0.0416	0.258		U
	PFTeDA	72629-94-8	ND	ND	ND	0.0653	0.258		U
	PFTeDA	376-06-7	ND	ND	ND	0.0727	0.258		U
Sulfonates	PFBS	375-73-5	2224.69	3.12	3.12	0.0727	0.258		
	PFPeS	2706-91-4	325.94	0.457	0.457	0.0868	0.258		
	PFHxS	355-46-4	2072.91	2.91	2.91	0.0725	0.258		
	PFHpS	375-92-8	206.94	0.290	0.290	0.0683	0.258		
	PFOS	1763-23-1	5749.71	8.06	8.06	0.0413	0.258		
	PFNS	68259-12-1	ND	ND	ND	0.0573	0.258		U
	PFDS	335-77-3	ND	ND	ND	0.118	0.258		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0566	0.258		U
	8:2 FTS	39108-34-4	ND	ND	ND	0.0499	0.258		U
other	PFOSA	754-91-6	ND	ND	ND	0.320	0.321		U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.0477	0.258		U
	N-EtFOSAA	2991-50-6	ND	ND	ND	0.0571	0.258		U
	HFPO-DA	13252-13-6	5974.23	8.38	8.38	0.0834	0.258		
	PFMOAA	674-13-5	28997.77	40.7	40.7	1.30	1.30		
	PFMOPrA	377-73-1	ND	ND	ND	0.210	0.258		U
	PFO2HxA	39492-88-1	4060.32	5.69	5.69	1.30	1.30		U
	PFO3OA	39492-89-2	2029.47	2.85	2.85	1.30	1.30		
	PFO4DA	39492-90-5	1264.06	1.77	1.77	1.30	1.30		
	Nafion Byproduct 1	29311-67-9	97.21	0.136	0.136	0.210	0.258		L
	ADONA	919005-14-4	ND	ND	ND	0.105	0.258		U
	9CI-PF3ONS	756426-58-1	ND	ND	ND	0.105	0.258		U
	11CI-PF3OUdS	763051-92-9	ND	ND	ND	0.105	0.258		U
	10:2 FTS	120226-60-0	ND	ND	ND	0.210	0.258		U
	FBSA	30334-69-1	432.51	0.607	0.607	0.210	0.258		
	N-EtFOSA	4151-50-2	ND	ND	ND	0.210	0.258		U
	N-EtFOSE	1691-99-2	ND	ND	ND	6.31	6.31		U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.210	0.258		U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.31	6.31		U
	Nafion Byproduct 2	749836-20-2	368.09	0.516	0.516	1.30	1.30		L
	NFDHA	151772-58-6	ND	ND	ND	0.210	0.258		U
	PEPA		ND	ND	ND	1.30	1.30		U
	PFECA-G	801212-59-9	ND	ND	ND	1.30	1.30		U
	PFEESA	113507-82-7	ND	ND	ND	0.210	0.258		U
	PFHxDA	67905-19-5	43.20	0.0606	0.0606	1.30	1.30		L
	PFMOBA	863090-89-5	ND	ND	ND	1.30	1.30		U
	PFOSDA	39492-91-6	ND	ND	ND	2.64	2.64		U
	PMPA	13140-29-9	ND	ND	ND	1.30	1.30		U
ES	MPFBA		5685.33	7.97				24.0%	
	M5PFPeA		14228.45	20.0				62.3%	
	M3PFBS		23456.15	32.9				100.4%	
	M2-4:2 FTS		48323.09	67.8				235.7%	Q
	M5PFHxA		4765.88	6.68				94.9%	
	M3HFPO-DA		3930.72	5.51				88.0%	
	M4PFHpA		4873.66	6.83				94.5%	
	M3PFHxS		4935.96	6.92				90.1%	
	M8PFOA		4499.02	6.31				88.0%	
	M9PFNA		3891.14	5.46				76.3%	
	M8PFOS		3807.13	5.34				70.6%	
	M2-8:2 FTS		2932.09	4.11				60.0%	
	M8FOSA-I		2494.62	3.50				47.4%	
	M6PFDA		3744.26	5.25				72.0%	
	d3-N-MeFOSAA		2865.02	4.02				55.4%	
	d5-N-EtFOSAA		2977.07	4.17				57.1%	
	M7PFUDa		3141.56	4.41				62.5%	
	MPFDoA		3014.96	4.23				57.5%	
	M2PFTeDA		1663.53	2.33				30.7%	

Enthalpy Analytical

Job No.: 0820-725 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: NW Plant Lab, Leland

Enthalpy ID	0820-725-001-2	Prep Batch	EU11128	Sample Vol (mL)	288.16
Sample Name	81320 S01	Prep Date	2020-09-02	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2020-09-02	Dilution Factor	1
Sampling Date	20200813 00:00				

	Compound	CAS	Extract Concentration ng/L	Sample Concentration ng/L	Formatted Result ng/L	LOD ng/L	LOQ ng/L	Recovery	Flags
Sulfonates	6:2 FTS	27619-97-2	122.21	0.170	0.170	0.0627	0.255	138.6%	J
ES	M2-6:2 FTS		44136.88	61.3					

Enthalpy Analytical

Job No.: 0820-725 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: NW Plant Lab, Leland

Enthalpy ID	0820-725-002-1	Prep Batch	EU11085	Sample Vol (mL)	277.45
Sample Name	81320 E01	Prep Date	2020-08-21	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2020-08-23	Dilution Factor	1
Sampling Date	20200813 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	0.265		U
	PFPeA	2706-90-3	ND	ND	ND	0.0809	0.265		U
	PFHxA	307-24-4	3654.70	5.27	5.27	0.142	0.265		
	PFHpA	375-85-9	1778.05	2.56	2.56	0.0626	0.265		
	PFOA	335-67-1	3336.88	4.81	4.81	0.0716	0.265		
	PFNA	375-95-1	545.42	0.786	0.786	0.0459	0.265		
	PFDA	335-76-2	301.17	0.434	0.434	0.113	0.265		
	PFUnDA	2058-94-8	88.70	0.128	0.128	0.0433	0.265		J
	PFDoDA	307-55-1	ND	ND	ND	0.0428	0.265		U
	PFTeDA	72629-94-8	ND	ND	ND	0.0671	0.265		U
	PFTeDA	376-06-7	ND	ND	ND	0.0748	0.265		U
Sulfonates	PFBS	375-73-5	2170.20	3.13	3.13	0.0748	0.265		
	PFPeS	2706-91-4	417.16	0.601	0.601	0.0892	0.265		
	PFHxS	355-46-4	1946.16	2.81	2.81	0.0745	0.265		
	PFHpS	375-92-8	135.70	0.196	0.196	0.0702	0.265		J
	PFOS	1763-23-1	5555.64	8.01	8.01	0.0424	0.265		
	PFNS	68259-12-1	ND	ND	ND	0.0589	0.265		U
	PFDS	335-77-3	ND	ND	ND	0.122	0.265		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0582	0.265		U
	8:2 FTS	39108-34-4	ND	ND	ND	0.0513	0.265		U
	other	PFOSA	754-91-6	ND	ND	0.329	0.330		U
other		N-MeFOSAA	2355-31-9	ND	ND	0.0490	0.265		U
		N-EtFOSAA	2991-50-6	ND	ND	0.0587	0.265		U
		HFPO-DA	13252-13-6	3947.49	5.69	0.0857	0.265		
		PFMOAA	674-13-5	29285.18	42.2	1.33	1.33		
		PFMOPrA	377-73-1	ND	ND	0.216	0.265		U
		PFO2HxA	39492-88-1	3058.52	4.40	1.33	1.33		U
		PFO3OA	39492-89-2	ND	ND	1.33	1.33		U
		PFO4DA	39492-90-5	ND	ND	1.33	1.33		U
		Nafion Byproduct 1	29311-67-9	ND	ND	0.216	0.265		U
		ADONA	919005-14-4	ND	ND	0.108	0.265		U
		9CI-PF3ONS	756426-58-1	ND	ND	0.108	0.265		U
		11CI-PF3OUdS	763051-92-9	ND	ND	0.108	0.265		U
		10:2 FTS	120226-60-0	ND	ND	0.216	0.265		U
		FBSA	30334-69-1	315.29	0.455	0.216	0.265		
		N-EtFOSA	4151-50-2	ND	ND	0.216	0.265		U
		N-EtFOSE	1691-99-2	ND	ND	6.49	6.49		U
		N-MeFOSA	31506-32-8	ND	ND	0.216	0.265		U
		N-MeFOSE	24448-09-7	ND	ND	6.49	6.49		U
		Nafion Byproduct 2	749836-20-2	ND	ND	1.33	1.33		U
		NFDHA	151772-58-6	ND	ND	0.216	0.265		U
		PEPA		ND	ND	1.33	1.33		U
		PFECA-G	801212-59-9	ND	ND	1.33	1.33		U
		PFEESA	113507-82-7	ND	ND	0.216	0.265		U
		PFHxDA	67905-19-5	ND	ND	1.33	1.33		U
		PFMOBA	863090-89-5	ND	ND	1.33	1.33		U
		PFOSDA	39492-91-6	439.45	0.634	0.634	2.71		L
		PMPA	13140-29-9	ND	ND	1.33	1.33		U
ES		MPFBA	4942.31	7.13				17.3%	Q
		M5PFPeA	13756.18	19.8				49.9%	
		M3PFBS	26135.02	37.7				92.7%	
		M2-4:2 FTS	50723.73	73.1				205.0%	Q
		M5PFHxA	4159.39	6.00				89.3%	
		M3HFPO-DA	4525.10	6.52				106.1%	
		M4PFHpA	4512.41	6.51				94.4%	
		M3PFHxS	4782.19	6.89				90.5%	
		M8PFOA	4463.02	6.43				94.2%	
		M9PFNA	3589.89	5.18				75.9%	
		M8PFOS	3726.36	5.37				71.7%	
		M2-8:2 FTS	3184.23	4.59				67.6%	
		M8FOSA-I	1642.34	2.37				32.4%	
		M6PFDA	3923.29	5.66				79.2%	
		d3-N-MeFOSAA	2871.80	4.14				57.6%	
		d5-N-EtFOSAA	2465.30	3.55				49.0%	
		M7PFUDa	2913.95	4.20				60.9%	
		MPFDoA	1883.18	2.71				37.7%	
		M2PFTeDA	662.85	0.956				12.8%	Q

Enthalpy Analytical

Job No.: 0820-725 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: NW Plant Lab, Leland

Enthalpy ID	0820-725-002-2	Prep Batch	EU11128	Sample Vol (mL)	274.47
Sample Name	81320 E01	Prep Date	2020-09-02	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2020-09-02	Dilution Factor	1
Sampling Date	20200813 00:00				

	Compound	CAS	Extract Concentration ng/L	Sample Concentration ng/L	Formatted Result ng/L	LOD ng/L	LOQ ng/L	Recovery	Flags
Sulfonates	6:2 FTS	27619-97-2	ND	ND	ND	0.0659	0.268	169.4%	U
ES	M2-6:2 FTS		60278.69	87.8					Q

QC Data

Enthalpy Analytical

Job No.: 0820-725 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: NW Plant Lab, Leland

Enthalpy ID MB-11085-PFAS

Prep Batch EU11085

Sample Vol (mL) 250

Sample Name MB-11085-PFAS

Prep Date 2020-08-21

Extract Vol (mL) 0.4

Matrix

Analysis Date 2020-08-23

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	ND	ND	ND	0.158	0.294		U
	PFHpA	375-85-9	0.21	0.000337	0.000337	0.0695	0.294		L
	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	54.50	0.0872	0.0872	0.125	0.294		L
	PFUnDA	2058-94-8	58.77	0.0940	0.0940	0.0481	0.294		J
	PFDoDA	307-55-1	ND	ND	ND	0.0475	0.294		U
	PFTTrDA	72629-94-8	53.41	0.0855	0.0855	0.0745	0.294		J
	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
	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	18.41	0.0295	0.0295	0.0544	0.294		L
	N-EtFOSAA	2991-50-6	27.98	0.0448	0.0448	0.0651	0.294		L
	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
	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-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
	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
ES	MPFBA		4904.12	7.85				83.2%	
	M5PFPeA		5295.37	8.47				93.1%	
	M3PFBS		4801.58	7.68				82.5%	
	M2-4:2 FTS		4595.95	7.35				90.0%	
	M5PFHxA		5209.95	8.34				93.1%	
	M3HFPO-DA		6479.53	10.4				119.6%	
	M4PFHpA		5043.21	8.07				87.8%	
	M3PFHxS		5268.99	8.43				81.6%	
	M8PFOA		4763.49	7.62				83.6%	
	M9PFNA		4443.77	7.11				78.2%	
	M8PFOS		4420.21	7.07				69.6%	
	M2-8:2 FTS		3516.93	5.63				61.1%	
	M8FOSA-I		3513.28	5.62				56.6%	
	M6PFDA		3988.66	6.38				67.6%	
	d3-N-MeFOSAA		3461.31	5.54				56.8%	
	d5-N-EtFOSAA		3742.55	5.99				60.8%	
	M7PFUdA		3778.20	6.05				66.2%	
	MPFDoA		3120.05	4.99				52.4%	
	M2PFTeDA		1783.45	2.85				29.0%	

Enthalpy Analytical

Job No.: 0820-725 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: NW Plant Lab, Leland

Enthalpy ID	MB-11128-PFAS	Prep Batch	EU11128	Sample Vol (mL)	250
Sample Name	MB-11128-PFAS	Prep Date	2020-09-02	Extract Vol (mL)	0.4
Matrix		Analysis Date	2020-09-02	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
Sulfonates	6:2 FTS	27619-97-2	36.31	0.0581	0.0581	0.0723	0.294		L
ES	M2-6:2 FTS		6560.33	10.5				115.2%	

Enthalpy Analytical

Job No.: 0820-725 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: NW Plant Lab, Leland

Enthalpy ID OPR-11085-PFAS

Prep Batch EU11085

Sample Vol (mL) 250

Sample Name OPR-11085-PFAS

Prep Date 2020-08-21

Extract Vol (mL) 0.4

Matrix

Analysis Date 2020-08-23

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	11273.81	18.0	18.0	0.157	0.294	90.2%	
	PFPeA	2706-90-3	12305.67	19.7	19.7	0.0898	0.294	98.4%	
	PFHxA	307-24-4	11610.13	18.6	18.6	0.158	0.294	92.9%	
	PFHpA	375-85-9	10586.39	16.9	16.9	0.0695	0.294	84.7%	
	PFOA	335-67-1	11272.66	18.0	18.0	0.0795	0.294	90.2%	
	PFNA	375-95-1	11896.26	19.0	19.0	0.0509	0.294	95.2%	
	PFDA	335-76-2	12394.32	19.8	19.8	0.125	0.294	99.2%	
	PFUnDA	2058-94-8	12637.34	20.2	20.2	0.0481	0.294	101.1%	
	PFDoDA	307-55-1	11029.99	17.6	17.6	0.0475	0.294	88.2%	
	PFTTrDA	72629-94-8	10398.91	16.6	16.6	0.0745	0.294	83.2%	
	PFTTeDA	376-06-7	11807.49	18.9	18.9	0.0830	0.294	94.5%	
Sulfonates	PFBS	375-73-5	9971.00	16.0	16.0	0.0830	0.294	89.9%	
	PFPeS	2706-91-4	11556.08	18.5	18.5	0.0990	0.294	98.2%	
	PFHxS	355-46-4	10303.78	16.5	16.5	0.0827	0.294	90.2%	
	PFHpS	375-92-8	10295.01	16.5	16.5	0.0779	0.294	86.4%	
	PFOS	1763-23-1	9893.60	15.8	15.8	0.0471	0.294	85.3%	
	PFNS	68259-12-1	9584.86	15.3	15.3	0.0654	0.294	79.7%	
	PFDS	335-77-3	11916.52	19.1	19.1	0.135	0.294	98.8%	
	4:2 FTS	757124-72-4	12391.89	19.8	19.8	0.0646	0.294	105.8%	
	8:2 FTS	39108-34-4	11965.25	19.1	19.1	0.0569	0.294	99.7%	
Other	PFOSA	754-91-6	12085.51	19.3	19.3	0.365	0.366	96.7%	
	N-MeFOSAA	2355-31-9	12192.52	19.5	19.5	0.0544	0.294	97.5%	
	N-EtFOSAA	2991-50-6	12387.41	19.8	19.8	0.0651	0.294	99.1%	
	HFPO-DA	13252-13-6	10092.58	16.1	16.1	0.0951	0.294	80.7%	
ES	MPFBA		5463.69	8.74				71.8%	
	M5PFPeA		5168.00	8.27				70.4%	
	M3PFBS		4804.20	7.69				63.9%	
	M2-4:2 FTS		4475.55	7.16				67.9%	
	M5PFHxA		5325.80	8.52				76.1%	
	M3HFPO-DA		5953.92	9.53				89.9%	
	M4PFHpA		5396.80	8.63				75.1%	
	M3PFHxS		5088.60	8.14				66.4%	
	M8PFOA		4673.16	7.48				65.6%	
	M9PFNA		3892.05	6.23				54.7%	
	M8PFOS		4356.69	6.97				57.8%	
	M2-8:2 FTS		3262.99	5.22				47.8%	
	M8FOSA-I		3542.94	5.67				48.2%	
	M6PFDA		3859.88	6.18				50.9%	
	d3-N-MeFOSAA		3247.70	5.20				44.9%	
	d5-N-EtFOSAA		3350.79	5.36				45.9%	
	M7PFUdA		3385.54	5.42				46.2%	
	MPFDoA		3584.97	5.74				46.9%	
	M2PFTeDA		2728.90	4.37				34.5%	

Enthalpy Analytical

Job No.: 0820-725 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: NW Plant Lab, Leland

Enthalpy ID	OPR-11128-PFAS	Prep Batch	EU11128	Sample Vol (mL)	250
Sample Name	OPR-11128-PFAS	Prep Date	2020-09-02	Extract Vol (mL)	0.4
Matrix		Analysis Date	2020-09-02	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
Sulfonates	6:2 FTS	27619-97-2	9055.21	14.5	14.5	0.0723	0.294	76.2%	
ES	M2-6:2 FTS		7585.31	12.1				148.2%	

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	0820-725 PFAS by Isotope Dilution (non-potable water)
Client ID.	N/A Site: NW Plant Lab, Leland

1. Custody

Caity Hayes received the samples on 08/13/20 at 2.7°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
0820-725-002-1, 0820-725-002-2	81320 E01	Aqueous
0820-725-001-1, 0820-725-001-2	81320 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 80µL of Injection Standard (IS), prior to analysis.



Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	0820-725 PFAS by Isotope Dilution (non-potable water)
Client ID.	N/A Site: NW Plant Lab, 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

Initial QC method blank, did not meet method criteria for analyte 6:2 FTS. As a result, the samples were re-extracted and analyzed for this analyte. The QC sample analyses (initial and re-extracted) 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, 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 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 (PFEEA)	113507-82-7
*	Fluorotelomer sulfonate 10:2 (10:2 FTS)	120226-60-0
*	Perfluoro-2-methoxypropanoic acid (PMPA)	13140-29-9
*	Hexafluoropropylene Oxide Dimer Acid (HFPOA-DA/Gen X)	13252-13-6(b)
*	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	151772-58-6
*	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol (N-EtFOSE)	1691-99-2
	Perfluorooctanesulfonate (PFOS)	1763-23-1
	Perfluoroundecanoic acid (PFUdA)	2058-94-8
	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)	2355-31-9
*	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol (N-MeFOSE)	24448-09-7
	Perfluoropentanoic acid (PFPeA)	2706-90-3
	Perfluoropentanesulfonate (PFPeS)	2706-91-4
	Fluorotelomer sulfonate 6:2 (6:2 FTS)	27619-97-2
	Perfluorodecane sulfonate (PFDS)	2806-15-7
*	Nafion Byproduct 1	29311-67-9
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)	2991-50-6
*	Perfluorobutanesulfonamide (FBSA)	30334-69-1
	Perfluorohexanoic acid (PFHxA)	307-24-4
	Perfluorododecanoic acid (PFDoA)	307-55-1
*	N-methylperfluoro-1-octanesulfonamide (N-MeFOSA)	31506-32-8
	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
*	N-ethylperfluoro-1-octanesulfonamide (N-EtFOSA)	4151-50-2
	Perfluorononanesulfonate (PFNS)	474511-07-4
*	Perfluoro-2-methoxyacetic acid (PFMOAA)	674-13-5
*	Perfluorohexadecanoic acid (PFHxDA)	67905-19-5
	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)
*	4-(Heptafluoroisopropoxy)hexafluorobutanoic acid (PFECA-G)	801212-59-9
*	Perfluoro-4-methoxybutanic acid (PFMOBA)	863090-89-5
*	Sodium dodecafluoro-3H-4,8-dioxanonoate (ADONA)	919005-14-4(e)
*	Perfluoro-2-ethoxypropanoic acid (PEPA)	N/A

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

Sample Custody

Chain of Custody Record

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