County of Brunswick

3954 Clearwell Dr NE
Leland, NC 28451

NW Plant

Leland, NC
Samples Received: 08/27/20

Analytical Report
0820-768

Isotope Dilution Method

PFAS

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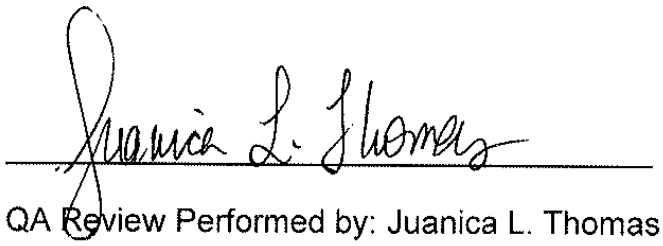
I certify that to the best of my knowledge all analytical data presented in this report:

- 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 __20__ pages.



QA Review Performed by: Juanica L. Thomas

Report Issued Date: 09/11/2020

ENTHALPY ANALYTICAL

Summary of Results

Enthalpy Analytical

Job No.: 0820-768 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: NW Water Plant, Leland

Summary

	Compound	CAS	082720-SO1 ng/L	082720-EO1 ng/L
Acids	PFBA	375-22-4	ND U	ND U
	PFPeA	2706-90-3	ND U	ND U
	PFHxA	307-24-4	4.51	6.25
	PFHpA	375-85-9	2.21	2.93
	PFOA	335-67-1	3.91	5.17
	PFNA	375-95-1	0.717	0.884
	PFDA	335-76-2	0.406	0.529
	PFUnDA	2058-94-8	0.189 J	0.139 J
	PFDoDA	307-55-1	ND U	ND U
	PFTrDA	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	0.646	0.634
	PFHxS	355-46-4	3.54	3.28
	PFHpS	375-92-8	ND U	ND U
	PFOS	1763-23-1	8.49	9.87
	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	0.231 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	ND U	ND U
	N-EtFOSAA	2991-50-6	ND U	ND U
	HFPO-DA	13252-13-6	4.43	5.35
	PFMOAA	674-13-5	34.7	34.1
	PFMOPrA	377-73-1	ND U	ND U
	PFO2HxA	39492-88-1	1.05	2.57
	PFO3OA	39492-89-2	ND U	3.74
	PFO4DA	39492-90-5	ND U	ND U
	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	0.439	0.763
	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	ND U	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	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.: 0820-768 PFAS by Isotope Dilution (non-potable water)
County of Brunswick Site: NW Water Plant, Leland

Enthalpy ID	0820-768-001-1	Prep Batch	EU11122	Sample Vol (mL)	289.24
Sample Name	082720-SO1	Prep Date	2020-09-03	Extract Vol (mL)	0.4
Matrix	aqueous	Analysis Date	2020-09-03	Dilution Factor	1
Sampling Date	20200827 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	0.136	0.254		U
	PFPeA	2706-90-3	ND	ND	ND	0.0776	0.254		U
	PFHxA	307-24-4	3262.56	4.51	4.51	0.136	0.254		
	PFHpA	375-85-9	1599.04	2.21	2.21	0.0601	0.254		
	PFOA	335-67-1	2824.13	3.91	3.91	0.0687	0.254		
	PFNA	375-95-1	518.11	0.717	0.717	0.0440	0.254		
	PFDA	335-76-2	293.77	0.406	0.406	0.108	0.254		
	PFUnDA	2058-94-8	136.62	0.189	0.189	0.0416	0.254		J
	PFDoDA	307-55-1	ND	ND	ND	0.0411	0.254		U
	PFTrDA	72629-94-8	ND	ND	ND	0.0644	0.254		U
	PFTeDA	376-06-7	ND	ND	ND	0.0717	0.254		U
Sulfonates	PFBS	375-73-5	ND	ND	ND	0.0717	0.254		U
	PFPeS	2706-91-4	466.85	0.646	0.646	0.0856	0.254		
	PFHxS	355-46-4	2558.87	3.54	3.54	0.0715	0.254		
	PFHpS	375-92-8	ND	ND	ND	0.0673	0.254		U
	PFOS	1763-23-1	6142.46	8.49	8.49	0.0407	0.254		
	PFNS	68259-12-1	ND	ND	ND	0.0565	0.254		U
	PFDS	335-77-3	ND	ND	ND	0.117	0.254		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0558	0.254		U
	6:2 FTS	27619-97-2	ND	ND	ND	0.0625	0.254		U
	8:2 FTS	39108-34-4	ND	ND	ND	0.0492	0.254		U
other	PFOSA	754-91-6	ND	ND	ND	0.315	0.317		U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.0470	0.254		U
	N-EtFOSAA	2991-50-6	ND	ND	ND	0.0563	0.254		U
	HFPO-DA	13252-13-6	3204.12	4.43	4.43	0.0822	0.254		
	PFMOAA	674-13-5	25072.41	34.7	34.7	1.28	1.28		
	PFMOPrA	377-73-1	ND	ND	ND	0.207	0.254		U
	PFO2HxA	39492-88-1	762.54	1.05	1.05	1.28	1.28		
	PFO3OA	39492-89-2	ND	ND	ND	1.28	1.28		U
	PFO4DA	39492-90-5	ND	ND	ND	1.28	1.28		U
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.207	0.254		U
	ADONA	919005-14-4	ND	ND	ND	0.104	0.254		U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.104	0.254		U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.104	0.254		U
	10:2 FTS	120226-60-0	ND	ND	ND	0.207	0.254		U
	FBSA	30334-69-1	317.13	0.439	0.439	0.207	0.254		
	N-EtFOSA	4151-50-2	ND	ND	ND	0.207	0.254		U
	N-EtFOSE	1691-99-2	ND	ND	ND	6.22	6.22		U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.207	0.254		U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.22	6.22		U
	Nafion Byproduct 2	749836-20-2	ND	ND	ND	1.28	1.28		U
	NFDHA	151772-58-6	ND	ND	ND	0.207	0.254		U
	PEPA		ND	ND	ND	1.28	1.28		U
	PFECA-G	801212-59-9	ND	ND	ND	1.28	1.28		U
	PFEESA	113507-82-7	ND	ND	ND	0.207	0.254		U
	PFHxDA	67905-19-5	ND	ND	ND	1.28	1.28		U
	PFMOBA	863090-89-5	ND	ND	ND	1.28	1.28		U
	PFO5DA	39492-91-6	ND	ND	ND	2.60	2.60		U
	PMPA	13140-29-9	ND	ND	ND	1.28	1.28		U
ES	MPFBA		5078.98	7.02				14.0%	Q
	M5PFPeA		12487.68	17.3				35.6%	
	M3PFBS		29280.30	40.5				81.6%	
	M2-4:2 FTS		72244.06	99.9				229.4%	Q
	M5PFHxA		3638.50	5.03				77.3%	
	M3HFPO-DA		5110.46	7.07				117.4%	
	M4PFHpA		4561.01	6.31				94.4%	
	M3PFHxS		4781.00	6.61				96.8%	
	M2-6:2 FTS		60030.59	83.0				187.1%	Q
	M8PFOA		4883.57	6.75				101.9%	
	M9PFNA		4454.20	6.16				93.1%	
	M8PFOS		4557.19	6.30				93.8%	
	M2-8:2 FTS		5293.32	7.32				120.2%	
	M8FOSA-I		2287.55	3.16				48.2%	
	M6PFDA		4491.12	6.21				104.0%	
	d3-N-MeFOSAA		3740.88	5.17				80.2%	
	d5-N-EtFOSAA		3838.09	5.31				81.6%	
	M7PFUdA		3868.27	5.35				92.6%	
	MPFDoA		3272.43	4.53				75.1%	
	M2PFTeDA		1622.35	2.24				36.0%	

Enthalpy Analytical

Job No.: 0820-768 PFAS by Isotope Dilution (non-potable water)
County of Brunswick Site: NW Water Plant, Leland

Enthalpy ID	0820-768-002-1	Prep Batch	EU11122	Sample Vol (mL)	287.22
Sample Name	082720-EO1	Prep Date	2020-09-03	Extract Vol (mL)	0.4
Matrix	aqueous	Analysis Date	2020-09-03	Dilution Factor	1
Sampling Date	20200827 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	0.137	0.256		U
	PFPeA	2706-90-3	ND	ND	ND	0.0781	0.256		U
	PFHxA	307-24-4	4491.16	6.25	6.25	0.137	0.256		
	PFHpA	375-85-9	2101.22	2.93	2.93	0.0605	0.256		
	PFOA	335-67-1	3710.17	5.17	5.17	0.0692	0.256		
	PFNA	375-95-1	634.45	0.884	0.884	0.0443	0.256		
	PFDA	335-76-2	379.98	0.529	0.529	0.109	0.256		
	PFUnDA	2058-94-8	99.48	0.139	0.139	0.0419	0.256		J
	PFDoDA	307-55-1	ND	ND	ND	0.0413	0.256		U
	PFTrDA	72629-94-8	ND	ND	ND	0.0648	0.256		U
	PFTeDA	376-06-7	ND	ND	ND	0.0722	0.256		U
Sulfonates	PFBS	375-73-5	ND	ND	ND	0.0722	0.256		U
	PFPeS	2706-91-4	454.92	0.634	0.634	0.0862	0.256		
	PFHxS	355-46-4	2353.77	3.28	3.28	0.0720	0.256		
	PFHpS	375-92-8	ND	ND	ND	0.0678	0.256		U
	PFOS	1763-23-1	7086.34	9.87	9.87	0.0410	0.256		
	PFNS	68259-12-1	ND	ND	ND	0.0569	0.256		U
	PFDS	335-77-3	ND	ND	ND	0.118	0.256		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0562	0.256		U
	6:2 FTS	27619-97-2	166.01	0.231	0.231	0.0629	0.256		J
	8:2 FTS	39108-34-4	ND	ND	ND	0.0495	0.256		U
other	PFOSA	754-91-6	ND	ND	ND	0.318	0.319		U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.0474	0.256		U
	N-EtFOSAA	2991-50-6	ND	ND	ND	0.0567	0.256		U
	HFPO-DA	13252-13-6	3844.80	5.35	5.35	0.0828	0.256		
	PFMOAA	674-13-5	24511.75	34.1	34.1	1.29	1.29		
	PFMOPrA	377-73-1	ND	ND	ND	0.209	0.256		U
	PFO2HxA	39492-88-1	1847.249	2.57	2.57	1.29	1.29		
	PFO3OA	39492-89-2	2684.37	3.74	3.74	1.29	1.29		
	PFO4DA	39492-90-5	ND	ND	ND	1.29	1.29		U
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.209	0.256		U
	ADONA	919005-14-4	ND	ND	ND	0.104	0.256		U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.104	0.256		U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.104	0.256		U
	10:2 FTS	120226-60-0	ND	ND	ND	0.209	0.256		U
	FBSA	30334-69-1	548.16	0.763	0.763	0.209	0.256		
	N-EtFOSA	4151-50-2	ND	ND	ND	0.209	0.256		U
	N-EtFOSE	1691-99-2	ND	ND	ND	6.27	6.27		U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.209	0.256		U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.27	6.27		U
	Nafion Byproduct 2	749836-20-2	ND	ND	ND	1.29	1.29		U
	NFDHA	151772-58-6	ND	ND	ND	0.209	0.256		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	0.256		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		4782.61	6.66				15.1%	Q
	M5PFPeA		13633.87	19.0				44.6%	
	M3PFBS		25991.57	36.2				83.0%	
	M2-4:2 FTS		55534.15	77.3				202.2%	Q
	M5PFHxA		3377.03	4.70				75.5%	
	M3HFPO-DA		4200.80	5.85				101.6%	
	M4PFHpA		3483.19	4.85				75.8%	
	M3PFHxS		3337.00	4.65				65.4%	
	M2-6:2 FTS		26055.88	36.3				93.1%	
	M8PFOA		2560.30	3.57				56.2%	
	M9PFNA		2307.57	3.21				50.8%	
	M8PFOS		2436.89	3.39				48.6%	
	M2-8:2 FTS		1801.04	2.51				39.6%	
	M8FOSA-I		1032.20	1.44				21.1%	
	M6PFDA		1923.24	2.68				43.1%	
	d3-N-MeFOSAA		1189.36	1.66				24.7%	
	d5-N-EtFOSAA		1107.34	1.54				22.8%	
	M7PFUdA		1240.65	1.73				28.8%	
	MPFDoA		1020.28	1.42				22.7%	
	M2PFTeDA		798.32	1.11				17.2%	Q

QC Data

Enthalpy Analytical

Job No.: 0820-768 PFAS by Isotope Dilution (non-potable water)
County of Brunswick Site: NW Water Plant, Leland

Enthalpy ID	MB-11122-PFAS	Prep Batch	EU11122	Sample Vol (mL)	250
Sample Name	MB-11122-PFAS	Prep Date	2020-09-03	Extract Vol (mL)	0.4
Matrix		Analysis Date	2020-09-03	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	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	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
	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
	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-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		5607.79	8.97				75.4%	
	M5PFPeA		6071.57	9.71				84.7%	
	M3PFBS		6255.44	10.0				85.3%	
	M2-4:2 FTS		5910.00	9.46				91.8%	
	M5PFHxA		4967.36	7.95				83.3%	
	M3HFPO-DA		7040.91	11.3				127.8%	
	M4PFHpA		5037.89	8.06				82.4%	
	M3PFHxS		5701.54	9.12				83.7%	
	M2-6:2 FTS		7215.07	11.5				110.0%	
	M8PFOA		5404.40	8.65				89.1%	
	M9PFNA		5738.11	9.18				94.8%	
	M8PFOS		5591.31	8.95				83.4%	
	M2-8:2 FTS		6002.66	9.60				98.8%	
	M8FOSA-I		4377.81	7.00				66.9%	
	M6PFDA		5299.87	8.48				95.4%	
	d3-N-MeFOSAA		5402.43	8.64				84.0%	
	d5-N-EtFOSAA		5107.74	8.17				78.7%	
	M7PFUdA		4632.51	7.41				86.3%	
	MPFDoA		3842.32	6.15				68.6%	
	M2PFTeDA		3006.76	4.81				51.9%	

Enthalpy Analytical

Job No.: 0820-768 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: NW Water Plant, Leland

Enthalpy ID	OPR-11122-PFAS	Prep Batch	EU11122	Sample Vol (mL)	250
Sample Name	OPR-11122-PFAS	Prep Date	2020-09-03	Extract Vol (mL)	0.4
Matrix		Analysis Date	2020-09-03	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	10309.85	16.5	16.5	0.157	0.294	82.5%	
	PFPeA	2706-90-3	10362.46	16.6	16.6	0.0898	0.294	82.9%	
	PFHxA	307-24-4	10435.55	16.7	16.7	0.158	0.294	83.5%	
	PFHpA	375-85-9	10567.48	16.9	16.9	0.0695	0.294	84.5%	
	PFOA	335-67-1	10187.81	16.3	16.3	0.0795	0.294	81.5%	
	PFNA	375-95-1	11034.19	17.7	17.7	0.0509	0.294	88.3%	
	PFDA	335-76-2	9857.47	15.8	15.8	0.125	0.294	78.9%	
	PFUnDA	2058-94-8	11045.88	17.7	17.7	0.0481	0.294	88.4%	
	PFDoDA	307-55-1	10485.21	16.8	16.8	0.0475	0.294	83.9%	
	PFTrDA	72629-94-8	9785.06	15.7	15.7	0.0745	0.294	78.3%	
	PFTeDA	376-06-7	10457.60	16.7	16.7	0.0830	0.294	83.7%	
Sulfonates	PFBS	375-73-5	7771.18	12.4	12.4	0.0830	0.294	70.1%	
	PFPeS	2706-91-4	8928.57	14.3	14.3	0.0990	0.294	75.9%	
	PFHxS	355-46-4	9115.10	14.6	14.6	0.0827	0.294	79.8%	
	PFHpS	375-92-8	9126.02	14.6	14.6	0.0779	0.294	76.6%	
	PFOS	1763-23-1	9468.44	15.1	15.1	0.0471	0.294	81.6%	
	PFNS	68259-12-1	9284.73	14.9	14.9	0.0654	0.294	77.2%	
	PFDS	335-77-3	12301.31	19.7	19.7	0.135	0.294	102.0%	
	4:2 FTS	757124-72-4	9798.23	15.7	15.7	0.0646	0.294	83.7%	
	6:2 FTS	27619-97-2	10533.46	16.9	16.9	0.0723	0.294	88.6%	
	8:2 FTS	39108-34-4	11630.52	18.6	18.6	0.0569	0.294	96.9%	
Other	PFOSA	754-91-6	9753.75	15.6	15.6	0.365	0.366	78.0%	
	N-MeFOSAA	2355-31-9	10573.83	16.9	16.9	0.0544	0.294	84.6%	
	N-EtFOSAA	2991-50-6	11314.40	18.1	18.1	0.0651	0.294	90.5%	
	HFPO-DA	13252-13-6	9408.10	15.1	15.1	0.0951	0.294	75.3%	
ES	MPFBA		5047.03	8.08				77.7%	
	M5PFPeA		5190.75	8.31				82.8%	
	M3PFBS		5646.26	9.03				88.0%	
	M2-4:2 FTS		4700.42	7.52				83.5%	
	M5PFHxA		4325.43	6.92				84.1%	
	M3HFPO-DA		7297.36	11.7				153.4%	Q
	M4PFHpA		4331.95	6.93				82.0%	
	M3PFHxS		4699.20	7.52				83.9%	
	M2-6:2 FTS		6215.72	9.95				108.3%	
	M8PFOA		4362.68	6.98				83.3%	
	M9PFNA		4522.04	7.24				86.5%	
	M8PFOS		4498.84	7.20				81.6%	
	M2-8:2 FTS		4790.23	7.66				95.9%	
	M8FOSA-I		3361.22	5.38				62.5%	
	M6PFDA		4869.80	7.79				91.0%	
	d3-N-MeFOSAA		3976.39	6.36				75.2%	
	d5-N-EtFOSAA		3973.96	6.36				74.5%	
	M7PFUdA		4495.44	7.19				86.9%	
	MPFDoA		4378.68	7.01				81.2%	
	M2PFTeDA		3491.36	5.59				62.6%	

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	0820-768 PFAS by Isotope Dilution (non-potable water)
Client ID.	Site: NW Water Plant, Leland

1. Custody

Braidy May received the samples on 08/27/20 at 5.4°C after being relinquished by County of Brunswick. The samples were received in Good Condition, but without chain of custody documentation.

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
0820-768-002-1	082720-EO1	aqueous
0820-768-001-1	082720-SO1	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.	0820-768 PFAS by Isotope Dilution (non-potable water)
Client ID.	Site: NW Water 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

Except where noted below, the QC sample analyses passed all method criteria.

QC samples that did not meet method acceptance criteria were: OPR-11122-PFAS M3HFPO-DA

ES recoveries of the above analyte did not meet method criteria which fell out of the upper limit. As the result for HFPO-DA in the OPR shows, this excursion does not affect the accuracy of the data for HFPO-DA.

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.

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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 wass 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.

- 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
	PFTrDA (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
*	11Cl-PF3OUdS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	674-13-5
*	9Cl-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

0820-768

Chain of Custody Record

ENTHALPY analytical

Enthalpy Ultratrace Job#: _____ COC Page_____of_____

Special Handling:
- ☐ 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: NORTHWEST WATER PLANT
Location: LELAND N.C.

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

Sample ID	Date	Time	Sample Volume	Type	Matrix	Sample Containers: # of Bottles	# of Jars	# of Bags	# Other	Analyses: Method 1613	Method 8290	Method 1668A/B/C PCB	PFAS by LC/MS/MS	PAHs by HRGC/HRMS	Sample on Hold	Method 23	ALL PFAS	Notes:
082720- SO1	8/27/2020	7:35 AM	250 ML	G	NW	2											X	
082720- EO1	8/27/2020	7:35 AM	250 ML	G	DW	2											X	

Relinquished By:	Date:	Received By:	Date:	Time:	Sample Temperature Upon Receipt:
Phil McCall	8-27-20	Brandy Veney	8/27/20	14:18	☑ Iced ☐ Ambient °C 5.4 T9
					☐ Iced ☐ Ambient °C_____
					☐ Iced ☐ Ambient °C_____

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Brunswick courier, cooler, no seal, good condition, Bv 8/27/20

This Is The Last Page Of This Report.