County of Brunswick

3954 Clearwell Dr NE
Leland, NC 28451

Northwest Water Plant

Leland, NC
Samples Received: 11/05/20

Analytical Report
1120-713

Isotope Dilution Method

PFAS

Enthalpy Analytical, LLC – Ultratrace

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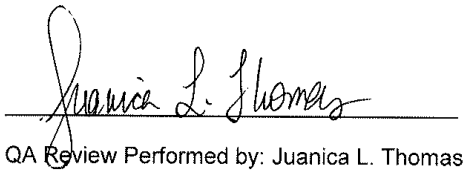
I certify that to the best of my knowledge all analytical data presented in this report:

- 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 __21__ pages.



QA Review Performed by: Juanica L. Thomas

Report Issued Date: 11/18/2020

ENTHALPY ANALYTICAL

Summary of Results

Enthalpy Analytical

Job No.: 1120-713-1 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: Northwest Water Plant

Summary

	Compound	CAS	110520-SO1 ng/L	110520-EO1 ng/L
Acids	PFBA	375-22-4	7.67	ND U
	PFPeA	2706-90-3	ND U	ND U
	PFHxA	307-24-4	8.69	6.25
	PFHpA	375-85-9	4.34	3.26
	PFOA	335-67-1	6.66	5.32
	PFNA	375-95-1	0.941	0.758
	PFDA	335-76-2	0.472	0.352
	PFUnDA	2058-94-8	ND U	0.101 J
	PFDoDA	307-55-1	ND U	0.0581 J
	PFTrDA	72629-94-8	ND U	ND U
	PFTeDA	376-06-7	ND U	ND U
Sulfonates	PFBS	375-73-5	5.00	ND U
	PFPeS	2706-91-4	0.898	0.632
	PFHxS	355-46-4	4.29	3.39
	PFHpS	375-92-8	0.428	0.243 J
	PFOS	1763-23-1	9.59	7.77
	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	0.269	0.505
	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	0.0280 L
	N-EtFOSAA	2991-50-6	ND U	ND U
	HFPO-DA	13252-13-6	5.62	4.53
	PFMOAA	674-13-5	29.3	24.9
	PFMOPrA	377-73-1	ND U	ND U
	PFO2HxA	39492-88-1	3.81	2.71
	PFO3OA	39492-89-2	8.61	4.82
	PFO4DA	39492-90-5	ND U	ND U
	Nafion Byproduct 1	29311-67-9	0.235 J	0.306
	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	1.38	0.802
	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	0.341 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.: 1120-713-1 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: Northwest Water Plant

Enthalpy ID	1120-713-001-1	Prep Batch	EU11275	Sample Vol (mL)	290.27
Sample Name	110520-SO1	Prep Date	2020-11-06	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2020-11-07	Dilution Factor	1
Sampling Date	20201105 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	5567.87	7.67	7.67	0.136	0.254		
	PFPeA	2706-90-3	ND	ND	ND	0.0773	0.254		U
	PFHxA	307-24-4	6304.24	8.69	8.69	0.136	0.254		
	PFHpA	375-85-9	3151.05	4.34	4.34	0.0599	0.254		
	PFOA	335-67-1	4830.03	6.66	6.66	0.0684	0.254		
	PFNA	375-95-1	682.58	0.941	0.941	0.0438	0.254		
	PFDA	335-76-2	342.41	0.472	0.472	0.108	0.254		
	PFUnDA	2058-94-8	ND	ND	ND	0.0414	0.254		U
	PFDoDA	307-55-1	ND	ND	ND	0.0409	0.254		U
	PFTrDA	72629-94-8	ND	ND	ND	0.0642	0.254		U
	PFTeDA	376-06-7	ND	ND	ND	0.0715	0.254		U
Sulfonates	PFBS	375-73-5	3632.00	5.00	5.00	0.0715	0.254		
	PFPeS	2706-91-4	651.44	0.898	0.898	0.0853	0.254		
	PFHxS	355-46-4	3110.35	4.29	4.29	0.0712	0.254		
	PFHpS	375-92-8	310.27	0.428	0.428	0.0671	0.254		
	PFOS	1763-23-1	6961.29	9.59	9.59	0.0406	0.254		
	PFNS	68259-12-1	ND	ND	ND	0.0563	0.254		U
	PFDS	335-77-3	ND	ND	ND	0.116	0.254		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0556	0.254		U
	6:2 FTS	27619-97-2	195.43	0.269	0.269	0.0623	0.254		
	8:2 FTS	39108-34-4	ND	ND	ND	0.0490	0.254		U
other	PFOSA	754-91-6	ND	ND	ND	0.314	0.316		U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.0469	0.254		U
	N-EtFOSAA	2991-50-6	ND	ND	ND	0.0561	0.254		U
	HFPO-DA	13252-13-6	4080.89	5.62	5.62	0.0819	0.254		
	PFMOAA	674-13-5	21282.03	29.3	29.3	1.27	1.27		
	PFMOPrA	377-73-1	ND	ND	ND	0.207	0.254		U
	PFO2HxA	39492-88-1	2768.858	3.81	3.81	1.27	1.27		
	PFO3OA	39492-89-2	6250.07	8.61	8.61	1.27	1.27		
	PFO4DA	39492-90-5	ND	ND	ND	1.27	1.27		U
	Nafion Byproduct 1	29311-67-9	170.39	0.235	0.235	0.207	0.254		J
	ADONA	919005-14-4	ND	ND	ND	0.103	0.254		U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.103	0.254		U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.103	0.254		U
	10:2 FTS	120226-60-0	ND	ND	ND	0.207	0.254		U
	FBSA	30334-69-1	1003.70	1.38	1.38	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	6.20	6.20		U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.207	0.254		U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.20	6.20		U
	Nafion Byproduct 2	749836-20-2	ND	ND	ND	1.27	1.27		U
	NFDHA	151772-58-6	ND	ND	ND	0.207	0.254		U
	PEPA		ND	ND	ND	1.27	1.27		U
	PFECA-G	801212-59-9	ND	ND	ND	1.27	1.27		U
	PFEESA	113507-82-7	ND	ND	ND	0.207	0.254		U
	PFHxDA	67905-19-5	ND	ND	ND	1.27	1.27		U
	PFMOBA	863090-89-5	ND	ND	ND	1.27	1.27		U
	PFO5DA	39492-91-6	ND	ND	ND	2.59	2.59		U
	PMPA	13140-29-9	ND	ND	ND	1.27	1.27		U
ES	MPFBA		4820.16	6.64				16.3%	Q
	M5PFPeA		12764.24	17.6				39.7%	
	M3PFBS		21878.45	30.1				70.1%	
	M2-4:2 FTS		48053.73	66.2				171.3%	Q
	M5PFHxA		4112.46	5.67				61.6%	
	M3HFPO-DA		3953.17	5.45				62.6%	
	M4PFHpA		4535.92	6.25				68.1%	
	M3PFHxS		4284.17	5.90				59.8%	
	M2-6:2 FTS		24351.23	33.6				82.8%	
	M8PFOA		4014.18	5.53				61.2%	
	M9PFNA		2960.26	4.08				42.7%	
	M8PFOS		2677.89	3.69				36.0%	
	M2-8:2 FTS		2350.79	3.24				37.0%	
	M8FOSA-I		2087.97	2.88				30.5%	
	M6PFDA		2447.89	3.37				34.7%	
	d3-N-MeFOSAA		2194.42	3.02				32.9%	
	d5-N-EtFOSAA		1803.13	2.48				27.2%	
	M7PFUdA		1765.30	2.43				24.8%	
	MPFDoA		1346.56	1.86				21.2%	
	M2PFTeDA		574.37	0.791				8.5%	Q

Enthalpy Analytical

Job No.: 1120-713-1 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: Northwest Water Plant

Enthalpy ID	1120-713-002-1	Prep Batch	EU11275	Sample Vol (mL)	291.11
Sample Name	110520-EO1	Prep Date	2020-11-06	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2020-11-07	Dilution Factor	1
Sampling Date	20201105 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	0.135	0.253		U
	PFPeA	2706-90-3	ND	ND	ND	0.0771	0.253		U
	PFHxA	307-24-4	4548.23	6.25	6.25	0.135	0.253		
	PFHpA	375-85-9	2370.41	3.26	3.26	0.0597	0.253		
	PFOA	335-67-1	3874.67	5.32	5.32	0.0682	0.253		
	PFNA	375-95-1	551.32	0.758	0.758	0.0437	0.253		
	PFDA	335-76-2	256.21	0.352	0.352	0.107	0.253		
	PFUnDA	2058-94-8	73.23	0.101	0.101	0.0413	0.253		J
	PFDoDA	307-55-1	42.31	0.0581	0.0581	0.0408	0.253		J
	PFTrDA	72629-94-8	ND	ND	ND	0.0640	0.253		U
	PFTeDA	376-06-7	ND	ND	ND	0.0713	0.253		U
Sulfonates	PFBS	375-73-5	ND	ND	ND	0.0713	0.253		U
	PFPeS	2706-91-4	459.65	0.632	0.632	0.0850	0.253		
	PFHxS	355-46-4	2464.86	3.39	3.39	0.0710	0.253		
	PFHpS	375-92-8	176.51	0.243	0.243	0.0669	0.253		J
	PFOS	1763-23-1	5654.12	7.77	7.77	0.0404	0.253		
	PFNS	68259-12-1	ND	ND	ND	0.0562	0.253		U
	PFDS	335-77-3	ND	ND	ND	0.116	0.253		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0555	0.253		U
	6:2 FTS	27619-97-2	367.19	0.505	0.505	0.0621	0.253		
	8:2 FTS	39108-34-4	ND	ND	ND	0.0489	0.253		U
other	PFOSA	754-91-6	ND	ND	ND	0.313	0.315		U
	N-MeFOSAA	2355-31-9	20.40	0.0280	0.0280	0.0467	0.253		L
	N-EtFOSAA	2991-50-6	ND	ND	ND	0.0559	0.253		U
	HFPO-DA	13252-13-6	3293.36	4.53	4.53	0.0817	0.253		
	PFMOAA	674-13-5	18098.56	24.9	24.9	1.27	1.27		
	PFMOPrA	377-73-1	ND	ND	ND	0.206	0.253		U
	PFO2HxA	39492-88-1	1975.705	2.71	2.71	1.27	1.27		
	PFO3OA	39492-89-2	3505.88	4.82	4.82	1.27	1.27		
	PFO4DA	39492-90-5	ND	ND	ND	1.27	1.27		U
	Nafion Byproduct 1	29311-67-9	222.45	0.306	0.306	0.206	0.253		
	ADONA	919005-14-4	ND	ND	ND	0.103	0.253		U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.103	0.253		U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.103	0.253		U
	10:2 FTS	120226-60-0	ND	ND	ND	0.206	0.253		U
	FBSA	30334-69-1	584.00	0.802	0.802	0.206	0.253		
	N-EtFOSA	4151-50-2	ND	ND	ND	0.206	0.253		U
	N-EtFOSE	1691-99-2	ND	ND	ND	6.18	6.18		U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.206	0.253		U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.18	6.18		U
	Nafion Byproduct 2	749836-20-2	248.08	0.341	0.341	1.27	1.27		L
	NFDHA	151772-58-6	ND	ND	ND	0.206	0.253		U
	PEPA		ND	ND	ND	1.27	1.27		U
	PFECA-G	801212-59-9	ND	ND	ND	1.27	1.27		U
	PFEESA	113507-82-7	ND	ND	ND	0.206	0.253		U
	PFHxDA	67905-19-5	ND	ND	ND	1.27	1.27		U
	PFMOBA	863090-89-5	ND	ND	ND	1.27	1.27		U
	PFO5DA	39492-91-6	ND	ND	ND	2.58	2.58		U
	PMPA	13140-29-9	ND	ND	ND	1.27	1.27		U
ES	MPFBA		5451.63	7.49				19.4%	Q
	M5PFPeA		13571.92	18.6				44.5%	
	M3PFBS		19420.54	26.7				65.5%	
	M2-4:2 FTS		49142.38	67.5				184.5%	Q
	M5PFHxA		4365.64	6.00				69.8%	
	M3HFPO-DA		4667.96	6.41				78.9%	
	M4PFHpA		4786.77	6.58				76.7%	
	M3PFHxS		4809.59	6.61				76.2%	
	M2-6:2 FTS		24865.60	34.2				89.0%	
	M8PFOA		4749.44	6.53				77.3%	
	M9PFNA		4631.92	6.36				71.4%	
	M8PFOS		4436.72	6.10				67.6%	
	M2-8:2 FTS		3961.34	5.44				70.7%	
	M8FOSA-I		2421.01	3.33				40.1%	
	M6PFDA		4488.70	6.17				69.2%	
	d3-N-MeFOSAA		3897.20	5.35				66.3%	
	d5-N-EtFOSAA		3694.95	5.08				63.2%	
	M7PFUdA		4101.76	5.64				62.9%	
	MPFDoA		3468.97	4.77				59.4%	
	M2PFTeDA		2583.30	3.55				41.5%	

QC Data

ENTHALPY ANALYTICAL

Enthalpy Analytical

Job No.: 1120-713-1 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: Northwest Water Plant

Enthalpy ID	MB-11275-PFAS	Prep Batch	EU11275	Sample Vol (mL)	250
Sample Name	MB-11275-PFAS	Prep Date	2020-11-06	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2020-11-07	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	7.45	0.0119	0.0119	0.0695	0.294		L
	PFOA	335-67-1	56.58	0.0905	0.0905	0.0795	0.294		J
	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		5293.03	8.47				67.4%	
	M5PFPeA		5114.42	8.18				60.0%	
	M3PFBS		5286.83	8.46				63.8%	
	M2-4:2 FTS		4775.43	7.64				64.1%	
	M5PFHxA		5265.57	8.42				65.1%	
	M3HFPO-DA		5665.19	9.06				74.0%	
	M4PFHpA		5099.79	8.16				63.2%	
	M3PFHxS		4793.79	7.67				59.4%	
	M2-6:2 FTS		4945.84	7.91				63.3%	
	M8PFOA		5310.67	8.50				66.8%	
	M9PFNA		5264.52	8.42				62.7%	
	M8PFOS		5050.83	8.08				60.2%	
	M2-8:2 FTS		4443.59	7.11				62.0%	
	M8FOSA-I		4032.08	6.45				52.2%	
	M6PFDA		4823.20	7.72				61.8%	
	d3-N-MeFOSAA		4233.02	6.77				56.3%	
	d5-N-EtFOSAA		4059.67	6.50				54.3%	
	M7PFUdA		4205.23	6.73				53.6%	
	MPFDoA		3242.84	5.19				46.2%	
	M2PFTeDA		2254.54	3.61				30.1%	

Enthalpy Analytical

Job No.: 1120-713-1 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: Northwest Water Plant

Enthalpy ID	OPR-11275-PFAS	Prep Batch	EU11275	Sample Vol (mL)	250
Sample Name	OPR-11275-PFAS	Prep Date	2020-11-06	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2020-11-07	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	12284.95	19.7	19.7	0.157	0.294	98.3%	
	PFPeA	2706-90-3	12254.77	19.6	19.6	0.0898	0.294	98.0%	
	PFHxA	307-24-4	12445.75	19.9	19.9	0.158	0.294	99.6%	
	PFHpA	375-85-9	11454.37	18.3	18.3	0.0695	0.294	91.6%	
	PFOA	335-67-1	11145.22	17.8	17.8	0.0795	0.294	89.2%	
	PFNA	375-95-1	12047.74	19.3	19.3	0.0509	0.294	96.4%	
	PFDA	335-76-2	11418.73	18.3	18.3	0.125	0.294	91.3%	
	PFUnDA	2058-94-8	11542.94	18.5	18.5	0.0481	0.294	92.3%	
	PFDoDA	307-55-1	11648.08	18.6	18.6	0.0475	0.294	93.2%	
	PFTrDA	72629-94-8	14715.52	23.5	23.5	0.0745	0.294	117.7%	
	PFTeDA	376-06-7	12154.51	19.4	19.4	0.0830	0.294	97.2%	
Sulfonates	PFBS	375-73-5	10320.09	16.5	16.5	0.0830	0.294	93.1%	
	PFPeS	2706-91-4	11228.76	18.0	18.0	0.0990	0.294	95.5%	
	PFHxS	355-46-4	9766.58	15.6	15.6	0.0827	0.294	85.5%	
	PFHpS	375-92-8	10597.92	17.0	17.0	0.0779	0.294	89.0%	
	PFOS	1763-23-1	10105.21	16.2	16.2	0.0471	0.294	87.1%	
	PFNS	68259-12-1	10267.00	16.4	16.4	0.0654	0.294	85.4%	
	PFDS	335-77-3	11952.27	19.1	19.1	0.135	0.294	99.1%	
	4:2 FTS	757124-72-4	11009.56	17.6	17.6	0.0646	0.294	94.0%	
	6:2 FTS	27619-97-2	10629.92	17.0	17.0	0.0723	0.294	89.4%	
	8:2 FTS	39108-34-4	10862.87	17.4	17.4	0.0569	0.294	90.5%	
Other	PFOSA	754-91-6	11640.78	18.6	18.6	0.365	0.366	93.1%	
	N-MeFOSAA	2355-31-9	12582.47	20.1	20.1	0.0544	0.294	100.7%	
	N-EtFOSAA	2991-50-6	11277.09	18.0	18.0	0.0651	0.294	90.2%	
	HFPO-DA	13252-13-6	11011.67	17.6	17.6	0.0951	0.294	88.1%	
ES	MPFBA		5061.12	8.10				85.0%	
	M5PFPeA		4972.74	7.96				76.9%	
	M3PFBS		4865.62	7.78				77.4%	
	M2-4:2 FTS		4615.20	7.38				81.8%	
	M5PFHxA		5040.17	8.06				81.3%	
	M3HFPO-DA		5638.38	9.02				96.2%	
	M4PFHpA		5124.89	8.20				82.9%	
	M3PFHxS		5116.66	8.19				84.5%	
	M2-6:2 FTS		4671.16	7.47				78.9%	
	M8PFOA		5012.00	8.02				82.3%	
	M9PFNA		4794.09	7.67				74.5%	
	M8PFOS		4572.03	7.32				72.7%	
	M2-8:2 FTS		4018.04	6.43				74.7%	
	M8FOSA-I		3700.11	5.92				63.9%	
	M6PFDA		4774.79	7.64				72.6%	
	d3-N-MeFOSAA		3812.20	6.10				67.7%	
	d5-N-EtFOSAA		3931.20	6.29				70.1%	
	M7PFUdA		4419.44	7.07				66.8%	
	MPFDoA		3796.62	6.07				64.1%	
	M2PFTeDA		2873.70	4.60				45.5%	

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	1120-713-1 PFAS by Isotope Dilution (non-potable water)
Client ID.	Site: Northwest Water Plant

1. Custody

Ann Marie Baxter received the samples on 11/05/20 at 8.6°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
1120-713-002-1	110520-EO1	Aqueous
1120-713-001-1	110520-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 "Kili").

For aqueous samples, the sample volume was measured gravimetrically by the laboratory, and spiked with Extraction Standard (ES). The sample was then mixed well and centrifuged.

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.

4. Calibration

In the initial calibration, the analytes exhibited R^2 of ≥ 0.99. The calibration standard analytes, continuing

Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	1120-713-1 PFAS by Isotope Dilution (non-potable water)
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calibration (concal) and Initial Calibration Verification (ICV) met the 30% criterion for native analytes.

5. QC Notes

QC sample analyses passed all method criteria.

An analyte(s) was detected in the method blank (MB) below the Reporting Limit (RL) with values more than 1/10 the sample amount. Any analyte(s) detected in the sample(s) associated with the analyte(s) found in the MB are notated with a B qualifier.

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.

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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

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1120-713

Chain of Custody Record

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Enthalpy Ultratrace Job#: _____ **COC Page** 1 of 1

Special Handling:
X 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:
110520-SO1	11/5/2020	10:30am	250 ml	G	NW	2														X	
110520-EO1	11/5/2020	10:30am	250 ml	G	DW	2														X	

Relinquished By:	Date:	Received By:	Date:	Time:	Sample Temperature Upon Receipt:
Madeline Hill	11/5/2020	Ann Marie Barker	11/5/20	11:30	☑ Iced ☐ Ambient °C 8.6 T9
					☐ Iced ☐ Ambient °C_____
					☐ Iced ☐ Ambient °C_____

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Courier, cooler, no seals, iced, 8.6°C, T9, good condition AMB 11/5/20

This Is The Last Page Of This Report.

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