

County of Brunswick

3954 Clearwell Dr NE
Leland, NC 28451

NW Plant

Leland, NC
Samples Received: 07/30/20

Analytical Report 0720-793

Isotope Dilution Method PFAS



Enthalpy Analytical, LLC – Ultratrace

Lindsay Boone
O: (910) 212-5855 / F: 910-212-5866
lboone@enthalpy.com / www.enthalpy.com
2714 Exchange Drive, Wilmington, NC 28405

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.: 0720-793 PFAS by Isotope Dilution (non-potable water)

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

Summary

	Compound	CAS	073020-S01 ng/L	073020-E01 ng/L
Acids	PFBA	375-22-4	5.82	ND U
	PFPeA	2706-90-3	8.08	8.26
	PFHxA	307-24-4	6.07	6.25
	PFHpA	375-85-9	3.44	3.18
	PFOA	335-67-1	5.93	5.44
	PFNA	375-95-1	0.869 J	0.863 J
	PFDA	335-76-2	0.352 J	0.354 J
	PFUnDA	2058-94-8	ND U	ND U
	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	0.708 J	0.848 J
	PFHxS	355-46-4	5.43	4.66
	PFHpS	375-92-8	0.187 J	0.0906 J
	PFOS	1763-23-1	11.1	11.6
	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	0.211 J	0.494 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	14.7	12.9
	PFMOAA	674-13-5	89.4	66.0
	PFMOPrA	377-73-1	ND U	ND U
	PFO2HxA	39492-88-1	6.40	6.60
	PFO3OA	39492-89-2	7.48	6.88
	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	0.316 J	0.474 J
	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	0.569 L	1.00 L
	NFDHA	151772-58-6	ND U	ND U
	PEPA		20.5	20.7
	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	10.5	17.5

Detailed Results

Enthalpy Analytical

Job No.: 0720-793 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID 0720-793-001-1

Prep Batch EU11054

Sample Vol (mL) 287.31

Sample Name 073020-S01

Prep Date 2020-08-01

Extract Vol (mL) 0.4

Matrix

Analysis Date 2020-08-01

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	4183.64	5.82	5.82	0.137	1.01		
	PFPeA	2706-90-3	5800.98	8.08	8.08	0.0781	1.01		
	PFHxA	307-24-4	4362.07	6.07	6.07	0.137	1.01		
	PFHpA	375-85-9	2473.63	3.44	3.44	0.0605	1.01		
	PFOA	335-67-1	4259.13	5.93	5.93	0.0691	1.01		
	PFNA	375-95-1	624.02	0.869	0.869	0.0443	1.01		J
	PFDA	335-76-2	252.96	0.352	0.352	0.109	1.01		J
	PFUnDA	2058-94-8	ND	ND	ND	0.0419	1.01		U
	PFDoDA	307-55-1	ND	ND	ND	0.0413	1.01		U
	PFTriDA	72629-94-8	ND	ND	ND	0.0648	1.01		U
	PFTeDA	376-06-7	ND	ND	ND	0.0722	1.01		U
Sulfonates	PFBS	375-73-5	ND	ND	ND	0.0722	1.01		U
	PFPeS	2706-91-4	508.42	0.708	0.708	0.0861	1.01		J
	PFHxS	355-46-4	3899.70	5.43	5.43	0.0720	1.01		
	PFHpS	375-92-8	134.00	0.187	0.187	0.0678	1.01		J
	PFOS	1763-23-1	7990.21	11.1	11.1	0.0410	1.01		
	PFNS	68259-12-1	ND	ND	ND	0.0569	1.01		U
	PFDS	335-77-3	ND	ND	ND	0.117	1.01		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0562	1.01		U
	6:2 FTS	27619-97-2	151.49	0.211	0.211	0.0629	1.01		J
	8:2 FTS	39108-34-4	ND	ND	ND	0.0495	1.01		U
other	PFOSA	754-91-6	ND	ND	ND	0.318	1.01		U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.0473	1.01		U
	N-EtFOSAA	2991-50-6	ND	ND	ND	0.0566	1.01		U
	HFPO-DA	13252-13-6	10556.57	14.7	14.7	0.0828	1.01		
	PFMOAA	674-13-5	64207.54	89.4	89.4	1.29	1.74		
	PFMOPrA	377-73-1	ND	ND	ND	0.209	1.10		U
	PFO2HxA	39492-88-1	4600.3	6.40	6.40	1.29	1.29		U
	PFO3OA	39492-89-2	5374.00	7.48	7.48	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	1.10		U
	ADONA	919005-14-4	ND	ND	ND	0.104	1.10		U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.104	1.10		U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.104	1.10		U
	10:2 FTS	120226-60-0	ND	ND	ND	0.209	1.10		U
	FBSA	30334-69-1	227.10	0.316	0.316	0.209	1.10		J
	N-EtFOSA	4151-50-2	ND	ND	ND	0.209	1.10		U
	N-EtFOSE	1691-99-2	ND	ND	ND	6.27	6.27		U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.209	1.10		U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.27	6.27		U
	Nafion Byproduct 2	749836-20-2	408.51	0.569	0.569	1.29	1.29		L
	NFDHA	151772-58-6	ND	ND	ND	0.209	1.10		U
	PEPA		14720.26	20.5	20.5	1.29	1.29		
	PFECA-G	801212-59-9	ND	ND	ND	1.29	1.29		U
	PFEEA	113507-82-7	ND	ND	ND	0.209	1.10		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
	PMMA	13140-29-9	7512.31	10.5	10.5	1.29	1.29		
ES	MPFBA		5129.92	7.14				20.4%	
	M5PFPeA		14512.88	20.2				54.7%	
	M3PFBS		25916.64	36.1				96.7%	
	M2-4:2 FTS		67421.86	93.9				261.0%	Q
	M5PFHxA		4746.25	6.61				87.2%	
	M3HFPO-DA		5159.07	7.18				92.8%	
	M4PFHpA		5045.82	7.02				90.3%	
	M3PFHxS		5151.45	7.17				95.8%	
	M8PFOA		4809.43	6.70				84.9%	
	M9PFNA		4957.06	6.90				87.8%	
	M8PFOS		5047.91	7.03				92.6%	
	M2-8:2 FTS		4642.18	6.46				93.1%	
	M8FOSA-I		2967.21	4.13				54.7%	
	M6PFDA		4726.40	6.58				86.9%	
	d3-N-MeFOSAA		4333.84	6.03				81.9%	
	d5-N-EtFOSAA		4145.07	5.77				76.1%	
	M7PFUDa		4172.14	5.81				79.7%	
	MPFDoA		2688.69	3.74				54.5%	
	M2PFTeDA		1028.26	1.43				21.3%	

Enthalpy Analytical

Job No.: 0720-793 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID 0720-793-002-1

Prep Batch EU11054

Sample Vol (mL) 292.09

Sample Name 073020-E01

Prep Date 2020-08-01

Extract Vol (mL) 0.4

Matrix

Analysis Date 2020-08-01

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	0.135	0.997		U
	PFPeA	2706-90-3	6028.65	8.26	8.26	0.0768	0.997		
	PFHxA	307-24-4	4564.31	6.25	6.25	0.135	0.997		
	PFHpA	375-85-9	2323.72	3.18	3.18	0.0595	0.997		
	PFOA	335-67-1	3971.53	5.44	5.44	0.0680	0.997		
	PFNA	375-95-1	629.92	0.863	0.863	0.0436	0.997		J
	PFDA	335-76-2	258.76	0.354	0.354	0.107	0.997		J
	PFUnDA	2058-94-8	ND	ND	ND	0.0412	0.997		U
	PFDoDA	307-55-1	ND	ND	ND	0.0407	0.997		U
	PFTeDA	72629-94-8	ND	ND	ND	0.0638	0.997		U
	PFTeDA	376-06-7	ND	ND	ND	0.0710	0.997		U
Sulfonates	PFBS	375-73-5	ND	ND	ND	0.0710	0.997		U
	PFPeS	2706-91-4	618.94	0.848	0.848	0.0847	0.997		J
	PFHxS	355-46-4	3404.54	4.66	4.66	0.0708	0.997		
	PFHpS	375-92-8	66.19	0.0906	0.0906	0.0667	0.997		J
	PFOS	1763-23-1	8473.46	11.6	11.6	0.0403	0.997		
	PFNS	68259-12-1	ND	ND	ND	0.0560	0.997		U
	PFDS	335-77-3	ND	ND	ND	0.116	0.997		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0553	0.997		U
	6:2 FTS	27619-97-2	360.95	0.494	0.494	0.0619	0.997		J
	8:2 FTS	39108-34-4	ND	ND	ND	0.0487	0.997		U
other	PFOSA	754-91-6	ND	ND	ND	0.312	0.997		U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.0466	0.997		U
	N-EtFOSAA	2991-50-6	ND	ND	ND	0.0557	0.997		U
	HFPO-DA	13252-13-6	9455.66	12.9	12.9	0.0814	0.997		
	PFMOAA	674-13-5	48163.69	66.0	66.0	1.27	1.71		
	PFMOPrA	377-73-1	ND	ND	ND	0.205	1.08		U
	PFO2HxA	39492-88-1	4820.83	6.60	6.60	1.27	1.27		U
	PFO3OA	39492-89-2	5024.42	6.88	6.88	1.27	1.27		
	PFO4DA	39492-90-5	ND	ND	ND	1.27	1.27		U
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.205	1.08		U
	ADONA	919005-14-4	ND	ND	ND	0.103	1.08		U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.103	1.08		U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.103	1.08		U
	10:2 FTS	120226-60-0	ND	ND	ND	0.205	1.08		U
	FBSA	30334-69-1	345.97	0.474	0.474	0.205	1.08		J
	N-EtFOSA	4151-50-2	ND	ND	ND	0.205	1.08		U
	N-EtFOSE	1691-99-2	ND	ND	ND	6.16	6.16		U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.205	1.08		U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.16	6.16		U
	Nafion Byproduct 2	749836-20-2	731.27	1.00	1.00	1.27	1.27		L
	NFDHA	151772-58-6	ND	ND	ND	0.205	1.08		U
	PEPA		15108.51	20.7	20.7	1.27	1.27		
	PFECA-G	801212-59-9	ND	ND	ND	1.27	1.27		U
	PFEESA	113507-82-7	ND	ND	ND	0.205	1.08		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	2.57	2.57		U
	PMPA	13140-29-9	12768.37	17.5	17.5	1.27	1.27		
ES	MPFBA		5072.57	6.95				26.3%	
	M5PFPeA		11970.39	16.4				59.0%	
	M3PFBS		19388.17	26.6				94.7%	
	M2-4:2 FTS		51570.46	70.6				261.4%	Q
	M5PFHxA		4371.74	5.99				89.7%	
	M3HFPO-DA		5088.48	6.97				102.2%	
	M4PFHpA		4974.63	6.81				99.4%	
	M3PFHxS		5183.95	7.10				100.6%	
	M8PFOA		4771.82	6.53				94.1%	
	M9PFNA		4527.29	6.20				89.6%	
	M8PFOS		4776.61	6.54				91.5%	
	M2-8:2 FTS		4351.17	5.96				91.1%	
	M8FOSA-I		2665.16	3.65				51.3%	
	M6PFDA		4575.58	6.27				91.0%	
	d3-N-MeFOSAA		4271.81	5.85				84.3%	
	d5-N-EtFOSAA		4389.69	6.01				84.1%	
	M7PFUDa		4157.08	5.69				85.9%	
	MPFDoA		3446.08	4.72				75.6%	
	M2PFTeDA		3004.60	4.11				67.2%	

QC Data

Enthalpy Analytical

Job No.: 0720-793 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID MB-11054-PFAS

Prep Batch EU11054

Sample Vol (mL) 250

Sample Name MB-11054-PFAS

Prep Date 2020-08-01

Extract Vol (mL) 0.4

Matrix

Analysis Date 2020-08-01

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	1.16		U
	PFPeA	2706-90-3	ND	ND	ND	0.0898	1.16		U
	PFHxA	307-24-4	ND	ND	ND	0.158	1.16		U
	PFHpA	375-85-9	ND	ND	ND	0.0695	1.16		U
	PFOA	335-67-1	91.13	0.146	0.146	0.0795	1.16		J
	PFNA	375-95-1	ND	ND	ND	0.0509	1.16		U
	PFDA	335-76-2	ND	ND	ND	0.125	1.16		U
	PFUnDA	2058-94-8	ND	ND	ND	0.0481	1.16		U
	PFDoDA	307-55-1	ND	ND	ND	0.0475	1.16		U
	PFTriDA	72629-94-8	ND	ND	ND	0.0745	1.16		U
	PFTeDA	376-06-7	ND	ND	ND	0.0830	1.16		U
Sulfonates	PFBS	375-73-5	ND	ND	ND	0.0830	1.16		U
	PFPeS	2706-91-4	ND	ND	ND	0.0990	1.16		U
	PFHxS	355-46-4	ND	ND	ND	0.0827	1.16		U
	PFHpS	375-92-8	ND	ND	ND	0.0779	1.16		U
	PFOS	1763-23-1	ND	ND	ND	0.0471	1.16		U
	PFNS	68259-12-1	ND	ND	ND	0.0654	1.16		U
	PFDS	335-77-3	ND	ND	ND	0.135	1.16		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0646	1.16		U
	6:2 FTS	27619-97-2	70.43	0.113	0.113	0.0723	1.16		J
	8:2 FTS	39108-34-4	ND	ND	ND	0.0569	1.16		U
other	PFOSA	754-91-6	ND	ND	ND	0.365	1.16		U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.0544	1.16		U
	N-EtFOSAA	2991-50-6	ND	ND	ND	0.0651	1.16		U
	HFPO-DA	13252-13-6	ND	ND	ND	0.0951	1.16		U
	PFMOA	674-13-5	ND	ND	ND	1.48	2.00		U
	PFMOPrA	377-73-1	ND	ND	ND	0.240	1.27		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	1.27		U
	ADONA	919005-14-4	ND	ND	ND	0.120	1.27		U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.120	1.27		U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.120	1.27		U
	10:2 FTS	120226-60-0	ND	ND	ND	0.240	1.27		U
	FBSA	30334-69-1	ND	ND	ND	0.240	1.27		U
	N-EtFOSA	4151-50-2	ND	ND	ND	0.240	1.27		U
	N-EtFOSE	1691-99-2	ND	ND	ND	7.20	7.20		U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.240	1.27		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	1.27		U
	PEPA		ND	ND	ND	1.48	1.48		U
	PFECA-G	801212-59-9	ND	ND	ND	1.48	1.48		U
	PFEEA	113507-82-7	ND	ND	ND	0.240	1.27		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
	PMMA	13140-29-9	ND	ND	ND	1.48	1.48		U
ES	MPFBA		4952.34	7.92				95.4%	
	M5PFPeA		5146.60	8.23				94.1%	
	M3PFBS		4708.84	7.53				85.3%	
	M2-4:2 FTS		4906.74	7.85				92.3%	
	M5PFHxA		5219.22	8.35				96.1%	
	M3HFPO-DA		6244.94	9.99				112.6%	
	M4PFHpA		5075.92	8.12				91.1%	
	M3PFHxS		5559.43	8.90				92.5%	
	M8PFOA		5020.29	8.03				88.8%	
	M9PFNA		4721.96	7.56				83.8%	
	M8PFOS		5003.36	8.01				82.2%	
	M2-8:2 FTS		4956.00	7.93				88.9%	
	M8FOSA-I		3751.32	6.00				61.9%	
	M6PFDA		4858.07	7.77				83.5%	
	d3-N-MeFOSAA		5115.22	8.18				86.5%	
	d5-N-EtFOSAA		4769.95	7.63				78.4%	
	M7PFUDa		4467.85	7.15				79.8%	
	MPFDoA		4016.37	6.43				76.2%	
	M2PFTeDA		3015.95	4.83				58.3%	

Enthalpy Analytical

Job No.: 0720-793 PFAS by Isotope Dilution (non-potable water)

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

Enthalpy ID OP-11054-PFAS

Prep Batch EU11054

Sample Vol (mL) 250

Sample Name OP-11054-PFAS

Prep Date 2020-08-01

Extract Vol (mL) 0.4

Matrix

Analysis Date 2020-08-01

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	12346.41	19.8	19.8	0.157	1.16	98.8%	
	PFPeA	2706-90-3	12081.44	19.3	19.3	0.0898	1.16	96.7%	
	PFHxA	307-24-4	11680.78	18.7	18.7	0.158	1.16	93.4%	
	PFHpA	375-85-9	11308.08	18.1	18.1	0.0695	1.16	90.5%	
	PFOA	335-67-1	12769.28	20.4	20.4	0.0795	1.16	102.2%	
	PFNA	375-95-1	12221.73	19.6	19.6	0.0509	1.16	97.8%	
	PFDA	335-76-2	11432.46	18.3	18.3	0.125	1.16	91.5%	
	PFUnDA	2058-94-8	11574.57	18.5	18.5	0.0481	1.16	92.6%	
	PFDoDA	307-55-1	11652.75	18.6	18.6	0.0475	1.16	93.2%	
	PFTeDA	72629-94-8	10775.58	17.2	17.2	0.0745	1.16	86.2%	
Sulfonates	PFBS	375-73-5	10635.75	17.0	17.0	0.0830	1.16	95.9%	
	PFPeS	2706-91-4	10752.34	17.2	17.2	0.0990	1.16	91.4%	
	PFHxS	355-46-4	9384.11	15.0	15.0	0.0827	1.16	82.1%	
	PFHpS	375-92-8	11471.23	18.4	18.4	0.0779	1.16	96.3%	
	PFOS	1763-23-1	10311.19	16.5	16.5	0.0471	1.16	88.9%	
	PFNS	68259-12-1	10474.97	16.8	16.8	0.0654	1.16	87.1%	
	PFDS	335-77-3	12986.79	20.8	20.8	0.135	1.16	107.7%	
	4:2 FTS	757124-72-4	9676.39	15.5	15.5	0.0646	1.16	82.6%	
	6:2 FTS	27619-97-2	10961.32	17.5	17.5	0.0723	1.16	92.2%	
	8:2 FTS	39108-34-4	9656.78	15.5	15.5	0.0569	1.16	80.5%	
Other	PFOSA	754-91-6	11246.25	18.0	18.0	0.365	1.16	90.0%	
	N-MeFOSAA	2355-31-9	12023.74	19.2	19.2	0.0544	1.16	96.2%	
	N-EtFOSAA	2991-50-6	11070.66	17.7	17.7	0.0651	1.16	88.6%	
	HFPO-DA	13252-13-6	12287.49	19.7	19.7	0.0951	1.16	98.3%	
ES	MPFBA		5603.25	8.97				103.4%	
	M5PFPeA		5455.46	8.73				95.6%	
	M3PFBS		5255.14	8.41				91.2%	
	M2-4:2 FTS		5503.80	8.81				99.1%	
	M5PFHxA		5244.73	8.39				97.1%	
	M3HFPO-DA		5919.96	9.47				107.3%	
	M4PFHpA		5328.49	8.53				96.1%	
	M3PFHxS		5808.50	9.29				105.4%	
	M8PFOA		4793.61	7.67				85.3%	
	M9PFNA		4813.90	7.70				85.9%	
	M8PFOS		5205.68	8.33				93.2%	
	M2-8:2 FTS		5048.35	8.08				98.8%	
	M8FOSA-I		4201.35	6.72				75.7%	
	M6PFDA		5269.84	8.43				86.7%	
	d3-N-MeFOSAA		5042.63	8.07				93.0%	
	d5-N-EtFOSAA		5045.85	8.07				90.4%	
	M7PFUDa		5048.13	8.08				86.3%	
	MPFDoA		4626.69	7.40				84.0%	
	M2PFTeDA		2967.47	4.75				54.9%	

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	County of Brunswick
Job No.	0720-793 PFAS by Isotope Dilution (non-potable water)
Client ID.	Site: N.W. Plant, Leland

1. Custody

Bryan Vining received the samples on 07/30/20 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
0720-793-002-1	073020-E01	Aqueous
0720-793-001-1	073020-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 the 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.	0720-793 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 and labeled standards RSDs $\leq 20\%$. 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 met all method acceptance criteria. The analytes PFOA and 6:2 FTS were detected in the method blank at concentrations less than half the reporting limit (LOQ).

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 samples were reinjected and the results for analytes PFO3OA, N-MeFOSA, N-EtFOSA, and N-EtFOSE were reported from the reinjections.

Some ES in the samples fell outside the limits for recovery. The target analytes are quantified based on their ratio to the ES; 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 (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



The logo for Enthalpy Analytical, featuring the letters 'ea' in a large, stylized, lowercase font, with the word 'ENTHALPY' in a bold, uppercase font and 'analytical' in a smaller, lowercase font below it.**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.

Enthalpy Ultratrace Job#: _____ COC Page ____ of ____

Client Name: BRUNSWICK COUNTY UTILITIES
Project Manager: GLENN WALKER
Report To: SAME

Project Number: _____

Site Name: N.W. PLANT

Location: **LELAND**

P0#:

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

2714 Exchange Drive • Wilmington, NC 28405 • (910) 212-5858 • www.enthalpy.com

Courier, on ice, no seals, good condition

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