

# County of Brunswick

3954 Clearwell Dr NE  
Leland, NC 28451

## 211 Water Treatment Plant

Southport, NC  
Samples Received: 10/08/20

### Analytical Report 1020-718

#### *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.: 1020-718 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: 211 Water Treatment Plant, Southport, NC

### Summary

	Compound	CAS	100820-SO2 ng/L	100820-EO2 ng/L	
Acids	PFBA	375-22-4	ND U	ND U	
	PFPeA	2706-90-3	ND U	ND U	
	PFHxA	307-24-4	ND U	ND U	
	PFHpA	375-85-9	ND U	ND U	
	PFOA	335-67-1	ND U	ND U	
	PFNA	375-95-1	ND U	ND U	
	PFDA	335-76-2	ND U	ND U	
	PFUnDA	2058-94-8	ND U	ND U	
	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	ND U	ND U	
PFHxS		355-46-4	ND U	ND U	
PFHpS		375-92-8	ND U	ND U	
PFOS		1763-23-1	0.335	0.224 J	
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	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	ND U	ND U	
	PFMOAA	674-13-5	4.20	2.96	
	PFMOPrA	377-73-1	ND U	ND U	
	PFO2HxA	39492-88-1	ND U	ND U	
	PFO3OA	39492-89-2	ND U	ND U	
	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	ND U	ND U	
	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.: 1020-718 PFAS by Isotope Dilution (non-potable water)  
 County of Brunswick Site: 211 Water Treatment Plant, Southport, NC

Enthalpy ID	1020-718-001-1	Prep Batch	EU11214	Sample Vol (mL)	291.49
Sample Name	100820-SO2	Prep Date	2020-10-09	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2020-10-09	Dilution Factor	1
Sampling Date	20201008 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	0.252		U
	PFPeA	2706-90-3	ND	ND	ND	0.0770	0.252		U
	PFHxA	307-24-4	ND	ND	ND	0.135	0.252		U
	PFHpA	375-85-9	ND	ND	ND	0.0596	0.252		U
	PFOA	335-67-1	ND	ND	ND	0.0681	0.252		U
	PFNA	375-95-1	ND	ND	ND	0.0437	0.252		U
	PFDA	335-76-2	ND	ND	ND	0.107	0.252		U
	PFUnDA	2058-94-8	ND	ND	ND	0.0413	0.252		U
	PFDODA	307-55-1	ND	ND	ND	0.0407	0.252		U
	PFTrDA	72629-94-8	ND	ND	ND	0.0639	0.252		U
	PFTeDA	376-06-7	ND	ND	ND	0.0712	0.252		U
	Sulfonates	PFBS	375-73-5	ND	ND	ND	0.0712	1.17	
PFPeS		2706-91-4	ND	ND	ND	0.0849	0.252		U
PFHxS		355-46-4	ND	ND	ND	0.0709	0.252		U
PFHpS		375-92-8	ND	ND	ND	0.0668	0.252		U
PFOS		1763-23-1	243.87	0.335	0.335	0.0404	0.252		U
PFNS		68259-12-1	ND	ND	ND	0.0561	0.252		U
PFDS		335-77-3	ND	ND	ND	0.116	0.252		U
4:2 FTS		757124-72-4	ND	ND	ND	0.0554	0.252		U
6:2 FTS		27619-97-2	ND	ND	ND	0.0620	0.252		U
8:2 FTS		39108-34-4	ND	ND	ND	0.0488	0.252		U
other	PFOSA	754-91-6	ND	ND	ND	0.313	0.314		U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.0467	0.252		U
	N-EiFOSAA	2991-50-6	ND	ND	ND	0.0558	0.252		U
	HFPO-DA	13252-13-6	ND	ND	ND	0.0816	0.252		U
	PFMOAA	674-13-5	3061.58	4.20	4.20	1.27	1.27		U
	PFMOPrA	377-73-1	ND	ND	ND	0.206	0.252		U
	PFO2HxA	39492-88-1	ND	ND	ND	1.27	1.27		U
	PFO3OA	39492-89-2	ND	ND	ND	1.27	1.27		U
	PFO4DA	39492-90-5	ND	ND	ND	1.27	1.27		U
	Nafion Byproduct 1	29311-67-9	ND	ND	ND	0.206	0.252		U
	ADONA	919005-14-4	ND	ND	ND	0.103	0.252		U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.103	0.252		U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.103	0.252		U
	10:2 FTS	120226-60-0	ND	ND	ND	0.206	0.252		U
	FBSA	30334-69-1	ND	ND	ND	0.206	0.252		U
	N-EiFOSA	4151-50-2	ND	ND	ND	0.206	0.252		U
	N-EiFOSE	1691-99-2	ND	ND	ND	6.18	6.18		U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.206	0.252		U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.18	6.18		U
	Nafion Byproduct 2	749836-20-2	ND	ND	ND	1.27	1.27		U
	NFDHA	151772-58-6	ND	ND	ND	0.206	0.252		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	0.252		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		5079.54	6.97				9.0%	Q
	M5PFPeA		13888.65	19.1				25.6%	
	M3PFBS		37060.23	50.9				65.8%	
	M2-4:2 FTS		120367.65	165				262.9%	Q
	M5PFHxA		3975.34	5.46				59.9%	
	M3HFPO-DA		4396.30	6.03				71.3%	
	M4PFHpA		4987.56	6.84				73.5%	
	M3PFHxS		5224.85	7.17				74.7%	
	M2-6:2 FTS		63126.38	86.6				124.4%	
	M8PFOA		5416.61	7.43				80.2%	
	M9PFNA		4753.96	6.52				69.7%	
	M8PFOS		5450.01	7.48				75.0%	
	M2-8:2 FTS		4841.25	6.64				71.5%	
	M8FOSA-I		4030.74	5.53				58.6%	
	M6PFDA		5295.68	7.27				78.4%	
	d3-N-MeFOSAA		4533.45	6.22				66.4%	
	d5-N-EiFOSAA		4259.94	5.85				65.4%	
	M7PFUDa		4152.48	5.70				63.2%	
	MPFDaA		2809.73	3.86				44.9%	
	M2PFTeDA		1178.52	1.62				17.8%	Q

# Enthalpy Analytical

Job No.: 1020-718 PFAS by Isotope Dilution (non-potable water)  
 County of Brunswick Site: 211 Water Treatment Plant, Southport, NC

Enthalpy ID 1020-718-002-1 Prep Batch EU11214 Sample Vol (mL) 288.59  
 Sample Name 100820-EO2 Prep Date 2020-10-09 Extract Vol (mL) 0.4  
 Matrix Aqueous Analysis Date 2020-10-09 Dilution Factor 1  
 Sampling Date 20201008 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	0.255		U
	PFPeA	2706-90-3	ND	ND	ND	0.0778	0.255		U
	PFHxA	307-24-4	ND	ND	ND	0.137	0.255		U
	PFHpA	375-85-9	ND	ND	ND	0.0602	0.255		U
	PFOA	335-67-1	ND	ND	ND	0.0688	0.255		U
	PFNA	375-95-1	ND	ND	ND	0.0441	0.255		U
	PFDA	335-76-2	ND	ND	ND	0.108	0.255		U
	PFUnDA	2058-94-8	ND	ND	ND	0.0417	0.255		U
	PFDODA	307-55-1	ND	ND	ND	0.0411	0.255		U
	PFTriDA	72629-94-8	ND	ND	ND	0.0645	0.255		U
	PFTeDA	376-06-7	ND	ND	ND	0.0719	0.255		U
Sulfonates	PFBS	375-73-5	ND	ND	ND	0.0719	1.18		U
	PFPeS	2706-91-4	ND	ND	ND	0.0858	0.255		U
	PFHxS	355-46-4	ND	ND	ND	0.0716	0.255		U
	PFHpS	375-92-8	ND	ND	ND	0.0675	0.255		U
	PFOS	1763-23-1	161.42	0.224	0.224	0.0408	0.255		J
	PFNS	68259-12-1	ND	ND	ND	0.0567	0.255		U
	PFDS	335-77-3	ND	ND	ND	0.117	0.255		U
	4:2 FTS	757124-72-4	ND	ND	ND	0.0560	0.255		U
	6:2 FTS	27619-97-2	ND	ND	ND	0.0626	0.255		U
	8:2 FTS	39108-34-4	ND	ND	ND	0.0493	0.255		U
other	PFOSA	754-91-6	ND	ND	ND	0.316	0.317		U
	N-MeFOSAA	2355-31-9	ND	ND	ND	0.0471	0.255		U
	N-EiFOSAA	2991-50-6	ND	ND	ND	0.0564	0.255		U
	HFPO-DA	13252-13-6	ND	ND	ND	0.0824	0.255		U
	PFMOAA	674-13-5	2132.08	2.96	2.96	1.28	1.28		
	PFMOPrA	377-73-1	ND	ND	ND	0.208	0.255		U
	PFO2HxA	39492-88-1	ND	ND	ND	1.28	1.28		U
	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	0.208	0.255		U
	ADONA	919005-14-4	ND	ND	ND	0.104	0.255		U
	9Cl-PF3ONS	756426-58-1	ND	ND	ND	0.104	0.255		U
	11Cl-PF3OUdS	763051-92-9	ND	ND	ND	0.104	0.255		U
	10:2 FTS	120226-60-0	ND	ND	ND	0.208	0.255		U
	FBSA	30334-69-1	ND	ND	ND	0.208	0.255		U
	N-EiFOSA	4151-50-2	ND	ND	ND	0.208	0.255		U
	N-EiFOSE	1691-99-2	ND	ND	ND	6.24	6.24		U
	N-MeFOSA	31506-32-8	ND	ND	ND	0.208	0.255		U
	N-MeFOSE	24448-09-7	ND	ND	ND	6.24	6.24		U
	Nafion Byproduct 2	749836-20-2	ND	ND	ND	1.28	1.28		U
	NFDHA	151772-58-6	ND	ND	ND	0.208	0.255		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	0.208	0.255		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	2.61	2.61		U
PMPA	13140-29-9	ND	ND	ND	1.28	1.28		U	
ES	MPFBA		5636.84	7.81				9.0%	Q
	M5PFPeA		14871.24	20.6				24.8%	
	M3PFBS		36310.96	50.3				58.2%	
	M2-4:2 FTS		91426.19	127				180.7%	Q
	M5PFHxA		3492.72	4.84				45.9%	
	M3HFPO-DA		4395.11	6.09				62.2%	
	M4PFHpA		5038.38	6.98				64.8%	
	M3PFHxS		5342.68	7.41				68.8%	
	M2-6:2 FTS		55793.35	77.3				99.5%	
	M8PFOA		5100.26	7.07				65.9%	
	M9PFNA		4817.60	6.68				61.6%	
	M8PFOS		5703.20	7.90				70.5%	
	M2-8:2 FTS		5159.49	7.15				68.5%	
	M8FOSA-I		3861.24	5.35				50.4%	
	M6PFDA		5349.49	7.41				68.2%	
	d3-N-MeFOSAA		5369.50	7.44				70.7%	
	d5-N-EiFOSAA		4320.11	5.99				59.5%	
	M7PFUDa		5071.11	7.03				66.5%	
	MPFDOA		4266.20	5.91				58.7%	
	M2PFTeDA		3993.09	5.53				52.0%	

# QC Data

# Enthalpy Analytical

Job No.: 1020-718 PFAS by Isotope Dilution (non-potable water)  
 County of Brunswick Site: 211 Water Treatment Plant, Southport, NC

Enthalpy ID MB-11214-PFAS Prep Batch EU11214 Sample Vol (mL) 250  
 Sample Name MB-11214-PFAS Prep Date 2020-10-09 Extract Vol (mL) 0.4  
 Matrix Aqueous Analysis Date 2020-10-09 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
	PFFHpA	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	1.36		U
	PFPeS	2706-91-4	ND	ND	ND	0.0990	0.294		U
	PFFhS	355-46-4	ND	ND	ND	0.0827	0.294		U
	PFFpS	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-EiFOSAA	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-EiFOSA	4151-50-2	ND	ND	ND	0.240	0.294		U
	N-EiFOSE	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
	PFFhDA	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		5299.98	8.48				66.2%	
	M5PFPeA		5267.21	8.43				68.9%	
	M3PFBS		5532.33	8.85				69.5%	
	M2-4:2 FTS		5043.19	8.07				78.1%	
	M5PFHxA		5477.98	8.76				70.0%	
	M3HFPO-DA		5394.44	8.63				74.3%	
	M4PFHpA		5343.63	8.55				66.9%	
	M3PFHxS		4615.28	7.38				63.4%	
	M2-6:2 FTS		4717.11	7.55				65.9%	
	M8PFOA		5594.23	8.95				70.4%	
	M9PFNA		5116.44	8.19				63.7%	
	M8PFOS		5340.80	8.55				70.6%	
	M2-8:2 FTS		4712.96	7.54				66.9%	
	M8FOSA-I		3305.12	5.29				46.1%	
	M6PFDA		5176.67	8.28				70.0%	
	d3-N-MeFOSAA		5009.76	8.02				70.5%	
	d5-N-EiFOSAA		4498.30	7.20				66.3%	
	M7PFUDa		4826.35	7.72				67.1%	
	MPFDaA		4115.65	6.59				60.0%	
	M2PFTeDA		2855.01	4.57				39.5%	

# Enthalpy Analytical

Job No.: 1020-718 PFAS by Isotope Dilution (non-potable water)

County of Brunswick Site: 211 Water Treatment Plant, Southport, NC

Enthalpy ID	OPR-11214-PFAS	Prep Batch	EU11214	Sample Vol (mL)	250
Sample Name	OPR-11214-PFAS	Prep Date	2020-10-09	Extract Vol (mL)	0.4
Matrix	Aqueous	Analysis Date	2020-10-09	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	11406.76	18.3	18.3	0.157	0.294	91.3%	
	PFPeA	2706-90-3	11220.37	18.0	18.0	0.0898	0.294	89.8%	
	PFHxA	307-24-4	11333.71	18.1	18.1	0.158	0.294	90.7%	
	PFHpA	375-85-9	11947.60	19.1	19.1	0.0695	0.294	95.6%	
	PFOA	335-67-1	12168.17	19.5	19.5	0.0795	0.294	97.3%	
	PFNA	375-95-1	11817.04	18.9	18.9	0.0509	0.294	94.5%	
	PFDA	335-76-2	12034.00	19.3	19.3	0.125	0.294	96.3%	
	PFUnDA	2058-94-8	11688.40	18.7	18.7	0.0481	0.294	93.5%	
	PFDoDA	307-55-1	11599.99	18.6	18.6	0.0475	0.294	92.8%	
	PFTTrDA	72629-94-8	15142.50	24.2	24.2	0.0745	0.294	121.1%	
	PFTeDA	376-06-7	12016.15	19.2	19.2	0.0830	0.294	96.1%	
Sulfonates	PFBS	375-73-5	9530.40	15.2	15.2	0.0830	1.36	86.0%	
	PFPeS	2706-91-4	11439.33	18.3	18.3	0.0990	0.294	97.3%	
	PFHxS	355-46-4	9927.76	15.9	15.9	0.0827	0.294	86.9%	
	PFHpS	375-92-8	10615.73	17.0	17.0	0.0779	0.294	89.1%	
	PFOS	1763-23-1	10775.52	17.2	17.2	0.0471	0.294	92.9%	
	PFNS	68259-12-1	11971.62	19.2	19.2	0.0654	0.294	99.6%	
	PFDS	335-77-3	13265.83	21.2	21.2	0.135	0.294	110.0%	
	4:2 FTS	757124-72-4	9990.13	16.0	16.0	0.0646	0.294	85.3%	
	6:2 FTS	27619-97-2	11143.92	17.8	17.8	0.0723	0.294	93.7%	
8:2 FTS	39108-34-4	13046.37	20.9	20.9	0.0569	0.294	108.7%		
Other	PFOSA	754-91-6	12740.39	20.4	20.4	0.365	0.366	101.9%	
	N-MeFOSAA	2355-31-9	12620.09	20.2	20.2	0.0544	0.294	101.0%	
	N-EtFOSAA	2991-50-6	12799.59	20.5	20.5	0.0651	0.294	102.4%	
	HFPO-DA	13252-13-6	11235.62	18.0	18.0	0.0951	0.294	89.9%	
ES	MPFBA		4858.19	7.77				80.7%	
	M5PFPeA		4966.71	7.95				86.4%	
	M3PFBS		4655.18	7.45				77.7%	
	M2-4:2 FTS		5003.12	8.00				103.0%	
	M5PFHxA		5292.71	8.47				85.3%	
	M3HFPO-DA		5573.73	8.92				96.7%	
	M4PFHpA		4978.52	7.97				78.5%	
	M3PFHxS		5040.50	8.06				86.0%	
	M2-6:2 FTS		5463.80	8.74				101.5%	
	M8PFOA		5002.19	8.00				79.3%	
	M9PFNA		4998.34	8.00				78.4%	
	M8PFOS		4816.27	7.71				79.1%	
	M2-8:2 FTS		4063.43	6.50				71.7%	
	M8FOSA-I		3579.70	5.73				62.1%	
	M6PFDA		4952.48	7.92				80.9%	
	d3-N-MeFOSAA		4419.06	7.07				77.3%	
	d5-N-EtFOSAA		4270.15	6.83				78.2%	
	M7PFUDa		4834.74	7.74				81.3%	
MPFDoA		4499.56	7.20				79.3%		
M2PFTeDA		3497.04	5.60				58.4%		

# Narrative Summary



# Enthalpy Analytical Narrative Summary

**Company** County of Brunswick  
**Job No.** 1020-718 PFAS by Isotope Dilution (non-potable water)  
**Client ID.** Site: 211 Water Treatment Plant, Southport, NC

## 1. Custody

Robin Appelle received the samples on 10/08/20 at 2.9°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
1020-718-002-1	100820-EO2	Aqueous
1020-718-001-1	100820-SO2	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.



# Enthalpy Analytical Narrative Summary

<b>Company</b>	County of Brunswick
<b>Job No.</b>	1020-718 PFAS by Isotope Dilution (non-potable water)
<b>Client ID.</b>	Site: 211 Water Treatment Plant, Southport, NC

## 4. Calibration

In the initial calibration, the analytes exhibited  $R^2$  of  $\geq 0.99$ . The calibration standard analytes, continuing calibration (concal) and Initial Calibration Verification (ICV) met the 30% criterion for native analytes.

## 5. QC Notes

QC sample analyses 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 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.



## 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.

**PFAS Compound Acronym List**

Acronym	Compound Name	CAS #
<b>Target Analytes</b>		
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
* 11CI-PF3OUdS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	674-13-5
* 9CI-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

