Brunswick County Public Utilities - NC

PO Box 249
Bolivia, NC 28422-0249

LELAND, N.C

Client Project# NORTHWEST WATER PLANT
Samples Received: 3/8/2024

Analytical Report
0324-764

PFAS by Isotope Dilution (non-potable water)
Custom List

Report Issue Date: 4/4/2024

I certify that to the best of my knowledge all analytical data presented in this report have been checked for completeness, accuracy, errors and legibility in addition to having 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 ___25____ pages. This report shall not be reproduced except in full without approval of the laboratory. This will provide assurance that parts of the report are not taken out of context.

Amendment(s):

Signature:

Laura Boivin, QA Associate II

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Summary of Results

Enthalpy Analytical

Job No.: 0324-764-1 PFAS by Isotope Dilution (non-potable water)

Brunswick County Public Utilities - NC NORTHWEST WATER PLANT LELAND, N.C

Summary

	Compound	CAS	030824-SO1 ng/L	030824-EO1 ng/L
Acids	PFPrA	422-64-0	4.01 J	5.32 J
	PFBA	375-22-4	2.10	1.78
	PFPeA	2706-90-3	2.29	2.68
	PFHxA	307-24-4	2.62	3.01
	PFHpA	375-85-9	1.30	1.42
	PFOA	335-67-1	2.43	3.07
	PFNA	375-95-1	0.322 J	0.399 J
	PFDA	335-76-2	0.170 J	0.190 J
	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
	PFHxDA	67905-19-5	ND U	ND U
Sulfonates	PFBS	375-73-5	1.85	2.12
	PFPeS	2706-91-4	0.233 J	0.304 J
	PFHxS	355-46-4	1.59	1.98
	PFHpS	375-92-8	0.0596 L	0.0608 L
	PFOS	1763-23-1	5.51	5.79
	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	0.111 L
	8:2 FTS	39108-34-4	ND U	ND U
	10:2 FTS	120226-60-0	ND U	ND U
Sulfonamidos	FBSA	30334-69-1	0.143 L	0.195 L
	N-EtFOSA	4151-50-2	ND U	ND U
	N-EtFOSAA	2991-50-6	ND U	ND U
	N-EtFOSE	1691-99-2	ND U	ND U
	N-MeFOSA	31506-32-8	ND U	ND U
	N-MeFOSAA	2355-31-9	ND U	ND U
	N-MeFOSE	24448-09-7	ND U	ND U
	PFOSA	754-91-6	1.75	0.0143 L
PFECAs	ADONA	919005-14-4	ND U	ND U
	EVE Acid	69087-46-3	ND U	ND U
	HFPO-DA	13252-13-6	1.00	2.05
	Hydro-EVE Acid	773804-62-9	ND U	ND U
	NFDHA	151772-58-6	ND U	ND U
	PEPA	267239-61-2	ND U	0.631
	PFECA-G	801212-59-9	ND U	ND U
	PFMOAA	674-13-5	2.65	3.28
	PFMOBA	863090-89-5	ND U	ND U
	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
	PFO5DA	39492-91-6	ND U	ND U
	PMPA	13140-29-9	1.83	2.78
	R-EVE	2416366-22-6	1.68	1.74
PFESAs	11Cl-PF3OUdS	763051-92-9	ND U	ND U
	9Cl-PF3ONS	756426-58-1	ND U	ND U
	Hydrolyzed PSDA	2416366-19-1	ND U	ND U
	Nafion Byproduct 1 (PS Acid)	29311-67-9	ND U	ND U
	Nafion Byproduct 2 (Hydro-PS Acid)	749836-20-2	ND U	ND U
	NVHOS	1132933-86-8	ND U	ND U
	PFEESA	113507-82-7	ND U	ND U
	R-PSDA	2416366-18-0	ND U	ND U
	R-PSDCA	241636-21-5	ND U	ND U

Detailed Results

Enthalpy Analytical

Job No.: 0324-764-1 PFAS by Isotope Dilution (non-potable water)

Brunswick County Public Utilities - NC NORTHWEST WATER PLANT LELAND, N.C

Enthalpy ID	0324-764-001-1	Prep Batch	EU17079	Sample Vol (mL)	286.9
Sample Name	030824-SO1	Prep Date	2024-03-15 10:45	Extract Vol (mL)	0.4
Matrix	aqueous	Analysis Date	2024-03-19 21:37	Split Factor	N/A
Sampling Date	2024-03-08 09:00	Analyst	wicleve	Method Code	EU-047-NPW
Received Date	2024-03-08	Instrument	Sauron	Sample Type	Sample
		Bottle ID	A		

	Compound	CAS	InjFileName	Formatted Result ng/L	LOD ng/L	LOQ ng/L	Recovery Limits	Recovery	Flags
Acids	PFPrA	422-64-0	F220324003	4.01	0.488	41.8			J
	PFBA	375-22-4	S190324024	2.10	0.221	0.558			
	PFPeA	2706-90-3	S190324024	2.29	0.159	0.558			
	PFHxA	307-24-4	S190324024	2.62	0.186	0.558			
	PFHpA	375-85-9	S190324024	1.30	0.195	0.558			
	PFOA	335-67-1	S190324024	2.43	0.128	0.558			
	PFNA	375-95-1	S190324024	0.322	0.126	0.558			J
	PFDA	335-76-2	S190324024	0.170	0.159	0.558			J
	PFUnDA	2058-94-8	S190324024	ND	0.126	0.558			U
	PFDoDA	307-55-1	S190324024	ND	0.227	0.558			U
	PFTrDA	72629-94-8	S190324024	ND	0.185	0.558			U
	PFTeDA	376-06-7	S190324024	ND	0.213	0.558			U
	PFHxDA	67905-19-5	S190324024	ND	0.296	0.558			U
Sulfonates	PFBS	375-73-5	S190324024	1.85	0.296	0.558			
	PFPeS	2706-91-4	S190324024	0.233	0.114	0.525			J
	PFHxS	355-46-4	S190324024	1.59	0.430	0.511			
	PFHpS	375-92-8	S190324024	0.0596	0.270	0.531			L
	PFOS	1763-23-1	S190324024	5.51	0.295	0.517			
	PFNS	68259-12-1	S190324024	ND	0.173	0.537			U
	PFDS	335-77-3	S190324024	ND	0.293	0.537			U
	4:2 FTS	757124-72-4	S190324024	ND	0.0723	0.522			U
	6:2 FTS	27619-97-2	S190324024	ND	0.263	0.531			U
	8:2 FTS	39108-34-4	S190324024	ND	0.125	0.534			U
	10:2 FTS	120226-60-0	S220324043	ND	0.427	0.558			U
Sulfonamidos	FBSA	30334-69-1	S190324024	0.143	0.265	0.558			L
	N-EtFOSA	4151-50-2	S190324024	ND	0.345	0.558			U
	N-EtFOSAA	2991-50-6	S190324024	ND	0.227	0.558			U
	N-EtFOSE	1691-99-2	S190324024	ND	0.854	2.51			U
	N-MeFOSA	31506-32-8	S190324024	ND	0.230	0.558			U
	N-MeFOSAA	2355-31-9	S190324024	ND	0.157	0.558			U
	N-MeFOSE	24448-09-7	S190324024	ND	0.530	2.51			U
	PFOSA	754-91-6	S190324024	1.75	0.0783	0.558			
PFECAs	ADONA	919005-14-4	S190324024	ND	0.151	0.528			U
	EVE Acid	69087-46-3	S190324024	ND	0.178	1.25			U
	HFPO-DA	13252-13-6	S190324024	1.00	0.0591	0.558			
	Hydro-EVE Acid	773804-62-9	S190324024	ND	0.183	0.558			U
	NFDHA	151772-58-6	S190324024	ND	0.117	0.558			U
	PEPA	267239-61-2	S190324024	ND	0.105	0.558			U
	PFECA-G	801212-59-9	S190324024	ND	0.0744	0.558			U
	PFMOAA	674-13-5	S190324024	2.65	0.282	0.558			
	PFMOBA	863090-89-5	S190324024	ND	0.936	1.25			U
	PFMOPrA	377-73-1	S190324024	ND	0.199	0.558			U

	PFO2HxA	39492-88-1	S190324024	ND	0.180	0.558			U
	PFO3OA	39492-89-2	S190324024	ND	0.256	0.558			U
	PFO4DA	39492-90-5	S190324024	ND	0.441	2.79			U
	PFO5DA	39492-91-6	S190324024	ND	0.446	2.79			U
	PMPA	13140-29-9	S190324024	1.83	0.131	0.558			
	R-EVE	2416366-22-6	S220324043	1.68	0.925	1.25			
PFESAs	11Cl-PF3OUdS	763051-92-9	S190324024	ND	0.263	0.525			U
	9Cl-PF3ONS	756426-58-1	S190324024	ND	0.357	0.520			U
	Hydrolyzed PSDA	2416366-19-1	S220324043	ND	0.371	0.558			U
	Nafion Byproduct 1 (PS Acid)	29311-67-9	S190324024	ND	0.298	0.298			U
	Nafion Byproduct 2 (Hydro-PS Acid)	749836-20-2	S190324024	ND	0.462	0.462			U
	NVHOS	1132933-86-8	S190324024	ND	0.0859	0.558			U
	PFEESA	113507-82-7	S190324024	ND	0.168	0.558			U
	R-PSDA	2416366-18-0	S220324043	ND	2.46	2.46			U
	R-PSDCA	241636-21-5	S190324024	ND	0.235	0.558			U
ES	MPFBA		S190324024				20-150%	98.6%	
	M5PFPeA		S190324024				20-150%	134.2%	
	M3PFBS		S190324024				20-150%	143.4%	
	M2-4:2 FTS		S190324024				20-150%	203.2%	Q
	M5PFHxA		S190324024				20-150%	86.2%	
	M3HFPO-DA		S190324024				20-150%	69.9%	
	M4PFHpA		S190324024				20-150%	100.8%	
	M3PFHxS		S190324024				20-150%	126.1%	
	M2-6:2 FTS		S190324024				20-150%	141.3%	
	M8PFOA		S190324024				20-150%	101.9%	
	M9PFNA		S190324024				20-150%	100.1%	
	M8PFOS		S190324024				20-150%	94.5%	
	M2-8:2 FTS		S190324024				20-150%	108.9%	
	M8FOSA-I		S190324024				20-150%	64.8%	
	M6PFDA		S190324024				20-150%	97.2%	
	d3-N-MeFOSAA		S190324024				20-150%	98.6%	
	d5-N-EtFOSAA		S190324024				20-150%	77.4%	
	M7PFUdA		S190324024				20-150%	78.9%	
	MPFDoA		S190324024				20-150%	63.0%	
	M2PFTeDA		S190324024				20-150%	42.0%	
	d3-N-MeFOSA		S190324024				10-200%	23.5%	
	d5-N-EtFOSA		S190324024				10-200%	17.9%	
	d7-N-MeFOSE		S190324024				10-200%	27.9%	
	d9-N-EtFOSE		S190324024				10-200%	25.4%	
	13C3-PFPrA		F220324003				20-150%	12.2%	Q

Enthalpy Analytical

Job No.: 0324-764-1 PFAS by Isotope Dilution (non-potable water)

Brunswick County Public Utilities - NC NORTHWEST WATER PLANT LELAND, N.C

Enthalpy ID	0324-764-002-1	Prep Batch	EU17079	Sample Vol (mL)	292.15
Sample Name	030824-EO1	Prep Date	2024-03-15 10:45	Extract Vol (mL)	0.4
Matrix	aqueous	Analysis Date	2024-03-19 22:00	Split Factor	N/A
Sampling Date	2024-03-08 09:00	Analyst	wicleve	Method Code	EU-047-NPW
Received Date	2024-03-08	Instrument	Sauron	Sample Type	Sample
		Bottle ID	A		

	Compound	CAS	InjFileName	Formatted Result ng/L	LOD ng/L	LOQ ng/L	Recovery Limits	Recovery	Flags
Acids	PFPrA	422-64-0	F220324004	5.32	0.479	41.1			J
	PFBA	375-22-4	S190324025	1.78	0.217	0.548			
	PFPeA	2706-90-3	S190324025	2.68	0.157	0.548			
	PFHxA	307-24-4	S190324025	3.01	0.183	0.548			
	PFHpA	375-85-9	S190324025	1.42	0.192	0.548			
	PFOA	335-67-1	S190324025	3.07	0.125	0.548			
	PFNA	375-95-1	S190324025	0.399	0.124	0.548			J
	PFDA	335-76-2	S190324025	0.190	0.157	0.548			J
	PFUnDA	2058-94-8	S190324025	ND	0.124	0.548			U
	PFDoDA	307-55-1	S190324025	ND	0.222	0.548			U
	PFTrDA	72629-94-8	S190324025	ND	0.181	0.548			U
	PFTeDA	376-06-7	S190324025	ND	0.209	0.548			U
	PFHxDA	67905-19-5	S190324025	ND	0.291	0.548			U
Sulfonates	PFBS	375-73-5	S190324025	2.12	0.291	0.548			
	PFPeS	2706-91-4	S190324025	0.304	0.112	0.516			J
	PFHxS	355-46-4	S190324025	1.98	0.423	0.502			
	PFHpS	375-92-8	S190324025	0.0608	0.265	0.522			L
	PFOS	1763-23-1	S190324025	5.79	0.289	0.507			
	PFNS	68259-12-1	S190324025	ND	0.170	0.527			U
	PFDS	335-77-3	S190324025	ND	0.288	0.527			U
	4:2 FTS	757124-72-4	S190324025	ND	0.0710	0.513			U
	6:2 FTS	27619-97-2	S190324025	0.111	0.258	0.522			L
	8:2 FTS	39108-34-4	S190324025	ND	0.123	0.525			U
	10:2 FTS	120226-60-0	S220324044	ND	0.419	0.548			U
Sulfonamidos	FBSA	30334-69-1	S190324025	0.195	0.260	0.548			L
	N-EtFOSA	4151-50-2	S190324025	ND	0.339	0.548			U
	N-EtFOSAA	2991-50-6	S190324025	ND	0.222	0.548			U
	N-EtFOSE	1691-99-2	S190324025	ND	0.839	2.46			U
	N-MeFOSA	31506-32-8	S190324025	ND	0.226	0.548			U
	N-MeFOSAA	2355-31-9	S190324025	ND	0.154	0.548			U
	N-MeFOSE	24448-09-7	S190324025	ND	0.520	2.46			U
	PFOSA	754-91-6	S190324025	0.0143	0.0768	0.548			L
PFECAs	ADONA	919005-14-4	S190324025	ND	0.148	0.519			U
	EVE Acid	69087-46-3	S190324025	ND	0.175	1.23			U
	HFPO-DA	13252-13-6	S190324025	2.05	0.0580	0.548			
	Hydro-EVE Acid	773804-62-9	S190324025	ND	0.180	0.548			U
	NFDHA	151772-58-6	S190324025	ND	0.115	0.548			U
	PEPA	267239-61-2	S190324025	0.631	0.103	0.548			
	PFECA-G	801212-59-9	S190324025	ND	0.0731	0.548			U
	PFMOAA	674-13-5	S190324025	3.28	0.277	0.548			
	PFMOBA	863090-89-5	S190324025	ND	0.919	1.23			U
	PFMOPrA	377-73-1	S190324025	ND	0.195	0.548			U
	PFO2HxA	39492-88-1	S190324025	ND	0.176	0.548			U

	PFO3OA	39492-89-2	S190324025	ND	0.252	0.548			U
	PFO4DA	39492-90-5	S190324025	ND	0.433	2.74			U
	PFO5DA	39492-91-6	S190324025	ND	0.438	2.74			U
	PMPA	13140-29-9	S190324025	2.78	0.129	0.548			
	R-EVE	2416366-22-6	S220324044	1.74	0.909	1.23			
PFESAs	11Cl-PF3OUdS	763051-92-9	S190324025	ND	0.258	0.516			U
	9Cl-PF3ONS	756426-58-1	S190324025	ND	0.351	0.510			U
	Hydrolyzed PSDA	2416366-19-1	S220324044	ND	0.365	0.548			U
	Nafion Byproduct 1 (PS Acid)	29311-67-9	S190324025	ND	0.293	0.293			U
	Nafion Byproduct 2 (Hydro-PS Acid)	749836-20-2	S190324025	ND	0.454	0.454			U
	NVHOS	1132933-86-8	S190324025	ND	0.0844	0.548			U
	PFEESA	113507-82-7	S190324025	ND	0.165	0.548			U
	R-PSDA	2416366-18-0	S220324044	ND	2.41	2.41			U
	R-PSDCA	241636-21-5	S190324025	ND	0.231	0.548			U
ES	MPFBA		S190324025				20-150%	99.7%	
	M5PFPeA		S190324025				20-150%	142.3%	
	M3PFBS		S190324025				20-150%	157.9%	Q
	M2-4:2 FTS		S190324025				20-150%	277.6%	Q
	M5PFHxA		S190324025				20-150%	82.3%	
	M3HFPO-DA		S190324025				20-150%	65.5%	
	M4PFHpA		S190324025				20-150%	98.4%	
	M3PFHxS		S190324025				20-150%	128.8%	
	M2-6:2 FTS		S190324025				20-150%	158.1%	Q
	M8PFOA		S190324025				20-150%	99.6%	
	M9PFNA		S190324025				20-150%	103.6%	
	M8PFOS		S190324025				20-150%	97.9%	
	M2-8:2 FTS		S190324025				20-150%	116.6%	
	M8FOSA-I		S190324025				20-150%	65.2%	
	M6PFDA		S190324025				20-150%	100.3%	
	d3-N-MeFOSAA		S190324025				20-150%	97.4%	
	d5-N-EtFOSAA		S190324025				20-150%	79.4%	
	M7PFUdA		S190324025				20-150%	80.5%	
	MPFDoA		S190324025				20-150%	65.0%	
	M2PFTeDA		S190324025				20-150%	37.8%	
	d3-N-MeFOSA		S190324025				10-200%	17.9%	
	d5-N-EtFOSA		S190324025				10-200%	14.9%	
	d7-N-MeFOSE		S190324025				10-200%	27.1%	
	d9-N-EtFOSE		S190324025				10-200%	24.5%	
	13C3-PFPrA		F220324004				20-150%	8.9%	Q

QC Data

ENTHALPY
ANALYTICAL

Enthalpy Analytical

Job No.: 0324-764-1 PFAS by Isotope Dilution (non-potable water)

Brunswick County Public Utilities - NC NORTHWEST WATER PLANT LELAND, N.C

Enthalpy ID	MB_17079_PFAS	Prep Batch	EU17079	Sample Vol (mL)	250
Sample Name	MB_17079_PFAS	Prep Date	2024-03-15 10:45	Extract Vol (mL)	0.4
Matrix	aqueous	Analysis Date	2024-03-19 15:35	Split Factor	N/A
Sampling Date		Analyst	wicleve	Method Code	EU-047-NPW
Received Date		Instrument	Sauron	Sample Type	Blank
		Bottle ID	-		

	Compound	CAS	InjFileName	Formatted Result ng/L	LOD ng/L	LOQ ng/L	Recovery Limits	Recovery	Flags
Acids	PFPrA	422-64-0	F200324003	ND	0.560	48.0			U
	PFBA	375-22-4	S190324008	ND	0.254	0.640			U
	PFPeA	2706-90-3	S190324008	ND	0.183	0.640			U
	PFHxA	307-24-4	S190324008	ND	0.214	0.640			U
	PFHpA	375-85-9	S190324008	ND	0.224	0.640			U
	PFOA	335-67-1	S190324008	ND	0.146	0.640			U
	PFNA	375-95-1	S190324008	ND	0.145	0.640			U
	PFDA	335-76-2	S190324008	ND	0.183	0.640			U
	PFUnDA	2058-94-8	S190324008	ND	0.145	0.640			U
	PFDoDA	307-55-1	S190324008	ND	0.260	0.640			U
	PFTrDA	72629-94-8	S190324008	ND	0.212	0.640			U
	PFTeDA	376-06-7	S190324008	ND	0.244	0.640			U
	PFHxDA	67905-19-5	S190324008	ND	0.340	0.640			U
Sulfonates	PFBS	375-73-5	S190324008	ND	0.340	0.640			U
	PFPeS	2706-91-4	S190324008	ND	0.131	0.603			U
	PFHxS	355-46-4	S190324008	ND	0.494	0.586			U
	PFHpS	375-92-8	S190324008	ND	0.310	0.610			U
	PFOS	1763-23-1	S190324008	ND	0.338	0.593			U
	PFNS	68259-12-1	S190324008	ND	0.199	0.616			U
	PFDS	335-77-3	S190324008	ND	0.336	0.616			U
	4:2 FTS	757124-72-4	S190324008	ND	0.0830	0.600			U
	6:2 FTS	27619-97-2	S190324008	ND	0.302	0.610			U
	8:2 FTS	39108-34-4	S190324008	ND	0.143	0.613			U
	10:2 FTS	120226-60-0	S220324038	ND	0.490	0.640			U
Sulfonamidos	FBSA	30334-69-1	S190324008	ND	0.304	0.640			U
	N-EtFOSA	4151-50-2	S190324008	ND	0.396	0.640			U
	N-EtFOSAA	2991-50-6	S190324008	ND	0.260	0.640			U
	N-EtFOSE	1691-99-2	S190324008	ND	0.980	2.88			U
	N-MeFOSA	31506-32-8	S190324008	ND	0.264	0.640			U
	N-MeFOSAA	2355-31-9	S190324008	ND	0.180	0.640			U
	N-MeFOSE	24448-09-7	S190324008	ND	0.608	2.88			U
	PFOSA	754-91-6	S190324008	ND	0.0898	0.640			U
PFECAs	ADONA	919005-14-4	S190324008	ND	0.173	0.606			U
	EVE Acid	69087-46-3	S190324008	ND	0.204	1.44			U
	HFPO-DA	13252-13-6	S190324008	ND	0.0678	0.640			U
	Hydro-EVE Acid	773804-62-9	S190324008	ND	0.210	0.640			U
	NFDHA	151772-58-6	S190324008	ND	0.135	0.640			U
	PEPA	267239-61-2	S190324008	ND	0.120	0.640			U
	PFECA-G	801212-59-9	S190324008	ND	0.0854	0.640			U
	PFMOAA	674-13-5	S190324008	ND	0.324	0.640			U
	PFMOBA	863090-89-5	S190324008	ND	1.07	1.44			U
	PFMOPrA	377-73-1	S190324008	ND	0.228	0.640			U

	PFO2HxA	39492-88-1	S190324008	ND	0.206	0.640			U
	PFO3OA	39492-89-2	S190324008	ND	0.294	0.640			U
	PFO4DA	39492-90-5	S190324008	ND	0.506	3.20			U
	PFO5DA	39492-91-6	S190324008	ND	0.512	3.20			U
	PMPA	13140-29-9	S190324008	ND	0.151	0.640			U
	R-EVE	2416366-22-6	S220324038	ND	1.06	1.44			U
PFESAs	11Cl-PF3OUdS	763051-92-9	S190324008	ND	0.302	0.603			U
	9Cl-PF3ONS	756426-58-1	S190324008	ND	0.410	0.596			U
	Hydrolyzed PSDA	2416366-19-1	S220324038	ND	0.426	0.640			U
	Nafion Byproduct 1 (PS Acid)	29311-67-9	S190324008	ND	0.342	0.342			U
	Nafion Byproduct 2 (Hydro-PS Acid)	749836-20-2	S190324008	ND	0.530	0.530			U
	NVHOS	1132933-86-8	S190324008	ND	0.0986	0.640			U
	PFEESA	113507-82-7	S190324008	ND	0.192	0.640			U
	R-PSDA	2416366-18-0	S220324038	ND	2.82	2.82			U
	R-PSDCA	241636-21-5	S190324008	ND	0.270	0.640			U
ES	MPFBA		S190324008				20-150%	101.0%	
	M5PFPeA		S190324008				20-150%	106.7%	
	M3PFBS		S190324008				20-150%	108.7%	
	M2-4:2 FTS		S190324008				20-150%	219.7%	Q
	M5PFHxA		S190324008				20-150%	95.7%	
	M3HFPO-DA		S190324008				20-150%	69.6%	
	M4PFHpA		S190324008				20-150%	110.2%	
	M3PFHxS		S190324008				20-150%	118.6%	
	M2-6:2 FTS		S190324008				20-150%	179.8%	Q
	M8PFOA		S190324008				20-150%	103.6%	
	M9PFNA		S190324008				20-150%	109.5%	
	M8PFOS		S190324008				20-150%	93.9%	
	M2-8:2 FTS		S190324008				20-150%	201.9%	Q
	M8FOSA-I		S190324008				20-150%	58.1%	
	M6PFDA		S190324008				20-150%	98.8%	
	d3-N-MeFOSAA		S190324008				20-150%	99.7%	
	d5-N-EtFOSAA		S190324008				20-150%	84.7%	
	M7PFUdA		S190324008				20-150%	84.3%	
	MPFDoA		S190324008				20-150%	77.4%	
	M2PFTeDA		S190324008				20-150%	62.8%	
	d3-N-MeFOSA		S190324008				10-200%	14.7%	
	d5-N-EtFOSA		S190324008				10-200%	14.6%	
	d7-N-MeFOSE		S190324008				10-200%	29.0%	
	d9-N-EtFOSE		S190324008				10-200%	29.5%	
	13C3-PFPrA		F200324003				20-150%	10.5%	Q

Enthalpy Analytical

Job No.: 0324-764-1 PFAS by Isotope Dilution (non-potable water)

Brunswick County Public Utilities - NC NORTHWEST WATER PLANT LELAND, N.C

Enthalpy ID	OPR_17079_PFAS	Prep Batch	EU17079	Sample Vol (mL)	250
Sample Name	OPR_17079_PFAS	Prep Date	2024-03-15 10:45	Extract Vol (mL)	0.4
Matrix	aqueous	Analysis Date	2024-03-19 15:57	Split Factor	N/A
Sampling Date		Analyst	wicleve	Method Code	EU-047-NPW
Received Date		Instrument	Sauron	Sample Type	Control
		Bottle ID	-		

	Compound	CAS	InjFileName	Formatted Result ng/L	LOD ng/L	LOQ ng/L	Recovery Limits	Recovery	Flags
Acids	PFBA	375-22-4	S190324009	18.6	0.254	0.640	69.1-122%	93.1%	
	PFPeA	2706-90-3	S190324009	18.1	0.183	0.640	68.5-121%	90.3%	
	PFHxA	307-24-4	S190324009	20.0	0.214	0.640	68.3-121%	99.9%	
	PFHpA	375-85-9	S190324009	19.1	0.224	0.640	62.4-128%	95.5%	
	PFOA	335-67-1	S190324009	20.1	0.146	0.640	66.3-124%	100.6%	
	PFNA	375-95-1	S190324009	20.1	0.145	0.640	70.5-120%	100.4%	
	PFDA	335-76-2	S190324009	21.1	0.183	0.640	68.9-117%	105.3%	
	PFUnDA	2058-94-8	S190324009	20.9	0.145	0.640	58.1-132%	104.7%	
	PFDoDA	307-55-1	S190324009	20.6	0.260	0.640	52.1-140%	103.1%	
	PFTrDA	72629-94-8	S190324009	21.3	0.212	0.640	65-144%	106.3%	
	PFTeDA	376-06-7	S190324009	21.2	0.244	0.640	36.1-161%	105.8%	
Sulfonates	PFBS	375-73-5	S190324009	19.1	0.340	0.640	67.5-111.6%	107.6%	
	PFPeS	2706-91-4	S190324009	18.7	0.131	0.603	51.8-142%	99.4%	
	PFHxS	355-46-4	S190324009	17.1	0.494	0.586	59.6-128%	93.4%	
	PFHpS	375-92-8	S190324009	20.3	0.310	0.610	46.9-157%	106.7%	
	PFOS	1763-23-1	S190324009	17.6	0.338	0.593	59.2-132%	95.0%	
	PFNS	68259-12-1	S190324009	17.1	0.199	0.616	53.9-133%	88.9%	
	PFDS	335-77-3	S190324009	16.3	0.336	0.616	38.1-142%	84.2%	
	4:2 FTS	757124-72-4	S190324009	18.4	0.0830	0.600	61.9-131%	98.0%	
	6:2 FTS	27619-97-2	S190324009	19.0	0.302	0.610	62.3-129%	99.9%	
	8:2 FTS	39108-34-4	S190324009	20.3	0.143	0.613	37.5-159%	105.8%	
Sulfonamidos	N-EtFOSAA	2991-50-6	S190324009	20.5	0.260	0.640	61.5-133%	102.4%	
	N-MeFOSAA	2355-31-9	S190324009	19.0	0.180	0.640	57.3-138%	95.1%	
	PFOSA	754-91-6	S190324009	25.7	0.0898	0.640	49.1-143%	128.5%	
PFECAs	HFPO-DA	13252-13-6	S190324009	19.0	0.0678	0.640	57.2-130%	95.1%	
ES	MPFBA		S190324009				20-150%	96.6%	
	M5PFPeA		S190324009				20-150%	107.0%	
	M3PFBS		S190324009				20-150%	105.8%	
	M2-4:2 FTS		S190324009				20-150%	202.3%	Q
	M5PFHxA		S190324009				20-150%	92.4%	
	M3HFPO-DA		S190324009				20-150%	70.6%	
	M4PFHpA		S190324009				20-150%	105.9%	
	M3PFHxS		S190324009				20-150%	118.7%	
	M2-6:2 FTS		S190324009				20-150%	169.1%	Q
	M8PFOA		S190324009				20-150%	101.2%	
	M9PFNA		S190324009				20-150%	105.3%	
	M8PFOS		S190324009				20-150%	93.8%	
	M2-8:2 FTS		S190324009				20-150%	186.0%	Q
	M8FOSA-I		S190324009				20-150%	55.1%	
	M6PFDA		S190324009				20-150%	94.8%	
	d3-N-MeFOSAA		S190324009				20-150%	98.6%	
	d5-N-EtFOSAA		S190324009				20-150%	78.5%	
	M7PFUdA		S190324009				20-150%	80.7%	
	MPFDoA		S190324009				20-150%	73.6%	

	M2PFTeDA		S190324009				20-150%	57.9%	

Narrative Summary

Enthalpy Analytical Narrative Summary

Company	Brunswick County Public Utilities - NC
Job No.	0324-764-1 PFAS by Isotope Dilution (non-potable water)
Client ID.	NORTHWEST WATER PLANT Site: LELAND, N.C

1. Custody

Christina Kurnath received the samples at 2.4 °C after being relinquished by Brunswick County Public Utilities - NC.

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	Received
0324-764-001-1	030824-SO1	aqueous	2024-03-08
0324-764-002-1	030824-EO1	aqueous	2024-03-08

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	Custom List	ENVI-Carb

3. Analysis

The samples were analyzed using Waters Acquity UPLC equipped with Xevo TQ MS (LC/MS/MS "Sauron").

The samples were analyzed on more than one instrument sequence in order to meet method acceptance criteria.

Sample and QC extracts were treated to a dilution factor of five (D5) prior to injection for PFPrA. Sample extracts were treated to a D10 and re-injected to improve surrogate (ES) signal.

4. Calibration

In the initial calibration, the analytes exhibited R^2 of ≥ 0.99. The reported analytes in the calibration standards, continuing calibration (concal) and Initial Calibration Verification (ICV) met the accuracy criterion for native analytes.

Enthalpy Analytical Narrative Summary

Company	Brunswick County Public Utilities - NC
Job No.	0324-764-1 PFAS by Isotope Dilution (non-potable water)
Client ID.	NORTHWEST WATER PLANT Site: LELAND, N.C

5. QC Notes

Ongoing Precision Recovery (OPR) control limits have not been established for some analytes of interest.

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

Select ES fell outside method recovery criteria in the method blank (MB), OPR, and samples. Target analytes are quantified based on their ratio to their labeled standard analogs. When detected at a signal-to-noise above 10:1 the ES peak area is used to quantify its respective target analyte using accepted isotope dilution principles. The data is reported without adverse impact.

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 results presented in this report are representative of the samples as provided to the laboratory.

This report provides all results including detections below LOD following client instruction.

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 amount 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: The EDL is unique to isotope dilution methods and reflects the conditions of analysis at the time of analysis, including the equipment used. Where the MDL is a static value, the EDL is a dynamic value.
- EMPC – Estimated Maximum Possible Concentration: EMPC is specific to Dioxin/Furan tests to indicate the determined ion-abundance ratio was outside the allowed theoretical range (usually due to being near the detection limit, although it can very rarely be caused by a co-eluting interference). The EMPC concentration is adjusted to reflect the value at the theoretical ion-abundance ratio.
- IR – The ion ratio between the primary and secondary ions was observed to be outside the method criteria. The analyte concentration may be inaccurate due to interference.
- 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 - For reports containing PFAS analytes only, this flag 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 LOQ 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.
- <LOQ() – Analyte was not found at a concentration high enough to be reported as above the QSM-defined LOQ or TNI defined Reporting Limit. It is reported as less than the LOQ, and the LOQ 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 / Q – The labeled standard recovery is not within method control limits.
- X – Indicates the result is 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.
- R – Indicates a re-extraction of the sample.

- RJ – Indicates a reinjection of the sample extract.
- S – Indicates a sample split. The number that follows the "S" indicates the split factor.
- SAT – Indicates an analyte saturated the detector.

	PFAS Compound Acronym List		
	Acronym	**CAS #**	**Compound Name**
	Target Analytes		
	*** Analyte is not accredited for SOP EU047**		***# Method 537.1 Accredited ^ Method 533 Accredited***
^	PFBA	375-22-4	Perfluorobutanoic Acid
^	PFPeA	2706-90-3	Perfluoropentanoic Acid
#, ^	PFHxA	307-24-4	Perfluorohexanoic Acid
#, ^	PFHpA	375-85-9	Perfluoroheptanoic Acid
#, ^	PFOA	335-67-1	Perfluorooctanoic Acid
#, ^	PFNA	375-95-1	Perfluorononanoic Acid
#, ^	PFDA	335-76-2	Perfluorodecanoic acid
#, ^	PFUnA (PFUnDA)	2058-94-8	Perfluoroundecanoic acid
#, ^	PFDoA (PFDoDA)	307-55-1	Perfluorododecanoic acid
#	PFTrDA (PFTriA)	72629-94-8	Perfluorotridecanoic acid
#	PFTeDA (PFTA)	376-06-7	Perfluorotetradecanoic acid
#, ^	PFBS	375-73-5	Perfluorobutane sulfonic acid
^	PFPeS	2706-91-4	Perfluoropentane sulfonic acid
#, ^	PFHxS	355-46-4	Perfluorohexane sulfonic acid
^	PFHpS	375-92-8	Perfluoroheptane sulfonic acid
#, ^	PFOS	1763-23-1	Perfluorooctane sulfonic acid
	PFNS	68259-12-1	Perfluorononane sulfonic acid
	PFDS	335-77-3	Perfluorodecane sulfonic acid
^	4:2 FTS	757124-72-4	4:2 fluorotelomer sulfonic acid
^	6:2 FTS	27619-97-2	6:2 fluorotelomer sulfonic acid
^	8:2 FTS	39108-34-4	8:2 fluorotelomer sulfonic acid
	PFOSA (FOSA)	754-91-6	Perfluorooctane sulfonamide
#	N-MeFOSAA	2355-31-9	N-methyl perfluorooctane sulfonamido acetic acid
#	N-EtFOSAA	2991-50-6	N-ethyl perfluorooctane sulfonamido acetic acid
#, ^	HFPO-DA	13252-13-6	2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)-propanoic acid (Gen-X)
*, #, ^	11Cl-PF3OUdS	763051-92-9	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
*, #, ^	9Cl-PF3ONS	756426-58-1	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
*, #, ^	ADONA	919005-14-4	4,8-dioxa-3H-perfluorononanoic acid
*,^	PFEESA	113507-82-7	Perfluoro(2-ethoxyethane)sulphonic acid
*, ^	PFMOBA (PFMBA)	863090-89-5	Perfluoro-4-methoxybutanic acid
*, ^	NFDHA	151772-58-6	Nonafluoro-3,6-dioxaheptanoic acid
*, ^	PFMOPrA (PFMPA)	377-73-1	Perfluoro-3-methoxypropanoic acid
*	PFMOAA	674-13-5	Perfluoro-2-methoxyacetic acid
*	PFO2HxA	39492-88-1	Perfluoro (3,5-dioxahexanoic) acid
*	PFO3OA	39492-89-2	Perfluoro (3,5,7-trioxaoctanoic) acid
*	PFO4DA	39492-90-5	Perfluoro (3,5,7,9-tetraoxadecanoic) acid
*	PFO5DA	39492-91-6	Perfluoro(3,5,7,9,11-pentaoxadodecanoic) acid
*	Nafion Byproduct 1	29311-67-9	Nafion Byproduct 1
*	Nafion Byproduct 2	749836-20-2	Nafion Byproduct 2
*	PEPA	267239-61-2	Perfluoro-2-ethoxypropanoic acid
*	PMPA	13140-29-9	Perfluoro-2-methoxypropanoic acid
*	10:2 FTS	120226-60-0	Fluorotelomer sulfonate 10:2
*	N-EtFOSA	4151-50-2	N-ethylperfluoro-1-octanesulfonamide
*	N-EtFOSE	1691-99-2	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
*	N-MeFOSA	31506-32-8	N-methylperfluoro-1-octanesulfonamide
*	N-MeFOSE	24448-09-7	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
*	PFECA-G	801212-59-9	4-(Heptafluoroisopropoxy)hexafluorobutanoic acid
*	PFHxDA	67905-19-5	Perfluorohexadecanoic acid
*	R-PSDA (Nafion Byproduct 4)	2416366-18-0	Perfluoro-4-(2-sulfoethoxy)pentanoic acid

	PFAS Compound Acronym List		
	Acronym	CAS #	Compound Name
	Target Analytes		
	* Analyte is not accredited for SOP EU047	# Method 537.1 Accredited ^ Method 533 Accredited	
*	Hydrolyzed PSDA (Nafion Byproduct 5)	2416366-19-1	2-fluoro-2-[1,1,2,3,3,3-hexafluoro-2-(1,1,2,2-tetrafluoro-2-sulfoethoxy)propoxy]-acetic acid
*	R-PSDCA (Nafion Byproduct 6)	2416366-21-5	1,1,2,2-tetrafluoro-2-[1,2,2,3,3-pentafluoro-1-(trifluoromethyl)propoxy] ethanesulfonic acid
*	EVE Acid	69087-46-3	2,2,3,3-tetrafluoro-3-({1,1,1,2,3,3-hexafluoro-3-[(1,2,2-trifluoroethenyl)oxy]propan-2-yl}oxy)propionic acid
*	FBSA	30334-69-1	Perfluorobutylsulfonamide
*	Hydro-EVE Acid	773804-62-9	2,2,3,3-Tetrafluoro-3-{[1,1,1,2,3,3-hexafluoro-3-(1,2,2,2-tetrafluoroethoxy)propan-2-yl]oxy}propanoic acid
*	R-EVE Acid	2416366-22-6	4-(2-carboxy-1,1,2,2-tetrafluoroethoxy)-2,2,3,3,4,5,5,5-octafluoro-pentanoic acid
*	NVHOS	1132933-86-8	Perfluoroethoxysulfonic acid
*	PFDoS	79780-39-5	Perfluorododecane sulfonic acid
*	PFODA	16517-11-6	Perfluorooctadecanoic acid
*	3:3 FTCA	356-02-5	2H,2H,3H,3H-Perfluorohexanoic acid
*	5:3 FTCA	914637-49-3	2H,2H,3H,3H-Perfluorooctanoic acid
*	7:3 FTCA	812-70-4	2H,2H,3H,3H-Perfluorodecanoic acid
*	N-AP-FHxSA	50598-28-2	N-(3-(Dimethylamino)propyl)tridecafluoro-1-hexanesulfonamide
*	N-CMAmP-6:2 FOSA	34455-29-3	N-(Carboxymethyl)-N,N-dimethyl-3-(((3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulfonyl)amino)1-propanaminium

Sample Custody

ENTHALPY
ANALYTICAL

0324-764

Chain of Custody Record

ENTHALPY analytical

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:
030824-SO1	3/8/2024	0900AM	250 ml	G	NW	2											X	Please Add PFPrA and
030824-EO1	3/8/2024	0900AM	250 ml	G	DW	2											X	PFHpA To The Testing.
																		Mark Hager Knows About
																		This If you Have Questions

Relinquished By:	Date:	Received By:	Date:	Time:	Sample Temperature Upon Receipt:
BILLY BENTON	3/8/2024	CMW CMC	3/8/24	2:34	☒ Iced ☐ Ambient °C 2.4
					☐ Iced ☐ Ambient °C
					☐ Iced ☐ Ambient °C

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

JOB ID: 0324-764 Date / Time: 3/8/24 2:34 Initials: CK

OR

Client: Brunswick

Cooler 1 of 1

Temp °C: 2.4 Thermometer ID: T10

Received via: FedEx ☐ UPS ☐ DHL ☐ USPS ☐ Courier ☑ Other ☐

Check one		Check one			Yes	No
On ice:	☑	in a Box:	☐	Cooler seals:	☐	☑
Melted ice:	☐	in a Cooler:	☑	Sample seals:	☐	☑
Ambient:	☐	Cooler in Box:	☐	Good condition:	☑	☐

Comment:

Cooler ____ of ____

Temp °C: ____ Thermometer ID: ____

Received via: FedEx ☐ UPS ☐ DHL ☐ USPS ☐ Courier ☐ Other ☐

Check one		Check one			Yes	No
On ice:	☐	in a Box:	☐	Cooler seals:	☐	☐
Melted ice:	☐	in a Cooler:	☐	Sample seals:	☐	☐
Ambient:	☐	Cooler in Box:	☐	Good condition:	☐	☐

Comment:

Cooler ____ of ____

Temp °C: ____ Thermometer ID: ____

Received via: FedEx ☐ UPS ☐ DHL ☐ USPS ☐ Courier ☐ Other ☐

Check one		Check one			Yes	No
On ice:	☐	in a Box:	☐	Cooler seals:	☐	☐
Melted ice:	☐	in a Cooler:	☐	Sample seals:	☐	☐
Ambient:	☐	Cooler in Box:	☐	Good condition:	☐	☐

Comment:

This Is The Last Page Of This Report.