









PO Box 30712 Charleston, SC 29417 2040 Savage Road Charleston, SC 29407 P 843.556.8171 F 843.766.1178

gel.com

December 21, 2017

Bob Walker H2GO Brunswick Regional Water & Sewer 516 Village Road, NE Leland, North Carolina 28451

Re: Sample Analysis Work Order: 439610

Dear Bob Walker:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 08, 2017. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4778.

Sincerely,

Hope Taylor Project Manager

Purchase Order: signed quote Enclosures

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# Certificate of Analysis Report for

H2GO001 H2GO Brunswick Regional Water & Sewer Client SDG: 439610 GEL Work Order: 439610

### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- B The target analyte was detected in the associated blank.
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- h Preparation or preservation holding time was exceeded

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Hope Taylor.



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# **Certificate of Analysis**

Report Date: December 21, 2017

Company: H2GO Brunswick Regional Water & Sewer

Address: 516 Village Road, NE

Leland, North Carolina 28451

Contact: Bob Walker Project: Sample Analysis

Client Sample ID: GST/BPS Project: H2GO00117 Sample ID: 439610001 Client ID: H2GO001

Matrix: Drinking Water (Potable)
Collect Date: 22-NOV-17 13:30
Receive Date: 08-DEC-17

Collector: Client

Parameter Q	ualifier	Result	DL	RL	Units	PF	DF	Anal	yst Date	Time	Batch	Method
LCMSMS PFCs												
NC 6 PFCs by LC-MS/MS	"As Rece	eived"										
Nafion Byproduct 1	UXh	ND			ng/L	0.0199	1	JLS	12/18/17	2057	1724946	1
Nafion Byproduct 2	UXh	ND			ng/L	0.0199	1					
Perfluoro(3,5,7,9-tetraoxadecanoic acid (PFO4DA)	) UXh	ND			ng/L	0.0199	1					
Perfluoro(3,5,7-trioxaoctanoic) aci (PFO3OA)	d UXh	ND			ng/L	0.0199	1					
Perfluoro(3,5-dioxahexanoic) acid (PFO2HxA)	UXh	ND			ng/L	0.0199	1					
Perfluoro-2-methoxyacetic acid (PFMOAA)	UXh	ND			ng/L	0.0199	1					
Perfluoro-3-methoxypropanoic aci (PFMOPrA)	d UXh	ND			ng/L	0.0199	1					
Perfluoro-4-methoxybutanic acid (PFMOBA)	UXh	ND			ng/L	0.0199	1					
PFOA, PFOS by LC-MS/M	S "As Re	eceived"										
2,3,3,3-Tetrafluoro-2- (1,1,2,2,3,3,3-heptafluoropropoxy) propanoic acid (PFPrOPrA)	Uh 	ND	0.657	1.99	ng/L	0.0199	1	JLS	12/18/17	2057	1724946	2
Fluorotelomer sulfonate 4:2 (4:2 FTS)	Uh	ND	1.31	3.74	ng/L	0.0199	1					
Fluorotelomer sulfonate 6:2 (6:2 FTS)	Uh	ND	1.31	3.78	ng/L	0.0199	1					
Fluorotelomer sulfonate 8:2 (8:2 FTS)	Uh	ND	1.31	3.82	ng/L	0.0199	1					
Perfluorobutanesulfonate (PFBS)	Uh	ND	0.657	1.77	ng/L	0.0199	1					
Perfluorobutyric acid (PFBA)	Uh	ND	0.657	1.99	ng/L	0.0199	1					
Perfluorodecanesulfonate (PFDS)	Uh	ND	0.657	1.93	ng/L	0.0199	1					
Perfluorodecanoic acid (PFDA)	Uh	ND	0.657	1.99	ng/L	0.0199	1					
Perfluorododecanoic acid (PFDoA	) Uh	ND	0.657	1.99	ng/L	0.0199	1					
Perfluoroheptanesulfonate (PFHpS	Uh	ND	0.657	1.89	ng/L	0.0199	1					
Perfluoroheptanoic acid (PFHpA)	Uh	ND	0.657	1.99	ng/L	0.0199	1					
Perfluorohexanesulfonate (PFHxS)	) Uh	ND	0.657	1.81	ng/L	0.0199	1					
Perfluorohexanoic acid (PFHxA)	Uh	ND	0.657	1.99	ng/L	0.0199	1					
Perfluorononanesulfonate (PFNS)	Uh	ND	0.657	1.91	ng/L	0.0199	1					
Perfluorononanoic acid (PFNA)	Uh	ND	0.657	1.99	ng/L	0.0199	1					
Perfluorooctanesulfonamide (PFOSA)	Uh	ND	0.657	1.85	ng/L	0.0199						
Perfluorooctanesulfonate (PFOS)	BJh	0.938	0.657	1.99	ng/L	0.0199	1					
Perfluorooctanoic acid (PFOA)	Uh	ND	0.657	1.99	ng/L	0.0199	1					

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# **Certificate of Analysis**

Report Date: December 21, 2017

Company: H2GO Brunswick Regional Water & Sewer

Address: 516 Village Road, NE

Leland, North Carolina 28451

Contact: Bob Walker Project: Sample Analysis

Client Sample ID: GST/BPS Project: H2GO00117 Sample ID: 439610001 Client ID: H2GO001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF A	nalyst Date	Time Batch	Method
LCMSMS PFCs										
PFOA, PFOS by LC-M	IS/MS "As Re	eceived"								
Perfluoropentanesulfonate (P	FPeS) Uh	ND	0.657	1.87	ng/L	0.0199	1			
Perfluoropentanoic acid (PFI	PeA) Uh	ND	0.657	1.99	ng/L	0.0199	1			
Perfluorotetradecanoic acid (PFTeDA)	Uh	ND	0.657	1.99	ng/L	0.0199	1			
Perfluorotridecanoic acid (PI	FTrDA) Uh	ND	0.657	1.99	ng/L	0.0199	1			
Perfluoroundecanoic acid (Pl	FUdA) Uh	ND	0.657	1.99	ng/L	0.0199	1			
The following Prep Me	thods were p	erformed:								
Method	Descriptio	n		Analyst	Date	Т	ime	Prep Batch		
EPA 537	PFCs Extract	ion in Drinking Water		GXC1	12/08/17	1	200	1724945		

### The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 537	•
2	EPA 537	

#### **Notes:**

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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# **Certificate of Analysis**

Report Date: December 21, 2017

Company: H2GO Brunswick Regional Water & Sewer

Address: 516 Village Road, NE

Leland, North Carolina 28451

Contact: Bob Walker Project: Sample Analysis

Collector:

Client Sample ID: GST/BPS Project: H2GO00117 Sample ID: 439610002 Client ID: H2GO001

Matrix: Drinking Water (Potable) Collect Date: 22-NOV-17 13:30 08-DEC-17 Receive Date:

Client

Parameter (	Qualifier	Result	DL	RL	Units	PF	DF	Anal	yst Date	Time	Batch	Method
LCMSMS PFCs												
NC 6 PFCs by LC-MS/MS	S "As Rece	eived"										
Nafion Byproduct 1	Xh	0.775			ng/L	0.0224	1	JLS	12/18/17	2112	1724946	1
Nafion Byproduct 2	Xh	3.96			ng/L	0.0224	1					
Perfluoro(3,5,7,9-tetraoxadecano acid (PFO4DA)	ic) Xh	1.49			ng/L	0.0224	1					
Perfluoro(3,5,7-trioxaoctanoic) ao (PFO3OA)	cid Xh	5.36			ng/L	0.0224	1					
Perfluoro(3,5-dioxahexanoic) acid (PFO2HxA)	d Xh	16.0			ng/L	0.0224	1					
Perfluoro-2-methoxyacetic acid (PFMOAA)	Xh	0.522			ng/L	0.0224	1					
Perfluoro-3-methoxypropanoic ac (PFMOPrA)	eid Xh	10.6			ng/L	0.0224	1					
Perfluoro-4-methoxybutanic acid (PFMOBA)	Xh	34.4			ng/L	0.0224	1					
PFOA, PFOS by LC-MS/N	MS "As Re	eceived"										
2,3,3,3-Tetrafluoro-2- (1,1,2,2,3,3,3-heptafluoropropoxy	h	38.8	0.739	2.24	ng/L	0.0224	1	JLS	12/18/17	2112	1724946	2
propanoic acid (PFPrOPrA) Fluorotelomer sulfonate 8:2 (8:2 FTS)	Uh	ND	1.48	4.30	ng/L	0.0224	1					
Perfluorobutanesulfonate (PFBS)	h	4.18	0.739	1.99	ng/L	0.0224	1					
Perfluorobutyric acid (PFBA)	h	17.5	0.739	2.24	ng/L	0.0224	1					
Perfluorodecanesulfonate (PFDS)	) Uh	ND	0.739	2.17	ng/L	0.0224	1					
Perfluorodecanoic acid (PFDA)	Jh	1.10	0.739	2.24	ng/L	0.0224	1					
Perfluorododecanoic acid (PFDo	A) Uh	ND	0.739	2.24	ng/L	0.0224	1					
Perfluoroheptanesulfonate (PFHp	S) Uh	ND	0.739	2.13	ng/L	0.0224	1					
Perfluoroheptanoic acid (PFHpA)	) h	23.0	0.739	2.24	ng/L	0.0224	1					
Perfluorohexanesulfonate (PFHx		4.12	0.739	2.04	ng/L	0.0224	1					
Perfluorohexanoic acid (PFHxA)	h	34.4	0.739	2.24	ng/L	0.0224	1					
Perfluorononanesulfonate (PFNS	) Uh	ND	0.739	2.15	ng/L	0.0224	1					
Perfluorononanoic acid (PFNA)	Jh	1.70	0.739	2.24	ng/L	0.0224	1					
Perfluorooctanesulfonamide (PFOSA)	Uh	ND	0.739	2.08	ng/L	0.0224	1					
Perfluorooctanesulfonate (PFOS)	Bh	5.53	0.739	2.24	ng/L	0.0224	1					
Perfluorooctanoic acid (PFOA)	h	8.64	0.739	2.24	ng/L	0.0224	1					
Perfluoropentanesulfonate (PFPe	S) Jh	0.767	0.739	2.11	ng/L	0.0224	1					
Perfluoropentanoic acid (PFPeA)	h	44.1	0.739	2.24	ng/L	0.0224	1					
Perfluorotetradecanoic acid (PFTeDA)	Uh	ND	0.739	2.24	ng/L	0.0224	1					

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**Certificate of Analysis** 

Report Date: December 21, 2017

Company: H2GO Brunswick Regional Water & Sewer

Address: 516 Village Road, NE

Leland, North Carolina 28451

Contact: Bob Walker Project: Sample Analysis

Client Sample ID: GST/BPS Project: H2GO00117 Sample ID: 439610002 Client ID: H2GO001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analy	st Date	Time	e Batch	Method
LCMSMS PFCs												
PFOA, PFOS by LC-MS	S/MS "As R	eceived"										
Perfluorotridecanoic acid (PF)	TrDA) Uh	ND	0.739	2.24	ng/L	0.0224	1					
Perfluoroundecanoic acid (PF	JdA) Uh	ND	0.739	2.24	ng/L	0.0224	1					
Fluorotelomer sulfonate 4:2 (4	:2 Uh	ND	7.39	21.1	ng/L	0.0224	5	JLS	12/19/17	1034	1724946	3
FTS)												
Fluorotelomer sulfonate 6:2 (6	:2 Uh	ND	7.39	21.3	ng/L	0.0224	5					
FTS)												
Semi-Volatile-GC/MS												
EPA 522 1,4-Dioxane ir	Liquid "As	Received"										
1,4-Dioxane		5.21			ug/L	0.020	1	JMB3	12/13/17	0533	1723304	4
The following Prep Met	hods were p	erformed:										
Method	Description	n		Analyst	Date	ı	Time	Pr	ep Batch			
EPA 522	EPA 522 Pre	ep 1,4-Dioxane		SJ	12/12/17		1000	17:	23303			
EPA 537	PFCs Extrac	tion in Drinking Water		GXC1	12/08/17		1200	17	24945			
TCI - C-11 - 1 - A 1 - (1)	.1 M . 4 1.											

#### The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 537	·
2	EPA 537	
3	EPA 537	
4	EPA 522	
Surrogate/Trace	r Recovery Test	Result Nominal Recovery% Accentable Limits

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,4-Dioxane-d8	EPA 522 1,4-Dioxane in Liquid "As Received"	4.15 ug/L	4.00	104	(70%-130%)

### **Notes:**

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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# **Certificate of Analysis**

Report Date: December 21, 2017

Company: H2GO Brunswick Regional Water & Sewer

Address: 516 Village Road, NE

Leland, North Carolina 28451

Contact: Bob Walker Project: Sample Analysis

Collector:

Client Sample ID: GST/BPS Project: H2GO00117 Sample ID: 439610003 Client ID: H2GO001

Matrix: Drinking Water (Potable)
Collect Date: 29-NOV-17 14:10
Receive Date: 08-DEC-17

Client

CLMSMS PFCs   NC 6 PFCs by LC-MS/MS "As Received"   ND   ND   ND   ND   ND   ND   ND   N	Parameter Qua	alifier	Result	DL	RL	Units	PF	DF	Analyst Date	Time Batch	Method
Nafion Byproduct 1	LCMSMS PFCs										
Nafion Byproduct 2	NC 6 PFCs by LC-MS/MS "A	As Rece	eived"								
Nafion Byproduct 2	Nafion Byproduct 1	UX	ND			ng/L	0.0199	1	JLS 12/18/17	2128 1724946	1
Perfluoro-3-methoxyacetic acid   UX   ND   ND   ND   ND   ND   ND   ND   N	Nafion Byproduct 2	UX	ND				0.0199	1			
Perfluoro(3,5,7-trioxoa(tanoic) acid   UX   ND   Perfluoro(3,5-dioxahexanoic) acid   UX   ND   Perfluoro(3,5-dioxahexanoic) acid   UX   ND   Perfluoro-2-methoxyacetic acid   UX   ND   Perfluoro-3-methoxypropanoic acid   UX   ND   Perfluoro-3-methoxypropanoic acid   UX   ND   Perfluoro-3-methoxypropanoic acid   UX   ND   Perfluoro-3-methoxypropanoic acid   UX   ND   Perfluoro-4-methoxybutanic acid   UX   ND   Perfluoro-4-methoxybutanic acid   UX   ND   Perfluoro-4-methoxybutanic acid   UX   ND   PoA, PFOS by LC-MS/MS "As Received"   PoA, PFOS by LC-MS/MS "As Received"   PoA, PFOS by LC-MS/MS "As Received   PoA, PFOS by LC-MS/MS "As	Perfluoro(3,5,7,9-tetraoxadecanoic)	UX	ND			ng/L	0.0199	1			
Perfluoro-1, Sdioxahexanoic) acid   UX   ND						_					
Perfluoro(3,5-dioxakexanoic) acid   UX   ND     ND     ND   ND   ND   ND   ND	* * * *	UX	ND			ng/L	0.0199	1			
PFCD(PIXA)   PFCPHOPO-2-methoxyacetic acid   UX   ND   ND   ND   ND   ND   ND   ND   N	,	ПХ	ND			ng/I	0.0100	1			
Perfluoro-2-methoxyacetic acid   UX   ND   ND   ND   ND   ND   ND   ND   N		OA	ND			ng/L	0.0177	1			
Perfluoro-4-methoxypropanoic acid   UX   ND   ND   ND   ND   ND   ND   ND   N		UX	ND			ng/L	0.0199	1			
Perfluoro-4-methoxybutanic acid   UX   ND   ND   ND   ND   ND   ND   ND   N											
Perfluoro-4-methoxybutanic acid   UX   ND   ND   ND   ND   ND   ND   ND   N		UX	ND			ng/L	0.0199	1			
PFOA, PFOS by LC-MS/MS "As Received"   2,3,3,3-fertafluoro-2-		ПV	ND			na/I	0.0100	1			
PFOA, PFOS by LC-MS/MS "As Received"   2,33,3-Tetrafluoro-2-   U ND   0.657   1.99   ng/L   0.0199   1 JLS   12/18/17   2128   1724946   2 (1,1,2,2,3,3,3-heptafluoropropoxy)-propanoic acid (PFPoPrA)   Fluorotelomer sulfonate 4:2 (4:2   U ND   1.31   3.74   ng/L   0.0199   1   FTS)   Fluorotelomer sulfonate 6:2 (6:2   U ND   1.31   3.78   ng/L   0.0199   1   FTS)   Fluorotelomer sulfonate 8:2 (8:2   U ND   1.31   3.82   ng/L   0.0199   1   FTS)   Fluorotelomer sulfonate 8:2 (8:2   U ND   0.657   1.77   ng/L   0.0199   1   FTS)   FTS)   Furly or obstance (PFBS)   U ND   0.657   1.99   ng/L   0.0199   1   FTS)   Furly or obstance (PFBS)   U ND   0.657   1.99   ng/L   0.0199   1   FTS)   Furly or obstance (PFDS)   U ND   0.657   1.99   ng/L   0.0199   1   FTS)   Furly or obstance (PFDS)   U ND   0.657   1.99   ng/L   0.0199   1   FTS)   FURLY or obstance (PFDS)   U ND   0.657   1.99   ng/L   0.0199   1   FTS)   FURLY or obstance (PFDS)   U ND   0.657   1.99   ng/L   0.0199   1   FTS   FTS   FTS   FURLY or obstance (PFDS)   U ND   0.657   1.99   ng/L   0.0199   1   FTS   F		UA	ND			ng/L	0.0199	1			
2,3,3,3-Tetrafluoro-2-		"As Re	eceived"								
(1,1,2,2,3,3,3-heptafluoropropoxy)- propancic acid (PFPrOPrA) Fluorotelomer sulfonate 4:2 (4:2 U ND 1.31 3.74 ng/L 0.0199 1 FTS) Fluorotelomer sulfonate 6:2 (6:2 U ND 1.31 3.78 ng/L 0.0199 1 FTS) Fluorotelomer sulfonate 8:2 (8:2 U ND 1.31 3.82 ng/L 0.0199 1 FTS) Fluorotelomer sulfonate (PFBS) U ND 1.31 3.82 ng/L 0.0199 1 Perfluorobutanesulfonate (PFBS) U ND 0.657 1.77 ng/L 0.0199 1 Perfluorodecanesulfonate (PFBS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorodecanesulfonate (PFDS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorodecanoic acid (PFDA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorodecanoic acid (PFDA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorodeptanesulfonate (PFHpS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorodeptanesulfonate (PFHpS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluoroheptanesulfonate (PFHpS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluoroheptanoic acid (PFDA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluoroheptanoic acid (PFHpA) U ND 0.657 1.89 ng/L 0.0199 1 Perfluoroheptanoic acid (PFHpA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorohexanesulfonate (PFHxS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorohexanoic acid (PFNA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorononanesulfonate (PFNS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorononanesulfonate (PFNS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorooctanesulfonate (PFNA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorooctanesulfonate (PFNA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorooctanesulfonate (PFNS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorooctanesulfonate (PFNA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorooctanesulfonate (PFNA) U ND 0.657 1.99 ng/L 0.0199 1	· ·			0.657	1.99	ng/L	0.0199	1	JLS 12/18/17	2128 1724946	2
Propanoic acid (PFPrOPrÅ)   Fluorotelomer sulfonate 4:2 (4:2   U   ND   ND   1.31   3.74   ng/L   0.0199   1		C	1,2	0.007	2.,,,	1.6/2	0.01	•	12/10/17	2120 172.7.0	_
FTS) Fluorotelomer sulfonate 6:2 (6:2 U ND 1.31 3.78 ng/L 0.0199 1 FTS) Fluorotelomer sulfonate 8:2 (8:2 U ND 1.31 3.82 ng/L 0.0199 1 FTS) Perfluorobutanesulfonate (PFBS) U ND 0.657 1.77 ng/L 0.0199 1 Perfluorodecanesulfonate (PFBA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorodecanesulfonate (PFDS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorodecanoic acid (PFDA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorodecanoic acid (PFDA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorodecanoic acid (PFDA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluoroheptanesulfonate (PFHpS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluoroheptanoic acid (PFHA) U ND 0.657 1.89 ng/L 0.0199 1 Perfluorohexanesulfonate (PFHpS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorohexanesulfonate (PFHxS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorohexanoic acid (PFHxA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorohexanoic acid (PFHxA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorononanoic acid (PFNS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.99 ng/L 0.0199 1	propanoic acid (PFPrOPrA)										
Fluorotelomer sulfonate 6:2 (6:2   U   ND   1.31   3.78   ng/L   0.0199   1		U	ND	1.31	3.74	ng/L	0.0199	1			
FTS) Fluorotelomer sulfonate 8:2 (8:2 U ND 1.31 3.82 ng/L 0.0199 1 FTS) Perfluorobutanesulfonate (PFBS) U ND 0.657 1.77 ng/L 0.0199 1 Perfluorobutyric acid (PFBA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorodecanesulfonate (PFDS) U ND 0.657 1.93 ng/L 0.0199 1 Perfluorodecanoic acid (PFDA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorodecanoic acid (PFDA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluoroheptanesulfonate (PFHS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluoroheptanesulfonate (PFHPS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluoroheptanoic acid (PFHA) U ND 0.657 1.89 ng/L 0.0199 1 Perfluorohexanesulfonate (PFHXS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorohexanesulfonate (PFHXS) U ND 0.657 1.81 ng/L 0.0199 1 Perfluorononanesulfonate (PFNS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.91 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.91 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.91 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.91 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.91 ng/L 0.0199 1 Perfluorononanoic acid (PFNA) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorooctanesulfonate (PFNS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorooctanesulfonate (PFNS) U ND 0.657 1.99 ng/L 0.0199 1 Perfluorooctanesulfonate (PFNS) U ND 0.657 1.99 ng/L 0.0199 1			ND	1 21	2.70	ma/I	0.0100	1			
Fluorotelomer sulfonate 8:2 (8:2 U ND   1.31   3.82   ng/L   0.0199   1	`	U	ND	1.51	3.76	ng/L	0.0199	1			
FTS)         Perfluorobutanesulfonate (PFBS)         U         ND         0.657         1.77         ng/L         0.0199         1           Perfluorobutyric acid (PFBA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorodecanesulfonate (PFDS)         U         ND         0.657         1.93         ng/L         0.0199         1           Perfluorodecanoic acid (PFDA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorododecanoic acid (PFDA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluoroheptanesulfonate (PFHpS)         U         ND         0.657         1.89         ng/L         0.0199         1           Perfluorohexanesulfonate (PFHxS)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorohexanoic acid (PFHxA)         U         ND         0.657         1.81         ng/L         0.0199         1           Perfluorohexanoic acid (PFNX)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluoroocanesulfonate (PFNS)         U <td></td> <td>U</td> <td>ND</td> <td>1.31</td> <td>3.82</td> <td>ng/L</td> <td>0.0199</td> <td>1</td> <td></td> <td></td> <td></td>		U	ND	1.31	3.82	ng/L	0.0199	1			
Perfluorobutyric acid (PFBA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorodecanesulfonate (PFDS)         U         ND         0.657         1.93         ng/L         0.0199         1           Perfluorodecanoic acid (PFDA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorodecanoic acid (PFDA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluoroheptanesulfonate (PFHpS)         U         ND         0.657         1.89         ng/L         0.0199         1           Perfluoroheptanoic acid (PFHpA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorohexanesulfonate (PFHxS)         U         ND         0.657         1.81         ng/L         0.0199         1           Perfluorononanesulfonate (PFNS)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorooctanesulfonamide         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorooctanesulfonate (PFOS)         BJ         0.829						8					
Perfluorodecanesulfonate (PFDS)         U         ND         0.657         1.93         ng/L         0.0199         1           Perfluorodecanoic acid (PFDA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorododecanoic acid (PFDoA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluoroheptanesulfonate (PFHpS)         U         ND         0.657         1.89         ng/L         0.0199         1           Perfluoroheptanoic acid (PFHpA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorohexanesulfonate (PFHxS)         U         ND         0.657         1.81         ng/L         0.0199         1           Perfluorohexanoic acid (PFHxA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorononanesulfonate (PFNS)         U         ND         0.657         1.91         ng/L         0.0199         1           Perfluorooctanesulfonamide         U         ND         0.657         1.85         ng/L         0.0199         1           Perfluorooctanesulfonate (PFOS)         BJ         0.829	Perfluorobutanesulfonate (PFBS)	U			1.77	ng/L	0.0199	1			
Perfluorodecanoic acid (PFDA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorododecanoic acid (PFDoA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluoroheptanesulfonate (PFHpS)         U         ND         0.657         1.89         ng/L         0.0199         1           Perfluoroheptanoic acid (PFHpA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorohexanesulfonate (PFHxS)         U         ND         0.657         1.81         ng/L         0.0199         1           Perfluorohexanoic acid (PFHxA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorononanesulfonate (PFNS)         U         ND         0.657         1.91         ng/L         0.0199         1           Perfluorooctanesulfonamide         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorooctanesulfonate (PFOS)         BJ         0.829         0.657         1.99         ng/L         0.0199         1	• • • • • • • • • • • • • • • • • • • •	U				_					
Perfluorododecanoic acid (PFDoA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluoroheptanesulfonate (PFHpS)         U         ND         0.657         1.89         ng/L         0.0199         1           Perfluoroheptanoic acid (PFHpA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorohexanesulfonate (PFHxS)         U         ND         0.657         1.81         ng/L         0.0199         1           Perfluorohexanoic acid (PFHxA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorononanesulfonate (PFNS)         U         ND         0.657         1.91         ng/L         0.0199         1           Perfluorooctanesulfonamide         U         ND         0.657         1.99         ng/L         0.0199         1           (PFOSA)         V         ND         0.657         1.85         ng/L         0.0199         1           Perfluorooctanesulfonate (PFOS)         BJ         0.829         0.657         1.99         ng/L         0.0199         1	` ,	U									
Perfluoroheptanesulfonate (PFHpS)         U         ND         0.657         1.89         ng/L         0.0199         1           Perfluoroheptanoic acid (PFHpA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorohexanesulfonate (PFHxS)         U         ND         0.657         1.81         ng/L         0.0199         1           Perfluorohexanoic acid (PFHxA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorononanesulfonate (PFNS)         U         ND         0.657         1.91         ng/L         0.0199         1           Perfluorooctanesulfonamide         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorooctanesulfonate (PFOS)         BJ         0.829         0.657         1.99         ng/L         0.0199         1	` ,					_					
Perfluoroheptanoic acid (PFHpA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorohexanesulfonate (PFHxS)         U         ND         0.657         1.81         ng/L         0.0199         1           Perfluorohexanoic acid (PFHxA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorononanesulfonate (PFNS)         U         ND         0.657         1.91         ng/L         0.0199         1           Perfluorooctanesulfonamide         U         ND         0.657         1.99         ng/L         0.0199         1           (PFOSA)         Perfluorooctanesulfonate (PFOS)         BJ         0.829         0.657         1.99         ng/L         0.0199         1											
Perfluorohexanesulfonate (PFHxS)         U         ND         0.657         1.81         ng/L         0.0199         1           Perfluorohexanoic acid (PFHxA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorononanesulfonate (PFNS)         U         ND         0.657         1.91         ng/L         0.0199         1           Perfluorononanoic acid (PFNA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorooctanesulfonamide         U         ND         0.657         1.85         ng/L         0.0199         1           Perfluorooctanesulfonate (PFOS)         BJ         0.829         0.657         1.99         ng/L         0.0199         1						_					
Perfluorohexanoic acid (PFHxA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorononanesulfonate (PFNS)         U         ND         0.657         1.91         ng/L         0.0199         1           Perfluorononanoic acid (PFNA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorooctanesulfonamide         U         ND         0.657         1.85         ng/L         0.0199         1           (PFOSA)         Perfluorooctanesulfonate (PFOS)         BJ         0.829         0.657         1.99         ng/L         0.0199         1											
Perfluorononanesulfonate (PFNS)         U         ND         0.657         1.91         ng/L         0.0199         1           Perfluorononanoic acid (PFNA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorooctanesulfonamide         U         ND         0.657         1.85         ng/L         0.0199         1           (PFOSA)         Perfluorooctanesulfonate (PFOS)         BJ         0.829         0.657         1.99         ng/L         0.0199         1	` ,										
Perfluorononanoic acid (PFNA)         U         ND         0.657         1.99         ng/L         0.0199         1           Perfluorooctanesulfonamide         U         ND         0.657         1.85         ng/L         0.0199         1           (PFOSA)           Perfluorooctanesulfonate (PFOS)         BJ         0.829         0.657         1.99         ng/L         0.0199         1	,										
Perfluorooctanesulfonamide         U         ND         0.657         1.85         ng/L         0.0199         1           (PFOSA)         Perfluorooctanesulfonate (PFOS)         BJ         0.829         0.657         1.99         ng/L         0.0199         1						-					
(PFOSA)         Perfluorooctanesulfonate (PFOS)       BJ       0.829       0.657       1.99       ng/L       0.0199       1						_					
Perfluorooctanesulfonate (PFOS) BJ 0.829 0.657 1.99 ng/L 0.0199 1		U	ND	0.657	1.85	ng/L	0.0199	1			
Perfluorooctanoic acid (PFOA) U ND 0.657 1.99 ng/L 0.0199 1		$_{\mathrm{BJ}}$	0.829	0.657	1.99	ng/L	0.0199	1			
	Perfluorooctanoic acid (PFOA)	U	ND	0.657	1.99	ng/L	0.0199	1			

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# **Certificate of Analysis**

Report Date: December 21, 2017

Company: H2GO Brunswick Regional Water & Sewer

Address: 516 Village Road, NE

Leland, North Carolina 28451

Contact: Bob Walker Project: Sample Analysis

Client Sample ID: GST/BPS Project: H2GO00117 Sample ID: 439610003 Client ID: H2GO001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF A	Analyst Date	Time Batch	Method
LCMSMS PFCs										
PFOA, PFOS by LC-MS	S/MS "As Re	eceived"								
Perfluoropentanesulfonate (PF	FPeS) U	ND	0.657	1.87	ng/L	0.0199	1			
Perfluoropentanoic acid (PFPe	eA) U	ND	0.657	1.99	ng/L	0.0199	1			
Perfluorotetradecanoic acid	U	ND	0.657	1.99	ng/L	0.0199	1			
(PFTeDA)										
Perfluorotridecanoic acid (PF)	ΓrDA) U	ND	0.657	1.99	ng/L	0.0199	1			
Perfluoroundecanoic acid (PF	UdA) U	ND	0.657	1.99	ng/L	0.0199	1			
The following Prep Met	hods were pe	erformed:								
Method	Description	1		Analyst	Date	-	Гіте	Prep Batch		
EPA 537	PFCs Extracti	on in Drinking Water		GXC1	12/08/17		1200	1724945		

### The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 537	
2	EPA 537	

#### **Notes:**

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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# **Certificate of Analysis**

Report Date: December 21, 2017

Company: H2GO Brunswick Regional Water & Sewer

Address: 516 Village Road, NE

Leland, North Carolina 28451

Contact: Bob Walker Project: Sample Analysis

Collector:

Client Sample ID: GST/BPS Project: H2GO00117 Sample ID: 439610004 Client ID: H2GO001

Matrix: Drinking Water (Potable)
Collect Date: 29-NOV-17 14:10
Receive Date: 08-DEC-17

Client

Parameter Qualifier DL RL Units PF Result DF Analyst Date Time Batch Method LCMSMS PFCs NC 6 PFCs by LC-MS/MS "As Received" Nafion Byproduct 1 X 0.779 ng/L 0.021 1 JLS 12/18/17 2143 1724946 1 Nafion Byproduct 2 0.021 X 3.73 ng/L 1 Perfluoro(3,5,7,9-tetraoxadecanoic) X 1.44 0.021 1 ng/L acid (PFO4DA) 0.021 1 Perfluoro(3,5,7-trioxaoctanoic) acid X 4.41 ng/L (PFO3OA) Perfluoro(3,5-dioxahexanoic) acid X 13.9 ng/L 0.021 1 (PFO2HxA) Perfluoro-2-methoxyacetic acid X 0.489 ng/L 0.021 1 (PFMOAA) Perfluoro-3-methoxypropanoic acid X 10.3 ng/L 0.021 1 (PFMOPrA) Perfluoro-4-methoxybutanic acid X 27.1 0.021 1 ng/L (PFMOBA) PFOA, PFOS by LC-MS/MS "As Received" 2,3,3,3-Tetrafluoro-2-49.0 0.694 2.10 ng/L 0.021 1 JLS 12/18/17 2143 1724946 (1,1,2,2,3,3,3-heptafluoropropoxy)propanoic acid (PFPrOPrA) Fluorotelomer sulfonate 6:2 (6:2 U ND 1.39 4.00 ng/L 0.021 1 FTS) Fluorotelomer sulfonate 8:2 (8:2 U ND 1.39 4.04 ng/L 0.021 1 FTS) ng/L Perfluorobutanesulfonate (PFBS) 5.05 0.694 1.87 0.021 1 Perfluorobutyric acid (PFBA) 24.3 0.694 2.10 ng/L 0.021 1 Perfluorodecanesulfonate (PFDS) U ND 0.694 2.04 ng/L 0.021 1 Perfluorodecanoic acid (PFDA) 1.46 0.694 2.10 ng/L 0.021 1 Perfluorododecanoic acid (PFDoA) U ND 0.694 2.10 ng/L 0.021 1 2.00 Perfluoroheptanesulfonate (PFHpS) U ND 0.694 ng/L 0.021 1 Perfluoroheptanoic acid (PFHpA) 2.10 ng/L0.021 30.0 0.694 1 Perfluorohexanesulfonate (PFHxS) 0.694 1.91 ng/L0.021 5.39 1 Perfluorohexanoic acid (PFHxA) 61.6 0.694 2.10 ng/L 0.021 Perfluorononanesulfonate (PFNS) U ND 0.694 2.02 ng/L 0.021 1 Perfluorononanoic acid (PFNA) 2.30 0.694 2.10 ng/L 0.021 1 Perfluorooctanesulfonamide 0.021 U ND 0.694 1.96 ng/L 1 (PFOSA) Perfluorooctanesulfonate (PFOS) В 7.39 0.694 2.10 ng/L 0.021 1 ng/L Perfluorooctanoic acid (PFOA) 13.5 0.694 2.10 0.021 1 0.948 0.694 Perfluoropentanesulfonate (PFPeS) 1.98 ng/L 0.021 1 Perfluoropentanoic acid (PFPeA) 69.4 0.694 2.10 ng/L 0.021

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**Certificate of Analysis** 

Report Date: December 21, 2017

Company: H2GO Brunswick Regional Water & Sewer

Address: 516 Village Road, NE

Leland, North Carolina 28451

Contact: Bob Walker Project: Sample Analysis

Client Sample ID: GST/BPS Project: H2GO00117 Sample ID: 439610004 Client ID: H2GO001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analy	st Date	Time	e Batch	Method
LCMSMS PFCs												
PFOA, PFOS by LC-M	IS/MS "As Re	eceived"										
Perfluorotetradecanoic acid (PFTeDA)	U	ND	0.694	2.10	ng/L	0.021	1					
Perfluorotridecanoic acid (Pl	FTrDA) U	ND	0.694	2.10	ng/L	0.021	1					
Perfluoroundecanoic acid (P.	FUdA) U	ND	0.694	2.10	ng/L	0.021	1					
Fluorotelomer sulfonate 4:2 FTS)	(4:2 U	ND	6.94	19.8	ng/L	0.021	5	JLS	12/19/17	1049	1724946	3
Semi-Volatile-GC/MS												
EPA 522 1,4-Dioxane	in Liquid "As	Received"										
1,4-Dioxane	_	5.72			ug/L	0.020	1	JMB3	12/13/17	0637	1723304	4
The following Prep Me	ethods were p	erformed:										
Method	Descriptio	n		Analyst	Date	ı	Tim	e Pr	ep Batch			
EPA 522	EPA 522 Pre	p 1,4-Dioxane		SJ	12/12/17		1000	17	23303			
EPA 537	PFCs Extract	ion in Drinking Water		GXC1	12/08/17		1200	17	24945			
The fellowing Ameleti	1 M-411											

### The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 537	·
2	EPA 537	
3	EPA 537	
4	EPA 522	
Surrogate/Trace	r Recovery Test	Result Nominal Recovery% Accentable Limits

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,4-Dioxane-d8	EPA 522 1,4-Dioxane in Liquid "As Received"	3.98 ug/L	4.00	100	(70%-130%)

### **Notes:**

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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# **QC Summary**

Report Date: December 21, 2017

Page 1 of 7

H2GO Brunswick Regional Water & Sewer

516 Village Road, NE Leland, North Carolina

Contact: Bob Walker

Workorder: 439610

Parmname	NOM	Sample Qual	QC	Units	RPD% REC	% Range	Anlst	Date	Time
Perfluorinated Compounds Batch 1724946 ————									
QC1203935165 LCS 2,3,3,3-Tetrafluoro-2- (1,1,2,2,3,3,3- heptafluoropropoxy)-propanoic	19.9		19.8	ng/L	100	) (70%-130%	ó) JLS	12/18/1	7 20:27
acid (PFPrOPrA) Fluorotelomer sulfonate 4:2 (4:2 FTS)	18.6		20.0	ng/L	108	3 (70%-130%	ó)		
Fluorotelomer sulfonate 6:2 (6:2 FTS)	18.9		21.0	ng/L	11	1 (70%-130%	ó)		
Fluorotelomer sulfonate 8:2 (8:2 FTS)	19.1		21.9	ng/L	11:	5 (70%-130%	ó)		
Perfluorobutanesulfonate (PFBS)	17.6		18.2	ng/L	103	3 (70%-130%	ó)		
Perfluorobutyric acid (PFBA)	19.9		23.6	ng/L	119	9 (70%-130%	ó)		
Perfluorodecanesulfonate (PFDS)	19.2		16.6	ng/L	8′	7 (70%-130%	ó)		
Perfluorodecanoic acid (PFDA)	19.9		24.0	ng/L	12	1 (70%-130%	ó)		
Perfluorododecanoic acid (PFDoA)	19.9		21.0	ng/L	100	5 (70%-130%	ó)		
Perfluoroheptanesulfonate (PFHpS)	18.9		18.9	ng/L	100	) (70%-130%	<b>6</b> )		
Perfluoroheptanoic acid (PFHpA)	19.9		21.9	ng/L	110	) (70%-130%	ó)		
Perfluorohexanesulfonate (PFHxS)	19.9		24.1	ng/L	12	1 (70%-130%	<b>6</b> )		
Perfluorohexanoic acid (PFHxA)	19.9		23.9	ng/L	120	) (70%-130%	ó)		

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# **QC Summary**

Workorder: 439610 Page 2 of 7 QC **Parmname NOM** Sample Qual Units RPD% REC% Range Anlst Date Time **Perfluorinated Compounds** 1724946 Batch Perfluorononanesulfonate (PFNS) 19.1 18.9 ng/L 99 (70% - 130%)JLS 12/18/17 20:27 Perfluorononanoic acid (PFNA) 19.9 23.1 ng/L 116 (70%-130%) Perfluorooctanesulfonamide 18.4 20.4 ng/L 111 (70% - 130%)(PFOSA) 19.9 В 18.8 Perfluorooctanesulfonate (PFOS) ng/L 95 (70% - 130%)Perfluorooctanoic acid (PFOA) 19.9 22.0 ng/L 111 (70%-130%) Perfluoropentanesulfonate (PFPeS) 19.9 24.5 124 ng/L (70%-130%) 25.0 Perfluoropentanoic acid (PFPeA) 19.9 ng/L 126 (70% - 130%)22.5 Perfluorotetradecanoic acid 19.9 114 ng/L (70%-130%) (PFTeDA) Perfluorotridecanoic acid 19.9 20.5 103 ng/L (70%-130%) (PFTrDA) Perfluoroundecanoic acid (PFUdA) 19.9 21.4 (70%-130%) ng/L 108 QC1203935166 LCSD 2,3,3,3-Tetrafluoro-2-19.8 22.1 11 112 12/18/17 20:42 ng/L (0%-30%)(1,1,2,2,3,3,3heptafluoropropoxy)-propanoic acid (PFPrOPrA) 21.2 Fluorotelomer sulfonate 4:2 (4:2 18.5 ng/L 6 115 (0%-30%)FTS) Fluorotelomer sulfonate 6:2 (6:2 18.8 19.7 6 105 ng/L (0%-30%)Fluorotelomer sulfonate 8:2 (8:2 19.0 25.2 14 132\* ng/L (0%-30%)FTS) 17.5 Perfluorobutanesulfonate (PFBS) 19.4 ng/L 7 111 (0%-30%)

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# **QC Summary**

Workorder: 439610 Page 3 of 7 QC **Parmname** NOM Sample Qual Units RPD% REC% Range Anlst Date Time **Perfluorinated Compounds** 1724946 Batch Perfluorobutyric acid (PFBA) 19.8 23.6 ng/L 0 119 (0%-30%)JLS 12/18/17 20:42 Perfluorodecanesulfonate (PFDS) 19.1 20.2 ng/L 20 106 (0%-30%)ng/L Perfluorodecanoic acid (PFDA) 19.8 21.9 9 111 (0%-30%)19.8 23.3 Perfluorododecanoic acid (PFDoA) ng/L 11 118 (0%-30%)Perfluoroheptanesulfonate (PFHpS) 18.8 21.1 ng/L 11 112 (0%-30%)Perfluoroheptanoic acid (PFHpA) 19.8 20.8 5 105 ng/L (0%-30%)Perfluorohexanesulfonate (PFHxS) 19.8 23.4 3 ng/L 118 (0%-30%)Perfluorohexanoic acid (PFHxA) 19.8 24.8 4 125 (0%-30%)ng/L Perfluorononanesulfonate (PFNS) 19.0 19.8 5 104 ng/L (0%-30%)Perfluorononanoic acid (PFNA) 19.8 20.8 10 105 ng/L (0%-30%)22.8 Perfluorooctanesulfonamide 18.3 ng/L 11 125 (0%-30%)(PFOSA) Perfluorooctanesulfonate (PFOS) 19.8 В 21.2 ng/L 12 107 (0%-30%)Perfluorooctanoic acid (PFOA) 19.8 25.3 ng/L 14 128 (0%-30%)Perfluoropentanesulfonate (PFPeS) 19.8 22.7 ng/L 8 114 (0%-30%)Perfluoropentanoic acid (PFPeA) 19.8 21.7 14 109 (0%-30%)ng/L

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# **QC Summary**

Workorder: 439610 Page 4 of 7 QC **Parmname** NOM Sample Qual Units RPD% REC% Range Anlst Date Time **Perfluorinated Compounds** 1724946 Batch Perfluorotetradecanoic acid 19.8 19.5 ng/L 14 99 (0%-30%)JLS 12/18/17 20:42 (PFTeDA) Perfluorotridecanoic acid 19.8 20.5 ng/L 0 104 (0%-30%)(PFTrDA) Perfluoroundecanoic acid (PFUdA) 19.8 24.3 ng/L 12 123 (0%-30%)QC1203935164 MB U 2.3.3.3-Tetrafluoro-2-ND ng/L 12/18/17 20:11 (1,1,2,2,3,3,3heptafluoropropoxy)-propanoic acid (PFPrOPrA) U Fluorotelomer sulfonate 4:2 (4:2 ND ng/L FTS) Fluorotelomer sulfonate 6:2 (6:2 U ND ng/L FTS) U ND Fluorotelomer sulfonate 8:2 (8:2 ng/L FTS) Nafion Byproduct 1 UX ND ng/L UX ND Nafion Byproduct 2 ng/L Perfluoro(3,5,7,9-tetraoxadecanoic) UX ND ng/L acid (PFO4DA) Perfluoro(3,5,7-trioxaoctanoic) UX ND ng/L acid (PFO3OA) UX ND Perfluoro(3,5-dioxahexanoic) acid ng/L (PFO2HxA) UX ND Perfluoro-2-methoxyacetic acid ng/L (PFMOAA) Perfluoro-3-methoxypropanoic UX ND ng/L acid (PFMOPrA) UX ND Perfluoro-4-methoxybutanic acid ng/L (PFMOBA)

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# **QC Summary**

439610 Page 5 of 7 NOM QC RPD% REC% **Parmname** Sample Qual Units Range Anlst Date Time **Perfluorinated Compounds** 1724946 Batch Perfluorobutanesulfonate (PFBS) U ND ng/L JLS 12/18/17 20:11 U ND Perfluorobutyric acid (PFBA) ng/L Perfluorodecanesulfonate (PFDS) U ND ng/L U ND Perfluorodecanoic acid (PFDA) ng/L U ND Perfluorododecanoic acid (PFDoA) ng/L U ND Perfluoroheptanesulfonate (PFHpS) ng/L Perfluoroheptanoic acid (PFHpA) U ND ng/L U ND Perfluorohexanesulfonate (PFHxS) ng/L U ND Perfluorohexanoic acid (PFHxA) ng/L Perfluorononanesulfonate (PFNS) U ND ng/L U ND Perfluorononanoic acid (PFNA) ng/L Perfluorooctanesulfonamide U ND ng/L (PFOSA) 0.963 Perfluorooctanesulfonate (PFOS) J ng/L Perfluorooctanoic acid (PFOA) U ND ng/L U Perfluoropentanesulfonate (PFPeS) ND ng/L

Workorder:

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# **QC Summary**

		<u>QC bu</u>	mma	<u>.y</u>					
Workorder: 439610									Page 6 of 7
Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
<b>Perfluorinated Compounds</b> Batch 1724946									
Perfluoropentanoic acid (PFPeA)		U	ND	ng/L				JLS	12/18/17 20:11
Perfluorotetradecanoic acid (PFTeDA)		U	ND	ng/L					
Perfluorotridecanoic acid (PFTrDA)		U	ND	ng/L					
Perfluoroundecanoic acid (PFUdA)		U	ND	ng/L					
Semi-Volatile-GC/MS Batch 1723304									
QC1203930892 LCS 1,4-Dioxane	4.00		3.85	ug/L		96	(70%-130%)	) JMB3	12/12/17 15:50
**1,4-Dioxane-d8	4.00		4.09	ug/L		102	(70%-130%)	)	
QC1203930891 MB 1,4-Dioxane		U	ND	ug/L					12/12/17 15:23
**1,4-Dioxane-d8	4.00		3.48	ug/L		87	(70%-130%)	)	
QC1203930893 438687001 MS 1,4-Dioxane	4.00	41.8	53.5	ug/L		N/A	(70%-130%)	)	12/13/17 09:00
**1,4-Dioxane-d8	4.00	4.50	5.14	ug/L		129	(70%-130%)	)	
QC1203930894 438687001 MSD 1,4-Dioxane	4.00	41.8	52.0	ug/L	3	N/A	(0%-30%)	)	12/13/17 09:26
**1,4-Dioxane-d8	4.00	4.50	5.05	ug/L		126	(70%-130%)	)	

### **Notes:**

The Qualifiers in this report are defined as follows:

\*\* Analyte is a surrogate compound

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# **QC Summary**

439610 Page 7 of 7 Parmname **NOM** Sample Qual OC Units RPD% REC% Range Anlst Date Time

- < Result is less than value reported
- Result is greater than value reported >
- Α The TIC is a suspected aldol-condensation product
- В The target analyte was detected in the associated blank.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- Е Concentration of the target analyte exceeds the instrument calibration range
- Η Analytical holding time was exceeded
- J Value is estimated

Workorder:

- JNX Non Calibrated Compound
- Organics--Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based N on nearest internal standard response factor
- Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest N internal standard response factor
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Р Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, the difference is >70%.
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- UJ Compound cannot be extracted
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Λ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
- h Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

- ^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
- \* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

### Technical Case Narrative H2GO Brunswick Regional Water & Sewer (H2GO) SDG #: 439610

## **GC/MS Semivolatile**

**Product:** Analysis of 1,4-Dioxane in Drinking Water by Solid Phase Extraction (SPE) and Gas

**Chromatography/Mass Spectrometry** 

**Analytical Method:** EPA 522

Analytical Procedure: GL-OA-E-073 REV# 2 Analytical Batches: 1723304 and 1723303

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
439610002	GST/BPS
439610004	GST/BPS
1203930891	Method Blank (MB)
1203930892	Laboratory Control Sample (LCS)
1203930893	438687001(NonSDG) Matrix Spike (MS)
1203930894	438687001(NonSDG) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Technical Information**

#### **Sample Dilutions**

Samples 1203930893 (Non SDG 438687001MS) and 1203930894 (Non SDG 438687001MSD) were diluted due to the presence of one or more over-range target analytes.

### **Miscellaneous Information**

#### **Manual Integrations**

Samples (See Below) required manual integration in order to properly identify one or more peaks and/or to correctly position the baseline as set in the calibration standard injections.

Sample	Analyte	Value
1203930893 (Non SDG 438687001MS)	Tetrahydrofuran-d8	Result 100ug/L
1203930894 (Non SDG 438687001MSD)	Tetrahydrofuran-d8	Result 100ug/L
439610002 (GST/BPS)	Tetrahydrofuran-d8	Result 10ug/L

### **LCMSMS-Misc**

**Product:** The Extraction and Analysis of Per and Polyfluroalkyl Substances Using LCMSMS

**Analytical Method:** EPA 537

Analytical Procedure: GL-OA-E-076 REV# 4
Analytical Batches: 1724946 and 1724945

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
439610001	GST/BPS
439610002	GST/BPS
439610003	GST/BPS
439610004	GST/BPS
1203935164	Method Blank (MB)
1203935165	Laboratory Control Sample (LCS)
1203935166	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Quality Control (QC) Information**

#### **Surrogate Recoveries**

Not all surrogate recoveries were within acceptable limits for the following sample. The sample was diluted to due to matrix interference. As a result, the surrogates fell outside of the acepptance range. 439610004 (GST/BPS).

#### Laboratory Control Sample (LCS) Recovery

The LCS and/or LCSD 1203935166 (LCSD) did not meet the spike recovery acceptance limits with a positive bias. As target analytes were not detected in the associated samples, the data were not adversely impacted.

### **Internal Standard (ISTD) Acceptance**

The internal standard associated with Fluorotelomer Sulfonate 4:2 (4:2 FTS) and /or Fluorotelomer Sulfonate 6:2 (6:2 FTS) recovered outside of the acceptance criteria for the samples listed below. The samples were reanalyzed re-analyzed at a dilution to minimize the effects. The diluted results were reported. 439610002 (GST/BPS) and 439610004 (GST/BPS).

#### **Technical Information**

### **Holding Time Specifications**

Not all samples in this SDG met the specified holding time requirements. The following samples were received by the laboratory after the recommended holding time had expired. 439610001 (GST/BPS) and 439610002 (GST/BPS).

#### **Sample Dilutions**

The following samples and/or QC were diluted due to matrix interference. 439610002 (GST/BPS) and 439610004 (GST/BPS).

Austra	439	610
Analyte	002	004

Fluorotelomer sulfonate 4:2 (4:2 FTS)	5X	5X
Fluorotelomer sulfonate 6:2 (6:2 FTS)	5X	1X

### **Miscellaneous Information**

### **Additional Comments**

Results reported with the X qualifier are estimated concentrations and were obtained the GenX calibration curve because authentic standards are not available at this time.

### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Project #: #260	GEL Chain of		CIS	Custody and Analytical Request	A bu	2 7 7				tun U	GEL 2040	GEL Laboratories, LLC	, LLC		
GEL Quote #:				! •• <b>6</b>		9		; (		) ]	Char	Charleston, SC 29407	407		
COC Number '': GEL Wo	GEL Work Order Number:	ber:		2	12961	10	0				Phon Fax	Phone: (843) 556-8171 Fax: (843) 766-1178	8171		
Client Name: $HZ6O$		Phone #:				S	ample	Analys	is Requ	Sample Analysis Requested (5)	Fill in th	e number of	container	(Fill in the number of containers for each test)	
Project/Site Name:		Fax #:			Should this		S,'	np	-					< Preservative Type (6)	(9)
Address: P.D. Box 2230, Leland, 1	NC 28451				sample be considered:		774	+	מעם						
Collected by: BGF; FF41.	Send Results To: BWalker	(ker				T	9+ net 01	14	X01					Comments Note: extra sample is	. <u>s</u> .
Sample ID * For composites - indicate start and stop date/time	*Date Collected (mm-dd-yy)	•Time Collected (Military)	QC Code	Field Sample Filtered (3) Matrix (4)	F S S S S S S S S S S S S S S S S S S S	ISCA Regula	Total num	Noi Fal	a->		<del></del>		No and the Control of	required for sample specific QC	<u> </u>
GST/BPS	112217		178	36 2	<del> </del>	<del> </del>	7		1		-				T
GST/BPS	112217	1330	マ	2 P	-	-	7	2					ļ		
05t/BPS	112219	1330	2	WG N					2						
657/885	112917		7.8	WE N				Ž							
651/885	115711	0/1/	マ	300		-	7	1	_						
CST/1885	112917	0//	7	300					5				<u> </u>		
									<u> </u>						
						-									T
						<u> </u>			<u> </u>						T
															T
TAT Requested: Normal: Rush: Specify:	(Subject to Surcharge)	e) Fax Results:	ılts:	Yes /	No.		Circle Deliverable: C of A	eliverab	le: C of		/ QC Summary	/ Level 1	/ Level 2	Level 1 / Level 2 / Level 3 / Level 4	4
<b>Remarks:</b> Are there any known hazards applicable to these samples? If so, please list the hazards	o these samples?	If so, plea.	se list ti	ıe hazards								Sample Co Eastern Central	e Collection rn Pa ral Or	Sample Collection Time Zone Eastern Pacific Central Other Mountain	
	dy Signatures								Sa	ımple Shi	pping an	Sample Shipping and Delivery Details	Details		T
. Relinquished By (Signed) Date Time	Received by (signed)	Da	te	Time		GEL PM:	Į:								T
1 Bab helpe 120717 1540			25	126/179:05		lethod of	Method of Shipment:	ıt			Date	Date Shipped:			
2	7				Y	Airbill #:									
3	<u>,</u>				_ ₹	Airbill #:					-				
1.) Chain of Custody Number = Client Determined 2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite	3 = Equipment Blank, M.	S = Matrix Spik	e Sample, A	4SD = Matrix S	pike Duplicat	e Sample,	G = Grab,	C = Com	posite				For La	For Lab Receiving Use Only	
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.	as field filtered or - N - fo	or sample was n	ot field filte	red.								<u>L</u>	Cu	Custedy Seal Intact?	T

WHITE = LABORATORY

YELLOW = FILE

4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Water, W=Water, SO=Soil, SD=Sediment, SL=Sludge, SS=Soild Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

PINK = CLIENT

Custody Seal Intact?
(YES) NO Gooleg Temp:

6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hxane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: H260			SD	G/AR/COC/Work Order:
Received By: ZKW			Т	te Received: 12/8/17
Carrier and Tracking Number				Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other  4158 S142 1480
Suspected Hazard Information	Yes	ž	*If	Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further estigation.
Shipped as a DOT Hazardous?		V		ard Class Shipped: UN#:
COC/Samples marked or classified as radioactive?		-	Clas	kimum Net Counts Observed* (Observed Counts - Area Background Counts): CPM/ mR/Hr ssified as: Rad 1 Rad 2 Rad 3
Is package, COC, and/or Samples marked HAZ?		~	If ye	es, select Hazards below, and contact the GEL Safety Group. 3's Flammable Foreign Soil RCRA Asbestos Beryllium Other:
Sample Receipt Criteria	Yes	NA	o <sub>N</sub>	Comments/Qualifiers (Required for Non-Conforming Items)
Shipping containers received intact and sealed?	V			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
Chain of custody documents included with shipment?	<u>~</u>			
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*				Preservation Method: Wet Co Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP:
Daily check performed and passed on IR temperature gun?	J			Temperature Device Serial #: IR3-16 Secondary Temperature Device Serial # (If Applicable):
5 Sample containers intact and sealed?				Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?		1	·	Sample ID's and Containers Affected:  If Preservation added, Lot#:
7 Do any samples require Volatile Analysis?				If Yes, Are Encores or Soil Kits present? YesNo (If yes, take to VOA Freezer)  Do VOA vials contain acid preservation? YesNoN/A (If unknown, select No)  YOA vials free of headspace? YesNoN/A  Sample ID's and containers affected:
8 Samples received within holding time?	7		1	D's and tests affected:
Sample ID's on COC match ID's on bottles?	7		Ī	Sample ID's and containers affected:
Date & time on COC match date & time on bottles?	1		2	Sample ID's affected:
number indicated on COC?	7		S	ample ID's affected:
GEL provided?				
3 COC form is properly signed in relinquished/received sections?	4			
omments (Use Continuation Form if needed):				
PM (or PMA) review:	Ymiel		'n	0817 pm 12/11/12 pm

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GL-CHL-SR-001 Rev 5

List of current GEL Certifications as of 21 December 2017

State	Certification					
Alaska	UST-0110					
Arkansas	88-0651					
CLIA	42D0904046					
California	2940					
Colorado	SC00012					
Connecticut	PH-0169					
Delaware	SC00012					
DoD ELAP/ ISO17025 A2LA	2567.01					
Florida NELAP	E87156					
Foreign Soils Permit	P330-15-00283, P330-15-00253					
Georgia	SC00012					
Georgia SDWA	967					
Hawaii	SC00012					
Idaho Chemistry	SC00012					
Idaho Radiochemistry	SC00012					
Illinois NELAP	200029					
Indiana	C-SC-01					
Kansas NELAP	E-10332					
Kentucky SDWA	90129					
Kentucky Wastewater	90129					
Louisiana NELAP	03046 (AI33904)					
Louisiana SDWA	LA170010					
Maryland	270					
Massachusetts	M-SC012					
Michigan	9976					
Mississippi	SC00012					
Nebraska	NE-OS-26-13					
Nevada	SC000122018-1					
New Hampshire NELAP	205415					
New Jersey NELAP	SC002					
New Mexico	SC00012					
New York NELAP	11501					
North Carolina	233					
North Carolina SDWA	45709					
North Dakota	R-158					
Oklahoma	9904					
Pennsylvania NELAP	68-00485					
Puerto Rico	SC00012					
S.Carolina Radchem	10120002					
South Carolina Chemistry	10120001					
Tennessee	TN 02934					
Texas NELAP	T104704235-17-12					
Utah NELAP	SC000122017-25					
Vermont	VT87156					
Virginia NELAP	460202					
Washington	C780					
West Virginia	997404					