

Report Prepared for:

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Pace Analytical Grand Rapids
5560 Corporate Exchange Court
Grand Rapids MI 49512

**REPORT OF
LABORATORY
ANALYSIS
FOR PFAAs**

Report Prepared Date:

March 29, 2018

Report Information:

Pace Project #: 10424502
Sample Receipt Date: 03/22/2018
Client Project #: 469681 Fleis & Vanderbrink
Client Sub PO #: N/A
State Cert #: 9909

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 PFAA Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Megan McCabe, your Pace Project Manager.

This report has been reviewed by:



March 29, 2018

Megan McCabe, Project Manager
612-607-6429
(612) 607-6444 (fax)
megan.mccabe@pacelabs.com



Report of Laboratory Analysis

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The results relate only to the samples included in this report.

DISCUSSION

This report presents the results from the analyses performed on three of six samples and a duplicate sample submitted by a representative of Pace Analytical-Grand Rapids. The samples were analyzed for the presence or absence of twenty-one perfluorinated compounds using a modified version of USEPA Method 537. Reporting limits were set to the quantitation limits. The field blanks were not provided with this sample set since the analytes were not detected in the water samples.

The recoveries of the isotopically-labeled surrogate standards in the sample extracts ranged from 94-125%. All of the labeled surrogate standard recoveries obtained for this project were within the target ranges specified in the method.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of the target perfluorinated compounds at the reporting limits. This indicates that the sample processing procedures did not significantly contribute to the analyte content determined for the sample material.

Laboratory spike samples were also prepared with the sample batch using clean reference matrix that had been fortified with native standards. The results show that the spiked native compounds in the laboratory spikes were recovered at 73-119%, with relative percent differences of 0-10%. These results were within the method limits. A third lab spike was analyzed and included in the above summary.

It should be noted that Pace Analytical has not yet completed the certification process for this method. Therefore, the results have been marked "N2" as qualified.

Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	CERT0092
Alaska	MN00064	Nebraska	NE-OS-18-06
Alaska	UST-078	Nevada	MN00064
Arizona	AZ0014	New Jersey (NE	MN002
Arkansas	88-0680	New York (NEL	11647
CNMI Saipan	MP0003	New hampshire	2081
California	MN00064	North Carolina	27700
Colorado	MN00064	North Carolina	530
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-L	Ohio	41244
Florida (NELAP	E87605	Ohio VAP	CL101
Georgia (EDP)	959	Oklahoma	9507
Guam EPA	959	Oregon (ELAP)	MN200001
Hawaii	MN00064	Oregon (OREL	MN300001
Idaho	MN00064	Pennsylvania	68-00563
Illinois	200011	Puerto Rico	MN00064
Indiana	C-MN-01	South Carolina	74003001
Iowa	368	Tennessee	TN02818
Kansas	E-10167	Texas	T104704192
Kentucky	90062	Utah (NELAP)	MN00064
Louisiana	03086	Virginia	460163
Louisiana	MN00064	Washington	C486
Maine	MN00064	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-L

REPORT OF LABORATORY ANALYSIS

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Report No.....10424503

Appendix A

Sample Management

Sample Condition Upon Receipt
 Client Name: PASI-MI
 Project #: _____
 Courier: Fed Ex UPS USPS Client
 Commercial Pace SpeeDee Other: _____
 Tracking Number: 4272-1336-9508

WO#: 10424502
 PM: MEM1 Due Date: 03/29/18
 CLIENT: PASI-MI

Custody Seal on Cooler/Box Present? Yes No Seals Intact? Yes No
 Optional: Proj. Due Date: _____ Proj. Name: _____

Packing Material: Bubble Wrap Bubble Bags None Other: _____ Temp Blank? Yes No

Thermometer 151401163 G87A9155100842
 Used: G87A9155100842 Type of ice: Wet Blue None Dry Melted

Cooler Temp Read (°C): 0.8 Cooler Temp Corrected (°C): 1.0 Biological Tissue Frozen? Yes No N/A
 Temp should be above freezing to 6°C Correction Factor: +0.2 Date and Initials of Person Examining Contents: 3-22-18 SDD

USDA Regulated Soil (N/A, water sample)
 Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? Yes No
 Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? Yes No
 If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
-Pace Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO ₃ <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> NaOH Positive for Res. Chlorine? Y N
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , <2pH, NaOH >9 Sulfide, NaOH >12 Cyanide) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

CLIENT NOTIFICATION/RESOLUTION
 Person Contacted: _____ Date/Time: _____
 Comments/Resolution: _____
 Field Data Required? Yes No

Project Manager Review: Megan McCalve Date: 3/23/18
 Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

WO#: 469681



469681

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

P728 LI

Section C
Invoice Information:

Company: Pace Environmental Engineering
Address: 2460 Levee Dr. SE
Email To: paul@paceenv.com
Phone: 231-219-1656 Fax: [blank]
Requested Date: 03/14/18
Project Name: City of Allegan
Project Number: Standard

Client Information:
Client Name: Brian Rice (brian@paceenv.com)
Client Address: 2460 Levee Dr. SE
Client City: Allegan
Client State: MI

Company Name: Pace Environmental Engineering
Address: 2460 Levee Dr. SE
City: Allegan
State: MI

Regulatory Agency: [blank]
NPDES: GROUND WATER DRINKING WATER
UST: RCRA: OTHER:

Site Location: [blank]
STATE: MI

Page: [blank] of [blank]
Invoice Number: 2178688

ITEM #	Matrix Codes MATRIX CODE Drinking Water DW Water WT Waste Water WW Product P Soil/Solid SL Oil ON Wipe WIP Air AIR Tissue TS Other OT	SAMPLE ID (4-2, 0-9, /,) Sample ID MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ S ₂ O ₈ Methanol Other	Y/N	Requested Analysis Filtered (Y/N)	Pace Project No./ Lab I.D.
					COMPOSITE START	COMPOSITE ENDING						
1		PW # 2	DW G	G	02/16/18	13:45		2				
2		FB-13:47	DW G	G	03/14/18	13:47		1				
3		PW # 1	DW G	G	3/14/18	14:05		2				
4		FB-14:07	DW G	G	3/14/18	14:07		1				
5		PW # 5	DW G	G	3/14/18	14:35		2				
6		FB-14:37	DW G	G	3/14/18	14:37		1				
7												
8												
9												
10												
11												
12												

Additional Comments: Hold field blanks until it's determined if corresponding well samples have impacts - do not exceed hold times

DELIVERED BY/AFFILIATION: [blank] DATE: 03/14/18 TIME: 15:22

ACCEPTED BY/AFFILIATION: [blank] DATE: 03/14/18 TIME: 15:22

Temp in °C: [blank]
Received on: [blank]
Sealed Cooler (Y/N): [blank]
Custom Cooler (Y/N): [blank]
Samples Intact (Y/N): [blank]

SAMPLER NAME AND SIGNATURE: [blank]
PRINT Name of SAMPLER: [blank]
SIGNATURE of SAMPLER: [blank]
DATE Signed (MM/DD/YYYY): 03/14/18

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

ORIGINAL

SAMPLE RECEIVING / LOG-IN CHECKLIST

Pace Analytical

Client FV-City of Allegan	Work Order #: 469681
Receipt Record Page/Line # 149-12	New / Add To Project Chemist Sample #s

Recorded by (initials/date) AW 03/19/18	Cooler <input checked="" type="checkbox"/> Cooler <input type="checkbox"/> Box <input type="checkbox"/> Other	City Received 1	Thermometer Used <input checked="" type="checkbox"/> IR Gun (#202) <input type="checkbox"/> Digital Thermometer (#54) <input type="checkbox"/> Other (#)	See Additional Cooler Information Form <input type="checkbox"/>
---	--	---------------------------	--	--

Cooler #	Time	Cooler #	Time	Cooler #	Time	Cooler #	Time
	1700						
Custody Seals: <input checked="" type="checkbox"/> None <input type="checkbox"/> Present / Intact <input type="checkbox"/> Present / Not Intact		Custody Seals: <input type="checkbox"/> None <input type="checkbox"/> Present / Intact <input type="checkbox"/> Present / Not Intact		Custody Seals: <input type="checkbox"/> None <input type="checkbox"/> Present / Intact <input type="checkbox"/> Present / Not Intact		Custody Seals: <input type="checkbox"/> None <input type="checkbox"/> Present / Intact <input type="checkbox"/> Present / Not Intact	
Coolant Type: <input checked="" type="checkbox"/> Loose Ice <input type="checkbox"/> Bagged Ice <input type="checkbox"/> Blue Ice <input checked="" type="checkbox"/> None		Coolant Type: <input type="checkbox"/> Loose Ice <input type="checkbox"/> Bagged Ice <input type="checkbox"/> Blue Ice <input type="checkbox"/> None		Coolant Type: <input type="checkbox"/> Loose Ice <input type="checkbox"/> Bagged Ice <input type="checkbox"/> Blue Ice <input type="checkbox"/> None		Coolant Type: <input type="checkbox"/> Loose Ice <input type="checkbox"/> Bagged Ice <input type="checkbox"/> Blue Ice <input type="checkbox"/> None	
Coolant Location: Dispersed / Top / Middle / Bottom Temp Blank Present: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Present, Temperature Blank Location is: <input type="checkbox"/> Representative <input type="checkbox"/> Not Representative		Coolant Location: Dispersed / Top / Middle / Bottom Temp Blank Present: <input type="checkbox"/> Yes <input type="checkbox"/> No If Present, Temperature Blank Location is: <input type="checkbox"/> Representative <input type="checkbox"/> Not Representative		Coolant Location: Dispersed / Top / Middle / Bottom Temp Blank Present: <input type="checkbox"/> Yes <input type="checkbox"/> No If Present, Temperature Blank Location is: <input type="checkbox"/> Representative <input type="checkbox"/> Not Representative		Coolant Location: Dispersed / Top / Middle / Bottom Temp Blank Present: <input type="checkbox"/> Yes <input type="checkbox"/> No If Present, Temperature Blank Location is: <input type="checkbox"/> Representative <input type="checkbox"/> Not Representative	
	Observed °C	Correction Factor °C	Actual °C		Observed °C	Correction Factor °C	Actual °C
Temp Blank:	0	0	0	Temp Blank:			
Sample 1:	14.4	0	14.4	Sample 1:			
Sample 2:	15.2	0	15.2	Sample 2:			
Sample 3:	13.9	0	13.9	Sample 3:			
3 Sample Average °C:		14.5		3 Sample Average °C:			
<input type="checkbox"/> Cooler ID on COC?		<input type="checkbox"/> VOC Trip Blank received?		<input type="checkbox"/> Cooler ID on COC?		<input type="checkbox"/> VOC Trip Blank received?	

If any shaded areas checked, complete Sample Receiving Non-Conformance and/or Inventory Form

Paperwork Received

Yes	No	<input checked="" type="checkbox"/> Chain of Custody record(s)? If No, Initiated By _____
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Received for Lab Signed/Date/Time?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shipping document?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Other _____

Check Sample Preservation

N/A	Yes	No	<input type="checkbox"/> Temperature Blank OR average sample temperature, ≥8° C?
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> If either is ≥8° C, was thermal preservation required?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If "Yes", Project Chemist Approval Initials: _____
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If "Yes" Completed Non Con Cooler - Cont Inventory Form?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Completed Sample Preservation Verification Form?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Samples chemically preserved correctly?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If "No", added orange tag?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Received pre-preserved VOC soils?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> MeOH <input type="checkbox"/> Na ₂ SO ₄

COC Information

Pace COC Other _____

COC ID Numbers:
2178688

Check for Short Hold-Time Prep/Analyses

<input type="checkbox"/>	Bacteriological
<input type="checkbox"/>	Air Bags
<input type="checkbox"/>	EnCores / Methanol Pre-Preserved
<input type="checkbox"/>	Formaldehyde/Aldehyde
<input type="checkbox"/>	Green-tagged containers
<input type="checkbox"/>	Yellow/White-tagged 1 L ambers (SV Prep-Lab)

AFTER HOURS ONLY:
COPIES OF COC TO LAB AREA(S)

NONE RECEIVED
 RECEIVED, COCs TO LAB(S)

Check COC for Accuracy

Yes	No	<input checked="" type="checkbox"/> Analysis Requested?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Sample ID matches COC?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Sample Date and Time matches COC?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Container type completed on COC?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	All container types indicated are received?

Sample Condition Summary

N/A	Yes	No	<input checked="" type="checkbox"/> Broken containers/lids?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Missing or incomplete labels?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Illegible information on labels?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Low volume received?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Inappropriate or non-Pace containers received?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> VOC vials / TOX containers have headspace?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Extra sample locations / containers not listed on COC?

Notes

Trip Blank received Trip Blank not listed on COC

Cooler Received (Date/Time)	Paperwork Delivered (Date/Time)	≤1 Hour Goal Met?
AW 03/19/18	AW 03/19/18	Yes / No

Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- * = See Discussion

REPORT OF LABORATORY ANALYSIS

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Report No.....10424503

Appendix B

Sample Analysis Summary



PFAA Sample Analysis Summary

Client's Sample ID	PW #2	Date Extracted	03/26/2018
Lab Sample ID	469681001	Total Amount Extracted	257 mL
Filename	10LCMS02_180328A_031	ICAL ID	180313A02
Matrix	Water	Starting CCal	10LCMS02_180328A_024
Collected	03/19/2018	Ending CCal	10LCMS02_180328A_044
Received	03/22/2018	Method Blank Filename	10LCMS02_180328A_030

Compound	Concentration (ng/L)	PQL (ng/L)	MDL (ng/L)	Dilution	Analyzed	CAS No.	Qual.
PFBS	ND	1.7	0.31	1	03/28/2018 16:13	375-73-5	N2
PFHxA	ND	1.9	0.38	1	03/28/2018 16:13	307-24-4	N2
PFHpA	ND	1.9	0.63	1	03/28/2018 16:13	375-85-9	N2
PFHxS	ND	1.8	0.60	1	03/28/2018 16:13	355-46-4	N2
PFOA	ND	1.9	0.42	1	03/28/2018 16:13	335-67-1	N2
PFNA	ND	1.9	0.67	1	03/28/2018 16:13	375-95-1	N2
PFOS	ND	1.9	0.44	1	03/28/2018 16:13	1763-23-1	N2
PFDA	ND	1.9	0.38	1	03/28/2018 16:13	335-76-2	N2
PFUdA	ND	1.9	0.54	1	03/28/2018 16:13	2058-94-8	N2
N-MeFOSAA	ND	3.9	0.97	1	03/28/2018 16:13	2355-31-9	N2
N-EtFOSAA	ND	3.9	1.3	1	03/28/2018 16:13	2991-50-6	N2
PFDoA	ND	1.9	0.46	1	03/28/2018 16:13	307-55-1	N2
PFTrDA	ND	1.9	0.44	1	03/28/2018 16:13	72629-94-8	N2
PFTeDA	ND	1.9	0.36	1	03/28/2018 16:13	376-06-7	N2
PFPrOPrA	ND	3.9	1.3	1	03/28/2018 16:13	62037-80-3	N2
PFBA	ND	1.9	0.60	1	03/28/2018 16:13	375-22-4	N2
PFPeA	ND	1.9	0.36	1	03/28/2018 16:13	2706-90-3	N2
PFDS	ND	1.9	0.46	1	03/28/2018 16:13	335-77-3	N2
NaDONA	ND	3.9	1.5	1	03/28/2018 16:13	958445-44-8	N2
PFHxDA	ND	1.9	0.50	1	03/28/2018 16:13	67905-19-5	N2
PFODA	ND	1.9	0.59	1	03/28/2018 16:13	16517-11-6	N2

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	2.3	113	70 - 130	Pass
13C2_PFDA	2.0	2.4	120	70 - 130	Pass
d5-EtFOSAA	8.0	8.5	106	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	295749	153106 - 459319	199100 - 398199	Pass
13C2_PFOA	229798	104486 - 313458	135343 - 270685	Pass
13C4_PFOS	273701	144806 - 434417	176743 - 353487	Pass
d3-MeFOSAA	166917	90929 - 272786	121272 - 242543	Pass

50-150% of Ical area

70-140% of the preceding CCV area

N2 = The lab does not hold NELAC/TNI accreditation for this parameter.



PFAA Sample Analysis Summary

Client's Sample ID	PW #1	Date Extracted	03/26/2018
Lab Sample ID	469681003	Total Amount Extracted	259 mL
Filename	10LCMS02_180328A_033	ICAL ID	180313A02
Matrix	Water	Starting CCal	10LCMS02_180328A_024
Collected	03/19/2018	Ending CCal	10LCMS02_180328A_044
Received	03/22/2018	Method Blank Filename	10LCMS02_180328A_030

Compound	Concentration (ng/L)	PQL (ng/L)	MDL (ng/L)	Dilution	Analyzed	CAS No.	Qual.
PFBS	ND	1.7	0.31	1	03/28/2018 16:38	375-73-5	N2
PFHxA	ND	1.9	0.37	1	03/28/2018 16:38	307-24-4	N2
PFHpA	ND	1.9	0.62	1	03/28/2018 16:38	375-85-9	N2
PFHxS	ND	1.8	0.60	1	03/28/2018 16:38	355-46-4	N2
PFOA	ND	1.9	0.42	1	03/28/2018 16:38	335-67-1	N2
PFNA	ND	1.9	0.66	1	03/28/2018 16:38	375-95-1	N2
PFOS	ND	1.9	0.44	1	03/28/2018 16:38	1763-23-1	N2
PFDA	ND	1.9	0.38	1	03/28/2018 16:38	335-76-2	N2
PFUdA	ND	1.9	0.53	1	03/28/2018 16:38	2058-94-8	N2
N-MeFOSAA	ND	3.9	0.96	1	03/28/2018 16:38	2355-31-9	N2
N-EtFOSAA	ND	3.9	1.3	1	03/28/2018 16:38	2991-50-6	N2
PFDoA	ND	1.9	0.46	1	03/28/2018 16:38	307-55-1	N2
PFTrDA	ND	1.9	0.44	1	03/28/2018 16:38	72629-94-8	N2
PFTeDA	ND	1.9	0.36	1	03/28/2018 16:38	376-06-7	N2
PFPrOPrA	ND	3.9	1.3	1	03/28/2018 16:38	62037-80-3	N2
PFBA	ND	1.9	0.59	1	03/28/2018 16:38	375-22-4	N2
PFPeA	ND	1.9	0.36	1	03/28/2018 16:38	2706-90-3	N2
PFDS	ND	1.9	0.45	1	03/28/2018 16:38	335-77-3	N2
NaDONA	ND	3.9	1.5	1	03/28/2018 16:38	958445-44-8	N2
PFHxDA	ND	1.9	0.50	1	03/28/2018 16:38	67905-19-5	N2
PFODA	ND	1.9	0.58	1	03/28/2018 16:38	16517-11-6	N2

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	2.5	125	70 - 130	Pass
13C2_PFDA	2.0	2.3	117	70 - 130	Pass
d5-EtFOSAA	8.0	8.2	103	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	268740	153106 - 459319	199100 - 398199	Pass
13C2_PFOA	200204	104486 - 313458	135343 - 270685	Pass
13C4_PFOS	263586	144806 - 434417	176743 - 353487	Pass
d3-MeFOSAA	169717	90929 - 272786	121272 - 242543	Pass

50-150% of Ical area

70-140% of the preceding CCV area

N2 = The lab does not hold NELAC/TNI accreditation for this parameter.



PFAA Sample Analysis Summary

Client's Sample ID	PW #1-dup	Date Extracted	03/26/2018
Lab Sample ID	469681003-DUP	Total Amount Extracted	249 mL
Filename	10LCMS02_180328A_043	ICAL ID	180313A02
Matrix	Water	Starting CCal	10LCMS02_180328A_024
Collected	03/19/2018	Ending CCal	10LCMS02_180328A_044
Received	03/22/2018	Method Blank Filename	10LCMS02_180328A_030

Compound	Concentration (ng/L)	PQL (ng/L)	MDL (ng/L)	Dilution	Analyzed	CAS No.	Qual.
PFBS	ND	1.8	0.32	1	03/28/2018 18:40	375-73-5	N2
PFHxA	ND	2.0	0.39	1	03/28/2018 18:40	307-24-4	N2
PFHpA	ND	2.0	0.65	1	03/28/2018 18:40	375-85-9	N2
PFHxS	ND	1.9	0.62	1	03/28/2018 18:40	355-46-4	N2
PFOA	ND	2.0	0.43	1	03/28/2018 18:40	335-67-1	N2
PFNA	ND	2.0	0.69	1	03/28/2018 18:40	375-95-1	N2
PFOS	ND	1.9	0.45	1	03/28/2018 18:40	1763-23-1	N2
PFDA	ND	2.0	0.39	1	03/28/2018 18:40	335-76-2	N2
PFUdA	ND	2.0	0.56	1	03/28/2018 18:40	2058-94-8	N2
N-MeFOSAA	ND	4.0	1.00	1	03/28/2018 18:40	2355-31-9	N2
N-EtFOSAA	ND	4.0	1.3	1	03/28/2018 18:40	2991-50-6	N2
PFDoA	ND	2.0	0.47	1	03/28/2018 18:40	307-55-1	N2
PFTTrDA	ND	2.0	0.46	1	03/28/2018 18:40	72629-94-8	N2
PFTeDA	ND	2.0	0.38	1	03/28/2018 18:40	376-06-7	N2
PFPrOPrA	ND	4.0	1.4	1	03/28/2018 18:40	62037-80-3	N2
PFBA	ND	2.0	0.62	1	03/28/2018 18:40	375-22-4	N2
PFPeA	ND	2.0	0.37	1	03/28/2018 18:40	2706-90-3	N2
PFDS	ND	1.9	0.47	1	03/28/2018 18:40	335-77-3	N2
NaDONA	ND	4.0	1.5	1	03/28/2018 18:40	958445-44-8	N2
PFHxDA	ND	2.0	0.52	1	03/28/2018 18:40	67905-19-5	N2
PFODA	ND	2.0	0.61	1	03/28/2018 18:40	16517-11-6	N2

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	2.1	105	70 - 130	Pass
13C2_PFDA	2.0	2.0	102	70 - 130	Pass
d5-EtFOSAA	8.0	7.5	94	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	306292	153106 - 459319	199100 - 398199	Pass
13C2_PFOA	238412	104486 - 313458	135343 - 270685	Pass
13C4_PFOS	290829	144806 - 434417	176743 - 353487	Pass
d3-MeFOSAA	189519	90929 - 272786	121272 - 242543	Pass

50-150% of Ical area

70-140% of the preceding CCV area

N2 = The lab does not hold NELAC/TNI accreditation for this parameter.



PFAA Sample Analysis Summary

Client's Sample ID	PW #5	Date Extracted	03/26/2018
Lab Sample ID	469681005	Total Amount Extracted	251 mL
Filename	10LCMS02_180328A_035	ICAL ID	180313A02
Matrix	Water	Starting CCal	10LCMS02_180328A_024
Collected	03/19/2018	Ending CCal	10LCMS02_180328A_044
Received	03/22/2018	Method Blank Filename	10LCMS02_180328A_030

Compound	Concentration (ng/L)	PQL (ng/L)	MDL (ng/L)	Dilution	Analyzed	CAS No.	Qual.
PFBS	ND	1.8	0.32	1	03/28/2018 17:02	375-73-5	N2
PFHxA	ND	2.0	0.39	1	03/28/2018 17:02	307-24-4	N2
PFHpA	ND	2.0	0.64	1	03/28/2018 17:02	375-85-9	N2
PFHxS	ND	1.9	0.62	1	03/28/2018 17:02	355-46-4	N2
PFOA	ND	2.0	0.43	1	03/28/2018 17:02	335-67-1	N2
PFNA	ND	2.0	0.68	1	03/28/2018 17:02	375-95-1	N2
PFOS	ND	1.9	0.45	1	03/28/2018 17:02	1763-23-1	N2
PFDA	ND	2.0	0.39	1	03/28/2018 17:02	335-76-2	N2
PFUdA	ND	2.0	0.55	1	03/28/2018 17:02	2058-94-8	N2
N-MeFOSAA	ND	4.0	0.99	1	03/28/2018 17:02	2355-31-9	N2
N-EtFOSAA	ND	4.0	1.3	1	03/28/2018 17:02	2991-50-6	N2
PFDoA	ND	2.0	0.47	1	03/28/2018 17:02	307-55-1	N2
PFTrDA	ND	2.0	0.45	1	03/28/2018 17:02	72629-94-8	N2
PFTeDA	ND	2.0	0.37	1	03/28/2018 17:02	376-06-7	N2
PFPrOPrA	ND	4.0	1.4	1	03/28/2018 17:02	62037-80-3	N2
PFBA	ND	2.0	0.61	1	03/28/2018 17:02	375-22-4	N2
PFPeA	ND	2.0	0.37	1	03/28/2018 17:02	2706-90-3	N2
PFDS	ND	1.9	0.47	1	03/28/2018 17:02	335-77-3	N2
NaDONA	ND	4.0	1.5	1	03/28/2018 17:02	958445-44-8	N2
PFHxDA	ND	2.0	0.51	1	03/28/2018 17:02	67905-19-5	N2
PFODA	ND	2.0	0.60	1	03/28/2018 17:02	16517-11-6	N2

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	2.4	118	70 - 130	Pass
13C2_PFDA	2.0	2.4	122	70 - 130	Pass
d5-EtFOSAA	8.0	8.8	110	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	297282	153106 - 459319	199100 - 398199	Pass
13C2_PFOA	209445	104486 - 313458	135343 - 270685	Pass
13C4_PFOS	276233	144806 - 434417	176743 - 353487	Pass
d3-MeFOSAA	163860	90929 - 272786	121272 - 242543	Pass

50-150% of Ical area

70-140% of the preceding CCV area

N2 = The lab does not hold NELAC/TNI accreditation for this parameter.



PFAA Blank Analysis Summary

Lab Sample ID	BLANK-61336	Total Amount Extracted	260 mL
Filename	10LCMS02_180328A_030	ICAL ID	180313A02
Matrix	Water	Starting CCal	10LCMS02_180328A_024
Date Extracted	03/26/2018	Ending CCal	10LCMS02_180328A_044

Compound	Concentration (ng/L)	PQL (ng/L)	Dilution	Analyzed	CAS No.	Qual.
PFBS	ND	1.7	1	03/28/2018 16:01	375-73-5	N2
PFHxA	ND	1.9	1	03/28/2018 16:01	307-24-4	N2
PFHpA	ND	1.9	1	03/28/2018 16:01	375-85-9	N2
PFHxS	ND	1.8	1	03/28/2018 16:01	355-46-4	N2
PFOA	ND	1.9	1	03/28/2018 16:01	335-67-1	N2
PFNA	ND	1.9	1	03/28/2018 16:01	375-95-1	N2
PFOS	ND	1.8	1	03/28/2018 16:01	1763-23-1	N2
PFDA	ND	1.9	1	03/28/2018 16:01	335-76-2	N2
PFUdA	ND	1.9	1	03/28/2018 16:01	2058-94-8	N2
N-MeFOSAA	ND	3.8	1	03/28/2018 16:01	2355-31-9	N2
N-EtFOSAA	ND	3.8	1	03/28/2018 16:01	2991-50-6	N2
PFDoA	ND	1.9	1	03/28/2018 16:01	307-55-1	N2
PFTTrDA	ND	1.9	1	03/28/2018 16:01	72629-94-8	N2
PFTeDA	ND	1.9	1	03/28/2018 16:01	376-06-7	N2
PFPPrOPrA	ND	3.8	1	03/28/2018 16:01	62037-80-3	N2
PFBA	ND	1.9	1	03/28/2018 16:01	375-22-4	N2
PFPeA	ND	1.9	1	03/28/2018 16:01	2706-90-3	N2
PFDS	ND	1.8	1	03/28/2018 16:01	335-77-3	N2
NaDONA	ND	3.8	1	03/28/2018 16:01	958445-44-8	N2
PFHxDA	ND	1.9	1	03/28/2018 16:01	67905-19-5	N2
PFODA	ND	1.9	1	03/28/2018 16:01	16517-11-6	N2

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	1.9	93	70 - 130	Pass
13C2_PFDA	2.0	1.9	94	70 - 130	Pass
d5-EtFOSAA	8.0	6.0	75	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	253706	153106 - 459319	199100 - 398199	Pass
13C2_PFOA	219552	104486 - 313458	135343 - 270685	Pass
13C4_PFOS	270276	144806 - 434417	176743 - 353487	Pass
d3-MeFOSAA	192965	90929 - 272786	121272 - 242543	Pass

50-150% of Ical area
70-140% of the preceding CCV area

N2 = The lab does not hold NELAC/TNI accreditation for this parameter.



PFAA Laboratory Control Sample (LCS)

LCS Lab Sample ID	LCS-61337	Matrix	Water
LCS Filename	10LCMS02_180328A_026	Dilution	1
Total Amount Extracted	258mL	Extracted	03/26/2018
ICAL ID	180313A02	Analyzed	03/28/2018 15:12
Start CCal Filename	10LCMS02_180328A_024	Injected By	QL
End CCal Filename	10LCMS02_180328A_044		
Method Blank Filename	10LCMS02_180328A_030		

Compound	Spiked (ng/L)	Recovered (ng/L)	Recovery %	Limits
PFBA	1.9	2.0	102	50.0 - 150.0
PFPeA	1.9	1.8	95	50.0 - 150.0
PFBS	1.7	1.7	98	50.0 - 150.0
PFHxA	1.9	1.8	94	50.0 - 150.0
PFPrOPrA	3.9	3.4	89	50.0 - 150.0
PFHpA	1.9	1.8	94	50.0 - 150.0
NaDONA	3.9	3.7	95	50.0 - 150.0
PFHxS	1.8	2.1	114	50.0 - 150.0
PFOA	1.9	2.0	105	50.0 - 150.0
PFNA	1.9	2.2	114	50.0 - 150.0
PFOS	1.9	2.2	117	50.0 - 150.0
PFDA	1.9	1.8	93	50.0 - 150.0
PFUdA	1.9	2.2	112	50.0 - 150.0
N-MeFOSAA	3.9	2.8	73	50.0 - 150.0
N-EtFOSAA	3.9	3.6	92	50.0 - 150.0
PFDS	1.9	2.0	108	50.0 - 150.0
PFDoA	1.9	1.8	92	50.0 - 150.0
PFTTrDA	1.9	2.1	110	50.0 - 150.0
PFTeDA	1.9	2.3	119	50.0 - 150.0
PFHxDA	1.9	1.8	90	50.0 - 150.0
PFODA	1.9	1.9	100	50.0 - 150.0

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	2.3	116	50 - 150	Pass
13C2_PFDA	2.0	2.4	120	50 - 150	Pass
d5-EtFOSAA	8.0	8.1	101	50 - 150	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	282286	153106 - 459319	199100 - 398199	Pass
13C2_PFOA	200150	104486 - 313458	135343 - 270685	Pass
13C4_PFOS	258323	144806 - 434417	176743 - 353487	Pass
d3-MeFOSAA	163979	90929 - 272786	121272 - 242543	Pass

50-150% of Ical area
70-140% of the preceding CCV area



PFAA Laboratory Control Sample (LCS)

LCS Lab Sample ID	LCS-61340	Matrix	Water
LCS Filename	10LCMS02_180328A_027	Dilution	1
Total Amount Extracted	261mL	Extracted	03/26/2018
ICAL ID	180313A02	Analyzed	03/28/2018 15:25
Start CCal Filename	10LCMS02_180328A_024	Injected By	QL
End CCal Filename	10LCMS02_180328A_044		
Method Blank Filename	10LCMS02_180328A_030		

Compound	Spiked (ng/L)	Recovered (ng/L)	Recovery %	Limits
PFBA	19	19	99	70.0 - 130.0
PFPeA	19	18	92	70.0 - 130.0
PFBS	17	17	98	70.0 - 130.0
PFHxA	19	18	95	70.0 - 130.0
PFPrOPrA	38	36	93	70.0 - 130.0
PFHpA	19	19	98	70.0 - 130.0
NaDONA	38	40	103	70.0 - 130.0
PFHxS	18	20	112	70.0 - 130.0
PFOA	19	19	100	70.0 - 130.0
PFNA	19	19	101	70.0 - 130.0
PFOS	18	19	101	70.0 - 130.0
PFDA	19	18	92	70.0 - 130.0
PFUdA	19	22	114	70.0 - 130.0
N-MeFOSAA	38	36	94	70.0 - 130.0
N-EtFOSAA	38	34	89	70.0 - 130.0
PFDS	18	20	110	70.0 - 130.0
PFDoA	19	18	93	70.0 - 130.0
PFTTrDA	19	22	115	70.0 - 130.0
PFTeDA	19	22	114	70.0 - 130.0
PFHxDA	19	18	95	70.0 - 130.0
PFODA	19	19	99	70.0 - 130.0

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	2.1	106	70 - 130	Pass
13C2_PFDA	2.0	2.2	112	70 - 130	Pass
d5-EtFOSAA	8.0	7.5	93	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	282268	153106 - 459319	199100 - 398199	Pass
13C2_PFOA	209458	104486 - 313458	135343 - 270685	Pass
13C4_PFOS	274595	144806 - 434417	176743 - 353487	Pass
d3-MeFOSAA	159197	90929 - 272786	121272 - 242543	Pass

50-150% of Ical area
70-140% of the preceding CCV area



PFAA Laboratory Control Sample Duplicate (LCSD)

LCSD Lab Sample ID	LCSD-61339	LCS Filename	10LCMS02_180328A_027
LCSD Filename	10LCMS02_180328A_028	Matrix	Water
Total Amount Extracted	260mL	Dilution	1
ICAL ID	180313A02	Extracted	03/26/2018
Start CCal Filename	10LCMS02_180328A_024	Analyzed	03/28/2018 15:37
End CCal Filename	10LCMS02_180328A_044	Injected By	QL
Method Blank Filename	10LCMS02_180328A_030		

Compound	Spiked (ng/L)	Recovered (ng/L)	Recovery %	Recovery Limits	RPD %
PFBA	19	20	105	70.0 - 130.0	7
PFPeA	19	19	99	70.0 - 130.0	7
PFBS	17	16	96	70.0 - 130.0	2
PFHxA	19	19	98	70.0 - 130.0	3
PFPrOPrA	38	35	91	70.0 - 130.0	1
PFHpA	19	19	99	70.0 - 130.0	1
NaDONA	38	39	101	70.0 - 130.0	2
PFHxS	18	20	112	70.0 - 130.0	1
PFOA	19	21	107	70.0 - 130.0	7
PFNA	19	21	110	70.0 - 130.0	9
PFOS	18	19	103	70.0 - 130.0	2
PFDA	19	16	83	70.0 - 130.0	10
PFUdA	19	20	104	70.0 - 130.0	9
N-MeFOSAA	38	33	85	70.0 - 130.0	9
N-EtFOSAA	38	37	96	70.0 - 130.0	8
PFDS	18	20	110	70.0 - 130.0	0
PFDoA	19	18	91	70.0 - 130.0	2
PFTTrDA	19	21	111	70.0 - 130.0	3
PFTeDA	19	20	106	70.0 - 130.0	7
PFHxDA	19	17	88	70.0 - 130.0	8
PFODA	19	18	94	70.0 - 130.0	5

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	2.3	114	70 - 130	Pass
13C2_PFDA	2.0	2.2	112	70 - 130	Pass
d5-EtFOSAA	8.0	6.7	84	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	287274	153106 - 459319	199100 - 398199	Pass
13C2_PFOA	196720	104486 - 313458	135343 - 270685	Pass
13C4_PFOS	266998	144806 - 434417	176743 - 353487	Pass
d3-MeFOSAA	167678	90929 - 272786	121272 - 242543	Pass

50-150% of Ical area
70-140% of the preceding CCV area