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Report Prepared for:

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**REPORT OF
LABORATORY
ANALYSIS
FOR PFAAs**

Report Prepared Date:

January 30, 2018

Report Information:

Pace Project #: 10417730

Sample Receipt Date: 01/19/2018

Client Project #: 467275 Fleis & Vandenbrink

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:

January 30, 2018

Scott Unze, Project Manager

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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 four of eight samples 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 blank results were not reported since the analytes were not detected in the sample material.

The recoveries of the isotopically-labeled surrogate standards in the sample extract ranged from 80-107%. All of the labeled 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 72-111%, with relative percent differences of 1-16%. 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.

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.....10404580


Appendix A

Sample Management

Sample Condition Upon Receipt **Client Name:** Pace - M1 **Project #:** **WO# : 10417730**

Courier: Fed Ex UPS USPS Client
 Commercial Pace Speedee Other: _____

Tracking Number: 4175 9743 4767


10417730

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: PS **Temp Blank?** Yes No

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

Cooler Temp Read (°C): 0.4 **Cooler Temp Corrected (°C):** 0.2 **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:** MD 1/19/18

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 type="checkbox"/> Yes <input checked="" type="checkbox"/> No	12. number of containers doesn't match coc
-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. <u>TRIZMA</u> <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 **Field Data Required?** Yes No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: Megan McCalve **Date:** 1/22/18

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).

SAMPLE RECEIVING / LOG-IN CHECKLIST

Pace Analytical

Client: FUB	Work Order #: 402407275
Receipt Record Page/Line #: 42-22	New / Add To Project Chemist: _____ Sample #: _____

Recorded by (initials/date): **RS - 11/7/18**

Cooler Qty Received: **1**
 Box
 Other

IR Gun (#202)
 Thermometer Used: Digital Thermometer (#54) See Additional Cooler Information Form
 Other (# _____)

Cooler #	Time	
Blue	1440	
Custody Seals:		
<input checked="" 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 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		
Observed °C	Correction Factor °C	Actual °C
Temp Blank:		
Sample 1:	6.0	6.0
Sample 2:	5.4	5.4
Sample 3:	5.3	5.3
3 Sample Average °C: 5.6		
<input type="checkbox"/> Cooler ID on COC? <input type="checkbox"/> VOC Trip Blank received?		

Cooler #	Time	
Custody Seals:		
<input type="checkbox"/> None <input type="checkbox"/> Present / Intact <input type="checkbox"/> Present / Not Intact		
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 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
Temp Blank:		
Sample 1:		
Sample 2:		
Sample 3:		
3 Sample Average °C: _____		
<input type="checkbox"/> Cooler ID on COC? <input type="checkbox"/> VOC Trip Blank received?		

Cooler #	Time	
Custody Seals:		
<input type="checkbox"/> None <input type="checkbox"/> Present / Intact <input type="checkbox"/> Present / Not Intact		
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 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
Temp Blank:		
Sample 1:		
Sample 2:		
Sample 3:		
3 Sample Average °C: _____		
<input type="checkbox"/> Cooler ID on COC? <input type="checkbox"/> VOC Trip Blank received?		

Cooler #	Time	
Custody Seals:		
<input type="checkbox"/> None <input type="checkbox"/> Present / Intact <input type="checkbox"/> Present / Not Intact		
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 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
Temp Blank:		
Sample 1:		
Sample 2:		
Sample 3:		
3 Sample Average °C: _____		
<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 Chain of Custody record(s)? If No, Initiated By _____

Received for Lab Signed/Date/Time? _____

Shipping document?

Other: _____

COC Information

Pace COC Other: _____

COC ID Numbers: **2178656**

Check COC for Accuracy

Yes No Analysis Requested?

Sample ID matches COC?

Sample Date and Time matches COC?

Container type completed on COC?

All container types indicated are received?

Check Sample Preservation

N/A Yes No Temperature Blank OR average sample temperature, ≥6° C?

If either is ≥6° C, was thermal preservation required?

If "Yes", Project Chemist Approval Initials: _____

If "Yes" Completed Non Con Cooler - Cont Inventory Form?

Completed Sample Preservation Verification Form?

Samples chemically preserved correctly?

If "No", added orange tag?

Received pre-preserved VOC soils?

MeOH Na₂SO₄

Check for Short Hold-Time Prep/Analyses

Bacteriological

Air Bags

EnCores / Methanol Pre-Preserved

Formaldehyde/Aldehyde

Green-tagged containers

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)

Sample Condition Summary

N/A	Yes	No	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Broken containers/lids?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Missing or incomplete labels?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Illegible information on labels?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Low volume received?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Inappropriate or non-Pace containers received?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	VOC vials / TOX containers have headspace?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" 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?
RS 11/7/18	RS 11/7/18	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.....10404580

Appendix B

Sample Analysis Summary



PFAA Sample Analysis Summary

Client's Sample ID	Lowell Well #4	Date Extracted	01/23/2018
Lab Sample ID	467275001	Total Amount Extracted	262 mL
Filename	10LCMS02_180125B_013	ICAL ID	180125A02
Matrix	Water	Starting CCal	10LCMS02_180125B_002
Collected	01/17/2018	Ending CCal	10LCMS02_180125B_026
Received	01/19/2018	Method Blank Filename	10LCMS02_180125B_004

Compound	Concentration (ng/L)	PQL (ng/L)	MDL (ng/L)	Dilution	Analyzed	CAS No.	Qual.
PFBS	ND	2	0.31	1	01/25/2018 13:53	375-73-5	
PFHxA	ND	2	0.37	1	01/25/2018 13:53	307-24-4	
PFHpA	ND	2	0.62	1	01/25/2018 13:53	375-85-9	
PFHxS	ND	2	0.59	1	01/25/2018 13:53	355-46-4	
PFOA	ND	2	0.41	1	01/25/2018 13:53	335-67-1	
PFNA	ND	2	0.66	1	01/25/2018 13:53	375-95-1	
PFOS	ND	2	0.43	1	01/25/2018 13:53	1763-23-1	
PFDA	ND	2	0.37	1	01/25/2018 13:53	335-76-2	
PFUdA	ND	2	0.53	1	01/25/2018 13:53	2058-94-8	
N-MeFOSAA	ND	4	0.95	1	01/25/2018 13:53	2355-31-9	
N-EtFOSAA	ND	4	1.3	1	01/25/2018 13:53	2991-50-6	
PFDaA	ND	2	0.45	1	01/25/2018 13:53	307-55-1	
PFTrDA	ND	2	0.43	1	01/25/2018 13:53	72629-94-8	
PFTeDA	ND	2	0.36	1	01/25/2018 13:53	376-06-7	
PFPrOPrA	ND	4	1.3	1	01/25/2018 13:53	62037-80-3	
PFBA	ND	2	0.59	1	01/25/2018 13:53	375-22-4	
PFPeA	ND	2	0.35	1	01/25/2018 13:53	2706-90-3	
PFDS	ND	2	0.45	1	01/25/2018 13:53	335-77-3	
NaDONA	ND	4	1.4	1	01/25/2018 13:53	958445-44-8	
PFHxDA	ND	2	0.49	1	01/25/2018 13:53	67905-19-5	
PFODA	ND	2	0.58	1	01/25/2018 13:53	16517-11-6	

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	1.6	80	70 - 130	Pass
13C2_PFDA	2.0	1.7	86	70 - 130	Pass
d5-EtFOSAA	8.0	7.3	91	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	421376	220959 - 662877	278844 - 557687	Pass
13C2_PFOA	256754	116636 - 349908	141520 - 283040	Pass
13C4_PFOS	466289	210188 - 630564	280831 - 561662	Pass
d3-MeFOSAA	256867	109963 - 329890	141607 - 283213	Pass

50-150% of Ical area

70-140% of the preceding CCV area



PFAA Sample Analysis Summary

Client's Sample ID	Lowell Well #2	Date Extracted	01/23/2018
Lab Sample ID	467275003	Total Amount Extracted	243 mL
Filename	10LCMS02_180125B_015	ICAL ID	180125A02
Matrix	Water	Starting CCal	10LCMS02_180125B_002
Collected	01/17/2018	Ending CCal	10LCMS02_180125B_026
Received	01/19/2018	Method Blank Filename	10LCMS02_180125B_004

Compound	Concentration (ng/L)	PQL (ng/L)	MDL (ng/L)	Dilution	Analyzed	CAS No.	Qual.
PFBS	ND	2	0.33	1	01/25/2018 14:17	375-73-5	
PFHxA	ND	2	0.40	1	01/25/2018 14:17	307-24-4	
PFHpA	ND	2	0.66	1	01/25/2018 14:17	375-85-9	
PFHxS	ND	2	0.64	1	01/25/2018 14:17	355-46-4	
PFOA	ND	2	0.44	1	01/25/2018 14:17	335-67-1	
PFNA	ND	2	0.71	1	01/25/2018 14:17	375-95-1	
PFOS	ND	2	0.46	1	01/25/2018 14:17	1763-23-1	
PFDA	ND	2	0.40	1	01/25/2018 14:17	335-76-2	
PFUdA	ND	2	0.57	1	01/25/2018 14:17	2058-94-8	
N-MeFOSAA	ND	4	1.0	1	01/25/2018 14:17	2355-31-9	
N-EtFOSAA	ND	4	1.4	1	01/25/2018 14:17	2991-50-6	
PFDaA	ND	2	0.49	1	01/25/2018 14:17	307-55-1	
PFTrDA	ND	2	0.47	1	01/25/2018 14:17	72629-94-8	
PFTeDA	ND	2	0.38	1	01/25/2018 14:17	376-06-7	
PFPrOPrA	ND	4	1.4	1	01/25/2018 14:17	62037-80-3	
PFBA	ND	2	0.63	1	01/25/2018 14:17	375-22-4	
PFPeA	ND	2	0.38	1	01/25/2018 14:17	2706-90-3	
PFDS	ND	2	0.48	1	01/25/2018 14:17	335-77-3	
NaDONA	ND	4	1.6	1	01/25/2018 14:17	958445-44-8	
PFHxDA	ND	2	0.53	1	01/25/2018 14:17	67905-19-5	
PFODA	ND	2	0.62	1	01/25/2018 14:17	16517-11-6	

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	1.7	86	70 - 130	Pass
13C2_PFDA	2.0	1.9	96	70 - 130	Pass
d5-EtFOSAA	8.0	6.9	86	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	429240	220959 - 662877	278844 - 557687	Pass
13C2_PFOA	266883	116636 - 349908	141520 - 283040	Pass
13C4_PFOS	454882	210188 - 630564	280831 - 561662	Pass
d3-MeFOSAA	240256	109963 - 329890	141607 - 283213	Pass

50-150% of Ical area

70-140% of the preceding CCV area



PFAA Sample Analysis Summary

Client's Sample ID	Lowell Well #3	Date Extracted	01/23/2018
Lab Sample ID	467275005	Total Amount Extracted	252 mL
Filename	10LCMS02_180125B_017	ICAL ID	180125A02
Matrix	Water	Starting CCal	10LCMS02_180125B_002
Collected	01/17/2018	Ending CCal	10LCMS02_180125B_026
Received	01/19/2018	Method Blank Filename	10LCMS02_180125B_004

Compound	Concentration (ng/L)	PQL (ng/L)	MDL (ng/L)	Dilution	Analyzed	CAS No.	Qual.
PFBS	ND	2	0.32	1	01/25/2018 14:42	375-73-5	
PFHxA	ND	2	0.39	1	01/25/2018 14:42	307-24-4	
PFHpA	ND	2	0.64	1	01/25/2018 14:42	375-85-9	
PFHxS	ND	2	0.62	1	01/25/2018 14:42	355-46-4	
PFOA	ND	2	0.43	1	01/25/2018 14:42	335-67-1	
PFNA	ND	2	0.68	1	01/25/2018 14:42	375-95-1	
PFOS	ND	2	0.45	1	01/25/2018 14:42	1763-23-1	
PFDA	ND	2	0.39	1	01/25/2018 14:42	335-76-2	
PFUdA	ND	2	0.55	1	01/25/2018 14:42	2058-94-8	
N-MeFOSAA	ND	4	0.99	1	01/25/2018 14:42	2355-31-9	
N-EtFOSAA	ND	4	1.3	1	01/25/2018 14:42	2991-50-6	
PFDaA	ND	2	0.47	1	01/25/2018 14:42	307-55-1	
PFTrDA	ND	2	0.45	1	01/25/2018 14:42	72629-94-8	
PFTeDA	ND	2	0.37	1	01/25/2018 14:42	376-06-7	
PFPrOPrA	ND	4	1.4	1	01/25/2018 14:42	62037-80-3	
PFBA	ND	2	0.61	1	01/25/2018 14:42	375-22-4	
PFPeA	ND	2	0.37	1	01/25/2018 14:42	2706-90-3	
PFDS	ND	2	0.46	1	01/25/2018 14:42	335-77-3	
NaDONA	ND	4	1.5	1	01/25/2018 14:42	958445-44-8	
PFHxDA	ND	2	0.51	1	01/25/2018 14:42	67905-19-5	
PFODA	ND	2	0.60	1	01/25/2018 14:42	16517-11-6	

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	1.7	85	70 - 130	Pass
13C2_PFDA	2.0	1.7	85	70 - 130	Pass
d5-EtFOSAA	8.0	7.2	90	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	436698	220959 - 662877	278844 - 557687	Pass
13C2_PFOA	277663	116636 - 349908	141520 - 283040	Pass
13C4_PFOS	429119	210188 - 630564	280831 - 561662	Pass
d3-MeFOSAA	263040	109963 - 329890	141607 - 283213	Pass

50-150% of Ical area

70-140% of the preceding CCV area



PFAA Sample Analysis Summary

Client's Sample ID	Lowell Well #3	Date Extracted	01/23/2018
Lab Sample ID	467275005-DUP	Total Amount Extracted	256 mL
Filename	10LCMS02_180125B_025	ICAL ID	180125A02
Matrix	Water	Starting CCal	10LCMS02_180125B_002
Collected	01/17/2018	Ending CCal	10LCMS02_180125B_026
Received	01/19/2018	Method Blank Filename	10LCMS02_180125B_004

Compound	Concentration (ng/L)	PQL (ng/L)	MDL (ng/L)	Dilution	Analyzed	CAS No.	Qual.
PFBS	ND	2	0.32	1	01/25/2018 16:20	375-73-5	
PFHxA	ND	2	0.38	1	01/25/2018 16:20	307-24-4	
PFHpA	ND	2	0.63	1	01/25/2018 16:20	375-85-9	
PFHxS	ND	2	0.61	1	01/25/2018 16:20	355-46-4	
PFOA	ND	2	0.42	1	01/25/2018 16:20	335-67-1	
PFNA	ND	2	0.67	1	01/25/2018 16:20	375-95-1	
PFOS	ND	2	0.44	1	01/25/2018 16:20	1763-23-1	
PFDA	ND	2	0.38	1	01/25/2018 16:20	335-76-2	
PFUdA	ND	2	0.54	1	01/25/2018 16:20	2058-94-8	
N-MeFOSAA	ND	4	0.97	1	01/25/2018 16:20	2355-31-9	
N-EtFOSAA	ND	4	1.3	1	01/25/2018 16:20	2991-50-6	
PFDaA	ND	2	0.46	1	01/25/2018 16:20	307-55-1	
PFTrDA	ND	2	0.44	1	01/25/2018 16:20	72629-94-8	
PFTeDA	ND	2	0.37	1	01/25/2018 16:20	376-06-7	
PFPrOPrA	ND	4	1.3	1	01/25/2018 16:20	62037-80-3	
PFBA	ND	2	0.60	1	01/25/2018 16:20	375-22-4	
PFPeA	ND	2	0.36	1	01/25/2018 16:20	2706-90-3	
PFDS	ND	2	0.46	1	01/25/2018 16:20	335-77-3	
NaDONA	ND	4	1.5	1	01/25/2018 16:20	958445-44-8	
PFHxDA	ND	2	0.50	1	01/25/2018 16:20	67905-19-5	
PFODA	ND	2	0.59	1	01/25/2018 16:20	16517-11-6	

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	2.1	107	70 - 130	Pass
13C2_PFDA	2.0	1.9	96	70 - 130	Pass
d5-EtFOSAA	8.0	8.0	100	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	463275	220959 - 662877	278844 - 557687	Pass
13C2_PFOA	253308	116636 - 349908	141520 - 283040	Pass
13C4_PFOS	430623	210188 - 630564	280831 - 561662	Pass
d3-MeFOSAA	251357	109963 - 329890	141607 - 283213	Pass

50-150% of Ical area

70-140% of the preceding CCV area



PFAA Sample Analysis Summary

Client's Sample ID	Lowell Well #1	Date Extracted	01/23/2018
Lab Sample ID	467275007	Total Amount Extracted	254 mL
Filename	10LCMS02_180125B_019	ICAL ID	180125A02
Matrix	Water	Starting CCal	10LCMS02_180125B_002
Collected	01/17/2018	Ending CCal	10LCMS02_180125B_026
Received	01/19/2018	Method Blank Filename	10LCMS02_180125B_004

Compound	Concentration (ng/L)	PQL (ng/L)	MDL (ng/L)	Dilution	Analyzed	CAS No.	Qual.
PFBS	ND	2	0.32	1	01/25/2018 15:06	375-73-5	
PFHxA	ND	2	0.38	1	01/25/2018 15:06	307-24-4	
PFHpA	ND	2	0.64	1	01/25/2018 15:06	375-85-9	
PFHxS	ND	2	0.61	1	01/25/2018 15:06	355-46-4	
PFOA	ND	2	0.42	1	01/25/2018 15:06	335-67-1	
PFNA	ND	2	0.68	1	01/25/2018 15:06	375-95-1	
PFOS	ND	2	0.44	1	01/25/2018 15:06	1763-23-1	
PFDA	ND	2	0.38	1	01/25/2018 15:06	335-76-2	
PFUdA	ND	2	0.54	1	01/25/2018 15:06	2058-94-8	
N-MeFOSAA	ND	4	0.98	1	01/25/2018 15:06	2355-31-9	
N-EtFOSAA	ND	4	1.3	1	01/25/2018 15:06	2991-50-6	
PFDaA	ND	2	0.46	1	01/25/2018 15:06	307-55-1	
PFTrDA	ND	2	0.45	1	01/25/2018 15:06	72629-94-8	
PFTeDA	ND	2	0.37	1	01/25/2018 15:06	376-06-7	
PFPrOPrA	ND	4	1.4	1	01/25/2018 15:06	62037-80-3	
PFBA	ND	2	0.61	1	01/25/2018 15:06	375-22-4	
PFPeA	ND	2	0.36	1	01/25/2018 15:06	2706-90-3	
PFDS	ND	2	0.46	1	01/25/2018 15:06	335-77-3	
NaDONA	ND	4	1.5	1	01/25/2018 15:06	958445-44-8	
PFHxDA	ND	2	0.50	1	01/25/2018 15:06	67905-19-5	
PFODA	ND	2	0.59	1	01/25/2018 15:06	16517-11-6	

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	1.9	93	70 - 130	Pass
13C2_PFDA	2.0	1.7	87	70 - 130	Pass
d5-EtFOSAA	8.0	6.6	83	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	436443	220959 - 662877	278844 - 557687	Pass
13C2_PFOA	243016	116636 - 349908	141520 - 283040	Pass
13C4_PFOS	464804	210188 - 630564	280831 - 561662	Pass
d3-MeFOSAA	264082	109963 - 329890	141607 - 283213	Pass

50-150% of Ical area

70-140% of the preceding CCV area



PFAA Blank Analysis Summary

Lab Sample ID	BLANK-59909	Total Amount Extracted	258 mL
Filename	10LCMS02_180125B_004	ICAL ID	180125A02
Matrix	Water	Starting CCal	10LCMS02_180125B_002
Date Extracted	01/23/2018	Ending CCal	10LCMS02_180125B_026

Compound	Concentration (ng/L)	PQL (ng/L)	Dilution	Analyzed	CAS No.	Qual.
PFBS	ND	2	1	01/25/2018 12:02	375-73-5	
PFHxA	ND	2	1	01/25/2018 12:02	307-24-4	
PFHpA	ND	2	1	01/25/2018 12:02	375-85-9	
PFHxS	ND	2	1	01/25/2018 12:02	355-46-4	
PFOA	ND	2	1	01/25/2018 12:02	335-67-1	
PFNA	ND	2	1	01/25/2018 12:02	375-95-1	
PFOS	ND	2	1	01/25/2018 12:02	1763-23-1	
PFDA	ND	2	1	01/25/2018 12:02	335-76-2	
PFUdA	ND	2	1	01/25/2018 12:02	2058-94-8	
N-MeFOSAA	ND	4	1	01/25/2018 12:02	2355-31-9	
N-EtFOSAA	ND	4	1	01/25/2018 12:02	2991-50-6	
PFDoA	ND	2	1	01/25/2018 12:02	307-55-1	
PFTriDA	ND	2	1	01/25/2018 12:02	72629-94-8	
PFTeDA	ND	2	1	01/25/2018 12:02	376-06-7	
PFPrOPrA	ND	4	1	01/25/2018 12:02	62037-80-3	
PFBA	ND	2	1	01/25/2018 12:02	375-22-4	
PFPeA	ND	2	1	01/25/2018 12:02	2706-90-3	
PFDS	ND	2	1	01/25/2018 12:02	335-77-3	
NaDONA	ND	4	1	01/25/2018 12:02	958445-44-8	
PFHxDA	ND	2	1	01/25/2018 12:02	67905-19-5	
PFODA	ND	2	1	01/25/2018 12:02	16517-11-6	

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	1.5	76	70 - 130	Pass
13C2_PFDA	2.0	1.8	92	70 - 130	Pass
d5-EtFOSAA	8.0	6.8	84	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	370915	220959 - 662877	278844 - 557687	Pass
13C2_PFOA	264807	116636 - 349908	141520 - 283040	Pass
13C4_PFOS	433938	210188 - 630564	280831 - 561662	Pass
d3-MeFOSAA	244552	109963 - 329890	141607 - 283213	Pass

50-150% of Ical area

70-140% of the preceding CCV area



PFAA Laboratory Control Sample (LCS)

LCS Lab Sample ID	LCS-59910	Matrix	Water
LCS Filename	10LCMS02_180125B_005	Dilution	1
Total Amount Extracted	259mL	Extracted	01/23/2018
ICAL ID	180125A02	Analyzed	01/25/2018 12:15
Start CCal Filename	10LCMS02_180125B_002	Injected By	QL
End CCal Filename	10LCMS02_180125B_026		
Method Blank Filename	10LCMS02_180125B_004		

Compound	Spiked (ng/L)	Recovered (ng/L)	Recovery %	Limits
PFBA	1.9	1.4	73	50.0 - 150.0
PFPeA	1.9	1.5	79	50.0 - 150.0
PFBS	1.7	1.5	90	50.0 - 150.0
PFHxA	1.9	1.6	84	50.0 - 150.0
PFPrOPrA	3.9	3.9	101	50.0 - 150.0
PFHpA	1.9	1.7	86	50.0 - 150.0
NaDONA	3.9	4.0	104	50.0 - 150.0
PFHxS	1.8	1.8	99	50.0 - 150.0
PFOA	1.9	1.9	98	50.0 - 150.0
PFNA	1.9	2.0	104	50.0 - 150.0
PFOS	1.9	1.8	96	50.0 - 150.0
PFDA	1.9	1.8	91	50.0 - 150.0
PFUdA	1.9	2.0	103	50.0 - 150.0
N-MeFOSAA	3.9	3.1	80	50.0 - 150.0
N-EtFOSAA	3.9	4.0	105	50.0 - 150.0
PFDS	1.9	1.8	100	50.0 - 150.0
PFDoA	1.9	1.9	100	50.0 - 150.0
PFTTrDA	1.9	1.9	96	50.0 - 150.0
PFTeDA	1.9	1.8	94	50.0 - 150.0
PFHxDA	1.9	1.7	89	50.0 - 150.0
PFODA	1.9	1.8	94	50.0 - 150.0

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	1.7	83	50 - 150	Pass
13C2_PFDA	2.0	2.0	99	50 - 150	Pass
d5-EtFOSAA	8.0	7.0	88	50 - 150	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	378312	220959 - 662877	278844 - 557687	Pass
13C2_PFOA	253798	116636 - 349908	141520 - 283040	Pass
13C4_PFOS	447456	210188 - 630564	280831 - 561662	Pass
d3-MeFOSAA	241255	109963 - 329890	141607 - 283213	Pass

50-150% of Ical area

70-140% of the preceding CCV area



PFAA Laboratory Control Sample (LCS)

LCS Lab Sample ID	LCS-59914	Matrix	Water
LCS Filename	10LCMS02_180125B_007	Dilution	1
Total Amount Extracted	257mL	Extracted	01/23/2018
ICAL ID	180125A02	Analyzed	01/25/2018 12:39
Start CCal Filename	10LCMS02_180125B_002	Injected By	QL
End CCal Filename	10LCMS02_180125B_026		
Method Blank Filename	10LCMS02_180125B_004		

Compound	Spiked (ng/L)	Recovered (ng/L)	Recovery %	Limits
PFBA	19	18	95	70.0 - 130.0
PFPeA	19	19	95	70.0 - 130.0
PFBS	17	18	103	70.0 - 130.0
PFHxA	19	19	99	70.0 - 130.0
PFPrOPrA	39	36	93	70.0 - 130.0
PFHpA	19	20	102	70.0 - 130.0
NaDONA	39	40	102	70.0 - 130.0
PFHxS	18	20	110	70.0 - 130.0
PFOA	19	19	99	70.0 - 130.0
PFNA	19	21	107	70.0 - 130.0
PFOS	19	21	111	70.0 - 130.0
PFDA	19	19	97	70.0 - 130.0
PFUdA	19	20	104	70.0 - 130.0
N-MeFOSAA	39	33	84	70.0 - 130.0
N-EtFOSAA	39	38	99	70.0 - 130.0
PFDS	19	20	105	70.0 - 130.0
PFDoA	19	20	103	70.0 - 130.0
PFTTrDA	19	20	105	70.0 - 130.0
PFTeDA	19	18	90	70.0 - 130.0
PFHxDA	19	16	82	70.0 - 130.0
PFODA	19	17	86	70.0 - 130.0

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	1.8	89	70 - 130	Pass
13C2_PFDA	2.0	1.9	94	70 - 130	Pass
d5-EtFOSAA	8.0	7.0	87	70 - 130	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	416864	220959 - 662877	278844 - 557687	Pass
13C2_PFOA	232442	116636 - 349908	141520 - 283040	Pass
13C4_PFOS	414745	210188 - 630564	280831 - 561662	Pass
d3-MeFOSAA	236907	109963 - 329890	141607 - 283213	Pass

50-150% of Ical area

70-140% of the preceding CCV area



PFAA Laboratory Control Sample Duplicate (LCSD)

LCSD Lab Sample ID	LCSD-59913	LCS Filename	10LCMS02_180125B_005
LCSD Filename	10LCMS02_180125B_006	Matrix	Water
Total Amount Extracted	251mL	Dilution	1
ICAL ID	180125A02	Extracted	01/23/2018
Start CCal Filename	10LCMS02_180125B_002	Analyzed	01/25/2018 12:27
End CCal Filename	10LCMS02_180125B_026	Injected By	QL
Method Blank Filename	10LCMS02_180125B_004		

Compound	Spiked (ng/L)	Recovered (ng/L)	Recovery %	Recovery Limits	RPD %
PFBA	2.0	1.4	72	50.0 - 150.0	1
PFPeA	2.0	1.5	77	50.0 - 150.0	1
PFBS	1.8	1.5	85	50.0 - 150.0	2
PFHxA	2.0	1.6	80	50.0 - 150.0	2
PFPrOPrA	4.0	3.9	97	50.0 - 150.0	1
PFHpA	2.0	1.8	89	50.0 - 150.0	7
NaDONA	4.0	4.2	106	50.0 - 150.0	4
PFHxS	1.9	1.7	90	50.0 - 150.0	6
PFOA	2.0	1.6	82	50.0 - 150.0	14
PFNA	2.0	1.8	88	50.0 - 150.0	13
PFOS	1.9	1.6	82	50.0 - 150.0	13
PFDA	2.0	1.9	93	50.0 - 150.0	5
PFUdA	2.0	1.9	95	50.0 - 150.0	5
N-MeFOSAA	4.0	3.3	83	50.0 - 150.0	7
N-EtFOSAA	4.0	3.4	86	50.0 - 150.0	16
PFDS	1.9	1.7	90	50.0 - 150.0	7
PFDoA	2.0	2.0	99	50.0 - 150.0	2
PFTrDA	2.0	2.0	100	50.0 - 150.0	7
PFTeDA	2.0	2.0	98	50.0 - 150.0	7
PFHxDA	2.0	1.8	91	50.0 - 150.0	6
PFODA	2.0	1.9	95	50.0 - 150.0	4

Surrogate Standards

SS Compound	Spiked	Found	%Recovery	Limits	Pass/Fail
13C2_PFHxA	2.0	1.7	84	50 - 150	Pass
13C2_PFDA	2.0	2.1	106	50 - 150	Pass
d5-EtFOSAA	8.0	7.3	91	50 - 150	Pass

Internal Standards

IS Compound	Area	Ical Limits	CCV Limits	Pass/Fail
13C3_PFPPrOPrA	376979	220959 - 662877	278844 - 557687	Pass
13C2_PFOA	251163	116636 - 349908	141520 - 283040	Pass
13C4_PFOS	433311	210188 - 630564	280831 - 561662	Pass
d3-MeFOSAA	223413	109963 - 329890	141607 - 283213	Pass

50-150% of Ical area

70-140% of the preceding CCV area