



**Groundwater Sample Results,  
Combined Level 2 and Level 4 Laboratory Report,  
Electronic Data Deliverable, Data Validation Report,  
and the Sample Location Report, SDG 320-42363-1**

*Naval Air Warfare Center Warminster  
Warminster, Pennsylvania*

August 2019

N62269\_001191  
WARMINSTER\_NAWC  
SSIC 5000-33c

**LABORATORY DATA PACKAGE, 320-42363-1, NAS WILLOW GROVE NAWC  
WARMINSTER PA**  
09/11/2018  
TESTAMERICA LABORATORIES INC

Approved for public release: distribution unlimited.

## ANALYTICAL REPORT

Job Number: 320-42363-1

Job Description: Warminster: PFAS, NAS JRB Willow Grove

For:  
Tetra Tech, Inc.  
234 Mall Boulevard  
Suite 260  
King of Prussia, PA 19406  
Attention: Andy Frebowitz



Approved for release.  
David R. Alltucker  
Project Manager I  
9/11/2018 8:31 AM

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David R Alltucker, Project Manager I  
880 Riverside Parkway, West Sacramento, CA, 95605  
(916)374-4383  
david.alltucker@testamericainc.com  
09/11/2018

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# Definitions/Glossary

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

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## Qualifiers

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### LCMS

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
J1	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
U	Undetected at the Limit of Detection.
M	Manual integrated compound.

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## Glossary

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Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

**Job Narrative**  
**320-42363-1**

**Receipt**

The samples were received on 8/22/2018 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.1° C.

**LCMS**

Method(s) 537: The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

Method(s) 537: The matrix spike / matrix spike duplicate (MS/MSD) precision for preparation batch 320-242479 and analytical batch 320-242992 was outside control limits. The associated laboratory control sample (LCS) was within acceptance limits. The MS/MSD recoveries were within control limits.

Method(s) 537: Internal standard (ISTD) response for the following sample was outside control limits: NAWC-082118-RW-098 (320-42363-5). The sample was re-analyzed with concurring results, and both sets of data were reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

**Organic Prep**

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

# Detection Summary

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

## Client Sample ID: NAWC-082118-RW-228

Lab Sample ID: 320-42363-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	11	J J1	36	6.1	ng/L	1		537	Total/NA
Perfluorooctanoic acid (PFOA)	12	J J1	18	2.5	ng/L	1		537	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.0	J	9.0	1.7	ng/L	1		537	Total/NA
Perfluorobutanesulfonic acid (PFBS)	31	J	81	14	ng/L	1		537	Total/NA

## Client Sample ID: NAWC-082118-FRB-228

Lab Sample ID: 320-42363-2

No Detections.

## Client Sample ID: NAWC-082118-RW-175

Lab Sample ID: 320-42363-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	65		36	6.1	ng/L	1		537	Total/NA
Perfluorooctanoic acid (PFOA)	12	J	18	2.5	ng/L	1		537	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	40		27	4.9	ng/L	1		537	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.1	J	8.9	1.7	ng/L	1		537	Total/NA

## Client Sample ID: NAWC-082118-FRB-175

Lab Sample ID: 320-42363-4

No Detections.

## Client Sample ID: NAWC-082118-RW-098

Lab Sample ID: 320-42363-5

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	11	J	34	5.8	ng/L	1		537	Total/NA
Perfluorooctanoic acid (PFOA)	11	J	17	2.4	ng/L	1		537	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.5	J	8.6	1.6	ng/L	1		537	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RA	11	J	34	5.8	ng/L	1		537	Total/NA
Perfluorooctanoic acid (PFOA) - RA	11	J	17	2.4	ng/L	1		537	Total/NA
Perfluoroheptanoic acid (PFHpA) - RA	3.4	J	8.6	1.6	ng/L	1		537	Total/NA

## Client Sample ID: NAWC-082118-FRB-098

Lab Sample ID: 320-42363-6

No Detections.

## Client Sample ID: WGNA-082118-RW-0488

Lab Sample ID: 320-42363-7

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	19	J	35	6.0	ng/L	1		537	Total/NA
Perfluorooctanoic acid (PFOA)	30		18	2.5	ng/L	1		537	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	20	J	27	4.9	ng/L	1		537	Total/NA
Perfluoroheptanoic acid (PFHpA)	11		8.9	1.7	ng/L	1		537	Total/NA

## Client Sample ID: WGNA-082118-FRB-0488

Lab Sample ID: 320-42363-8

No Detections.

## Client Sample ID: NAWC-082118-RW-265

Lab Sample ID: 320-42363-9

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	23	J	36	6.1	ng/L	1		537	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento



# Detection Summary

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

## Client Sample ID: NAWC-082118-RW-265 (Continued)

Lab Sample ID: 320-42363-9

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	15	J	18	2.5	ng/L	1		537	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	12	J	27	4.9	ng/L	1		537	Total/NA
Perfluoroheptanoic acid (PFHpA)	9.1		8.9	1.7	ng/L	1		537	Total/NA

## Client Sample ID: NAWC-082118-FRB-265

Lab Sample ID: 320-42363-10

No Detections.

## Client Sample ID: WGNA-082118-RW-3556

Lab Sample ID: 320-42363-11

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	13	J	38	6.4	ng/L	1		537	Total/NA
Perfluorooctanoic acid (PFOA)	14	J	19	2.7	ng/L	1		537	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.6	J	9.5	1.8	ng/L	1		537	Total/NA

## Client Sample ID: WGNA-082118-FRB-3556

Lab Sample ID: 320-42363-12

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

# Client Sample Results

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

**Client Sample ID: NAWC-082118-RW-228**

**Lab Sample ID: 320-42363-1**

Date Collected: 08/21/18 09:10

Matrix: Water

Date Received: 08/22/18 09:30

**Method: 537 - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	11	J J1	36	6.1	ng/L		08/28/18 06:42	08/30/18 07:01	1
Perfluorooctanoic acid (PFOA)	12	J J1	18	2.5	ng/L		08/28/18 06:42	08/30/18 07:01	1
Perfluorononanoic acid (PFNA)	18	U	22	7.2	ng/L		08/28/18 06:42	08/30/18 07:01	1
Perfluorohexanesulfonic acid (PFHxS)	11	U J1	27	5.0	ng/L		08/28/18 06:42	08/30/18 07:01	1
Perfluoroheptanoic acid (PFHpA)	4.0	J	9.0	1.7	ng/L		08/28/18 06:42	08/30/18 07:01	1
Perfluorobutanesulfonic acid (PFBS)	31	J	81	14	ng/L		08/28/18 06:42	08/30/18 07:01	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	91		70 - 130				08/28/18 06:42	08/30/18 07:01	1
13C2 PFDA	97		70 - 130				08/28/18 06:42	08/30/18 07:01	1

**Client Sample ID: NAWC-082118-FRB-228**

**Lab Sample ID: 320-42363-2**

Date Collected: 08/21/18 09:05

Matrix: Water

Date Received: 08/22/18 09:30

**Method: 537 - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	15	U	37	6.3	ng/L		08/28/18 06:42	08/30/18 07:15	1
Perfluorooctanoic acid (PFOA)	7.5	U	19	2.6	ng/L		08/28/18 06:42	08/30/18 07:15	1
Perfluorononanoic acid (PFNA)	19	U	22	7.5	ng/L		08/28/18 06:42	08/30/18 07:15	1
Perfluorohexanesulfonic acid (PFHxS)	11	U	28	5.1	ng/L		08/28/18 06:42	08/30/18 07:15	1
Perfluoroheptanoic acid (PFHpA)	3.7	U	9.3	1.8	ng/L		08/28/18 06:42	08/30/18 07:15	1
Perfluorobutanesulfonic acid (PFBS)	34	U	84	15	ng/L		08/28/18 06:42	08/30/18 07:15	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	97		70 - 130				08/28/18 06:42	08/30/18 07:15	1
13C2 PFDA	103		70 - 130				08/28/18 06:42	08/30/18 07:15	1

**Client Sample ID: NAWC-082118-RW-175**

**Lab Sample ID: 320-42363-3**

Date Collected: 08/21/18 10:10

Matrix: Water

Date Received: 08/22/18 09:30

**Method: 537 - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	65		36	6.1	ng/L		08/28/18 06:42	08/30/18 07:20	1
Perfluorooctanoic acid (PFOA)	12	J	18	2.5	ng/L		08/28/18 06:42	08/30/18 07:20	1
Perfluorononanoic acid (PFNA)	18	U	21	7.1	ng/L		08/28/18 06:42	08/30/18 07:20	1
Perfluorohexanesulfonic acid (PFHxS)	40		27	4.9	ng/L		08/28/18 06:42	08/30/18 07:20	1
Perfluoroheptanoic acid (PFHpA)	5.1	J	8.9	1.7	ng/L		08/28/18 06:42	08/30/18 07:20	1
Perfluorobutanesulfonic acid (PFBS)	32	U	80	14	ng/L		08/28/18 06:42	08/30/18 07:20	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	95		70 - 130				08/28/18 06:42	08/30/18 07:20	1
13C2 PFDA	102		70 - 130				08/28/18 06:42	08/30/18 07:20	1

# Client Sample Results

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

**Client Sample ID: NAWC-082118-FRB-175**

**Lab Sample ID: 320-42363-4**

**Date Collected: 08/21/18 10:05**

**Matrix: Water**

**Date Received: 08/22/18 09:30**

**Method: 537 - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	15	U	36	6.2	ng/L		08/28/18 06:42	08/30/18 07:24	1
Perfluorooctanoic acid (PFOA)	7.3	U	18	2.6	ng/L		08/28/18 06:42	08/30/18 07:24	1
Perfluorononanoic acid (PFNA)	18	U	22	7.3	ng/L		08/28/18 06:42	08/30/18 07:24	1
Perfluorohexanesulfonic acid (PFHxS)	11	U	27	5.0	ng/L		08/28/18 06:42	08/30/18 07:24	1
Perfluoroheptanoic acid (PFHpA)	3.6	U	9.1	1.7	ng/L		08/28/18 06:42	08/30/18 07:24	1
Perfluorobutanesulfonic acid (PFBS)	33	U	82	15	ng/L		08/28/18 06:42	08/30/18 07:24	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	96		70 - 130	08/28/18 06:42	08/30/18 07:24	1
13C2 PFDA	102		70 - 130	08/28/18 06:42	08/30/18 07:24	1

**Client Sample ID: NAWC-082118-RW-098**

**Lab Sample ID: 320-42363-5**

**Date Collected: 08/21/18 10:40**

**Matrix: Water**

**Date Received: 08/22/18 09:30**

**Method: 537 - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	11	J	34	5.8	ng/L		08/28/18 06:42	08/30/18 07:29	1
Perfluorooctanoic acid (PFOA)	11	J	17	2.4	ng/L		08/28/18 06:42	08/30/18 07:29	1
Perfluorononanoic acid (PFNA)	17	U	21	6.9	ng/L		08/28/18 06:42	08/30/18 07:29	1
Perfluorohexanesulfonic acid (PFHxS)	10	U	26	4.7	ng/L		08/28/18 06:42	08/30/18 07:29	1
Perfluoroheptanoic acid (PFHpA)	3.5	J	8.6	1.6	ng/L		08/28/18 06:42	08/30/18 07:29	1
Perfluorobutanesulfonic acid (PFBS)	31	U	77	14	ng/L		08/28/18 06:42	08/30/18 07:29	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	93		70 - 130	08/28/18 06:42	08/30/18 07:29	1
13C2 PFDA	103		70 - 130	08/28/18 06:42	08/30/18 07:29	1

**Method: 537 - Perfluorinated Alkyl Acids (LC/MS) - RA**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	11	J	34	5.8	ng/L		08/28/18 06:42	08/31/18 08:18	1
Perfluorooctanoic acid (PFOA)	11	J	17	2.4	ng/L		08/28/18 06:42	08/31/18 08:18	1
Perfluorononanoic acid (PFNA)	17	U	21	6.9	ng/L		08/28/18 06:42	08/31/18 08:18	1
Perfluorohexanesulfonic acid (PFHxS)	10	U	26	4.7	ng/L		08/28/18 06:42	08/31/18 08:18	1
Perfluoroheptanoic acid (PFHpA)	3.4	J	8.6	1.6	ng/L		08/28/18 06:42	08/31/18 08:18	1
Perfluorobutanesulfonic acid (PFBS)	31	U	77	14	ng/L		08/28/18 06:42	08/31/18 08:18	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	88		70 - 130	08/28/18 06:42	08/31/18 08:18	1
13C2 PFDA	89		70 - 130	08/28/18 06:42	08/31/18 08:18	1

**Client Sample ID: NAWC-082118-FRB-098**

**Lab Sample ID: 320-42363-6**

**Date Collected: 08/21/18 10:35**

**Matrix: Water**

**Date Received: 08/22/18 09:30**

**Method: 537 - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	16	U	39	6.6	ng/L		08/28/18 06:42	08/30/18 07:34	1
Perfluorooctanoic acid (PFOA)	7.8	U	19	2.7	ng/L		08/28/18 06:42	08/30/18 07:34	1

TestAmerica Sacramento

# Client Sample Results

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

**Client Sample ID: NAWC-082118-FRB-098**

**Lab Sample ID: 320-42363-6**

**Date Collected: 08/21/18 10:35**

**Matrix: Water**

**Date Received: 08/22/18 09:30**

**Method: 537 - Perfluorinated Alkyl Acids (LC/MS) (Continued)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	19	U	23	7.8	ng/L		08/28/18 06:42	08/30/18 07:34	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	29	5.4	ng/L		08/28/18 06:42	08/30/18 07:34	1
Perfluoroheptanoic acid (PFHpA)	3.9	U	9.7	1.8	ng/L		08/28/18 06:42	08/30/18 07:34	1
Perfluorobutanesulfonic acid (PFBS)	35	U	88	16	ng/L		08/28/18 06:42	08/30/18 07:34	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	101		70 - 130				08/28/18 06:42	08/30/18 07:34	1
13C2 PFDA	106		70 - 130				08/28/18 06:42	08/30/18 07:34	1

**Client Sample ID: WGNA-082118-RW-0488**

**Lab Sample ID: 320-42363-7**

**Date Collected: 08/21/18 11:40**

**Matrix: Water**

**Date Received: 08/22/18 09:30**

**Method: 537 - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Perfluorooctanesulfonic acid (PFOS)</b>	<b>19</b>	<b>J</b>	35	6.0	ng/L		08/28/18 06:42	08/31/18 08:22	1
<b>Perfluorooctanoic acid (PFOA)</b>	<b>30</b>		18	2.5	ng/L		08/28/18 06:42	08/31/18 08:22	1
Perfluorononanoic acid (PFNA)	18	U	21	7.1	ng/L		08/28/18 06:42	08/31/18 08:22	1
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>20</b>	<b>J</b>	27	4.9	ng/L		08/28/18 06:42	08/31/18 08:22	1
<b>Perfluoroheptanoic acid (PFHpA)</b>	<b>11</b>		8.9	1.7	ng/L		08/28/18 06:42	08/31/18 08:22	1
Perfluorobutanesulfonic acid (PFBS)	32	U	80	14	ng/L		08/28/18 06:42	08/31/18 08:22	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	93		70 - 130				08/28/18 06:42	08/31/18 08:22	1
13C2 PFDA	89		70 - 130				08/28/18 06:42	08/31/18 08:22	1

**Client Sample ID: WGNA-082118-FRB-0488**

**Lab Sample ID: 320-42363-8**

**Date Collected: 08/21/18 11:35**

**Matrix: Water**

**Date Received: 08/22/18 09:30**

**Method: 537 - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	15	U	37	6.3	ng/L		08/28/18 06:42	08/30/18 07:52	1
Perfluorooctanoic acid (PFOA)	7.4	U	18	2.6	ng/L		08/28/18 06:42	08/30/18 07:52	1
Perfluorononanoic acid (PFNA)	18	U	22	7.4	ng/L		08/28/18 06:42	08/30/18 07:52	1
Perfluorohexanesulfonic acid (PFHxS)	11	U	28	5.1	ng/L		08/28/18 06:42	08/30/18 07:52	1
Perfluoroheptanoic acid (PFHpA)	3.7	U	9.2	1.7	ng/L		08/28/18 06:42	08/30/18 07:52	1
Perfluorobutanesulfonic acid (PFBS)	33	U	83	15	ng/L		08/28/18 06:42	08/30/18 07:52	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	89		70 - 130				08/28/18 06:42	08/30/18 07:52	1
13C2 PFDA	101		70 - 130				08/28/18 06:42	08/30/18 07:52	1

# Client Sample Results

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

**Client Sample ID: NAWC-082118-RW-265**

**Lab Sample ID: 320-42363-9**

**Date Collected: 08/21/18 12:10**

**Matrix: Water**

**Date Received: 08/22/18 09:30**

**Method: 537 - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	23	J	36	6.1	ng/L		08/28/18 06:42	08/30/18 07:57	1
Perfluorooctanoic acid (PFOA)	15	J	18	2.5	ng/L		08/28/18 06:42	08/30/18 07:57	1
Perfluorononanoic acid (PFNA)	18	U	21	7.1	ng/L		08/28/18 06:42	08/30/18 07:57	1
Perfluorohexanesulfonic acid (PFHxS)	12	J	27	4.9	ng/L		08/28/18 06:42	08/30/18 07:57	1
Perfluoroheptanoic acid (PFHpA)	9.1		8.9	1.7	ng/L		08/28/18 06:42	08/30/18 07:57	1
Perfluorobutanesulfonic acid (PFBS)	32	U	80	14	ng/L		08/28/18 06:42	08/30/18 07:57	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	98		70 - 130				08/28/18 06:42	08/30/18 07:57	1
13C2 PFDA	104		70 - 130				08/28/18 06:42	08/30/18 07:57	1

**Client Sample ID: NAWC-082118-FRB-265**

**Lab Sample ID: 320-42363-10**

**Date Collected: 08/21/18 12:05**

**Matrix: Water**

**Date Received: 08/22/18 09:30**

**Method: 537 - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	14	U	36	6.1	ng/L		08/28/18 06:42	08/30/18 08:02	1
Perfluorooctanoic acid (PFOA)	7.2	U	18	2.5	ng/L		08/28/18 06:42	08/30/18 08:02	1
Perfluorononanoic acid (PFNA)	18	U	22	7.2	ng/L		08/28/18 06:42	08/30/18 08:02	1
Perfluorohexanesulfonic acid (PFHxS)	11	U	27	5.0	ng/L		08/28/18 06:42	08/30/18 08:02	1
Perfluoroheptanoic acid (PFHpA)	3.6	U	9.0	1.7	ng/L		08/28/18 06:42	08/30/18 08:02	1
Perfluorobutanesulfonic acid (PFBS)	33	U	81	15	ng/L		08/28/18 06:42	08/30/18 08:02	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	98		70 - 130				08/28/18 06:42	08/30/18 08:02	1
13C2 PFDA	106		70 - 130				08/28/18 06:42	08/30/18 08:02	1

**Client Sample ID: WGNA-082118-RW-3556**

**Lab Sample ID: 320-42363-11**

**Date Collected: 08/21/18 12:40**

**Matrix: Water**

**Date Received: 08/22/18 09:30**

**Method: 537 - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	13	J	38	6.4	ng/L		08/28/18 06:42	08/30/18 08:06	1
Perfluorooctanoic acid (PFOA)	14	J	19	2.7	ng/L		08/28/18 06:42	08/30/18 08:06	1
Perfluorononanoic acid (PFNA)	19	U	23	7.6	ng/L		08/28/18 06:42	08/30/18 08:06	1
Perfluorohexanesulfonic acid (PFHxS)	11	U	28	5.2	ng/L		08/28/18 06:42	08/30/18 08:06	1
Perfluoroheptanoic acid (PFHpA)	4.6	J	9.5	1.8	ng/L		08/28/18 06:42	08/30/18 08:06	1
Perfluorobutanesulfonic acid (PFBS)	34	U	85	15	ng/L		08/28/18 06:42	08/30/18 08:06	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	94		70 - 130				08/28/18 06:42	08/30/18 08:06	1
13C2 PFDA	101		70 - 130				08/28/18 06:42	08/30/18 08:06	1

# Client Sample Results

Client: Tetra Tech, Inc.  
 Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

**Client Sample ID: WGNA-082118-FRB-3556**

**Lab Sample ID: 320-42363-12**

**Date Collected: 08/21/18 12:35**

**Matrix: Water**

**Date Received: 08/22/18 09:30**

**Method: 537 - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	15	U	36	6.2	ng/L		08/28/18 06:42	08/30/18 08:11	1
Perfluorooctanoic acid (PFOA)	7.3	U	18	2.5	ng/L		08/28/18 06:42	08/30/18 08:11	1
Perfluorononanoic acid (PFNA)	18	U	22	7.3	ng/L		08/28/18 06:42	08/30/18 08:11	1
Perfluorohexanesulfonic acid (PFHxS)	11	U	27	5.0	ng/L		08/28/18 06:42	08/30/18 08:11	1
Perfluoroheptanoic acid (PFHpA)	3.6	U	9.1	1.7	ng/L		08/28/18 06:42	08/30/18 08:11	1
Perfluorobutanesulfonic acid (PFBS)	33	U	82	15	ng/L		08/28/18 06:42	08/30/18 08:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	97		70 - 130	08/28/18 06:42	08/30/18 08:11	1
13C2 PFDA	107		70 - 130	08/28/18 06:42	08/30/18 08:11	1

# Default Detection Limits

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

## Method: 537 - Perfluorinated Alkyl Acids (LC/MS)

Prep: 537

Analyte	LOQ	DL	Units	Method
Perfluorobutanesulfonic acid (PFBS)	90	16	ng/L	537
Perfluoroheptanoic acid (PFHpA)	10	1.9	ng/L	537
Perfluorohexanesulfonic acid (PFHxS)	30	5.5	ng/L	537
Perfluorononanoic acid (PFNA)	24	8.0	ng/L	537
Perfluorooctanesulfonic acid (PFOS)	40	6.8	ng/L	537
Perfluorooctanoic acid (PFOA)	20	2.8	ng/L	537

# Surrogate Summary

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

## Method: 537 - Perfluorinated Alkyl Acids (LC/MS)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		PFHxA (70-130)	PFDA (70-130)
320-42363-1	NAWC-082118-RW-228	91	97
320-42363-1 MS	NAWC-082118-RW-228	106	115
320-42363-1 MSD	NAWC-082118-RW-228	77	86
320-42363-2	NAWC-082118-FRB-228	97	103
320-42363-3	NAWC-082118-RW-175	95	102
320-42363-4	NAWC-082118-FRB-175	96	102
320-42363-5	NAWC-082118-RW-098	93	103
320-42363-5 - RA	NAWC-082118-RW-098	88	89
320-42363-6	NAWC-082118-FRB-098	101	106
320-42363-7	WGNA-082118-RW-0488	93	89
320-42363-8	WGNA-082118-FRB-0488	89	101
320-42363-9	NAWC-082118-RW-265	98	104
320-42363-10	NAWC-082118-FRB-265	98	106
320-42363-11	WGNA-082118-RW-3556	94	101
320-42363-12	WGNA-082118-FRB-3556	97	107
LCS 320-242479/2-A	Lab Control Sample	104	107
MB 320-242479/1-A	Method Blank	98	101

### Surrogate Legend

PFHxA = 13C2 PFHxA

PFDA = 13C2 PFDA



# QC Sample Results

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

## Method: 537 - Perfluorinated Alkyl Acids (LC/MS)

**Lab Sample ID: MB 320-242479/1-A**  
**Matrix: Water**  
**Analysis Batch: 242992**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 242479**

Analyte	MB	MB	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorooctanesulfonic acid (PFOS)	16	U	40	6.8	ng/L		08/28/18 06:42	08/30/18 06:52	1
Perfluorooctanoic acid (PFOA)	8.0	U	20	2.8	ng/L		08/28/18 06:42	08/30/18 06:52	1
Perfluorononanoic acid (PFNA)	20	U	24	8.0	ng/L		08/28/18 06:42	08/30/18 06:52	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	30	5.5	ng/L		08/28/18 06:42	08/30/18 06:52	1
Perfluoroheptanoic acid (PFHpA)	4.0	U	10	1.9	ng/L		08/28/18 06:42	08/30/18 06:52	1
Perfluorobutanesulfonic acid (PFBS)	36	U	90	16	ng/L		08/28/18 06:42	08/30/18 06:52	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C2 PFHxA	98		70 - 130	08/28/18 06:42	08/30/18 06:52	1
13C2 PFDA	101		70 - 130	08/28/18 06:42	08/30/18 06:52	1

**Lab Sample ID: LCS 320-242479/2-A**  
**Matrix: Water**  
**Analysis Batch: 242992**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 242479**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanoic acid (PFOA)	110	106		ng/L		97	70 - 130
Perfluorononanoic acid (PFNA)	110	100		ng/L		91	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	168	172		ng/L		102	70 - 130
Perfluoroheptanoic acid (PFHpA)	54.0	56.1		ng/L		104	70 - 130
Perfluorobutanesulfonic acid (PFBS)	500	448		ng/L		89	70 - 130

Surrogate	LCS	LCS	Limits
	%Recovery	Qualifier	
13C2 PFHxA	104		70 - 130
13C2 PFDA	107		70 - 130

**Lab Sample ID: 320-42363-1 MS**  
**Matrix: Water**  
**Analysis Batch: 242992**

**Client Sample ID: NAWC-082118-RW-228**  
**Prep Type: Total/NA**  
**Prep Batch: 242479**

Analyte	Sample	Sample	Spike Added	MS	MS	Unit	D	%Rec	%Rec. Limits
	Result	Qualifier		Result	Qualifier				
Perfluorooctanesulfonic acid (PFOS)	11	J1	199	257		ng/L		124	70 - 130
Perfluorooctanoic acid (PFOA)	12	J1	99.5	125	M	ng/L		113	70 - 130
Perfluorononanoic acid (PFNA)	18	U	99.5	106		ng/L		106	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	11	U J1	152	191		ng/L		126	70 - 130
Perfluoroheptanoic acid (PFHpA)	4.1	J	48.9	58.8		ng/L		112	70 - 130
Perfluorobutanesulfonic acid (PFBS)	29	J	453	513		ng/L		107	70 - 130

Surrogate	MS	MS	Limits
	%Recovery	Qualifier	
13C2 PFHxA	106		70 - 130
13C2 PFDA	115		70 - 130

# QC Sample Results

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

## Method: 537 - Perfluorinated Alkyl Acids (LC/MS) (Continued)

**Lab Sample ID: 320-42363-1 MSD**

**Matrix: Water**

**Analysis Batch: 242992**

**Client Sample ID: NAWC-082118-RW-228**

**Prep Type: Total/NA**

**Prep Batch: 242479**

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Perfluorooctanesulfonic acid (PFOS)	11	J1	194	183	J1	ng/L		89	70 - 130	33	30
Perfluorooctanoic acid (PFOA)	12	J1	97.1	89.4	J1	ng/L		79	70 - 130	33	30
Perfluorononanoic acid (PFNA)	18	U	97.1	78.0		ng/L		80	70 - 130	30	30
Perfluorohexanesulfonic acid (PFHxS)	11	U J1	148	137	J1	ng/L		92	70 - 130	33	30
Perfluoroheptanoic acid (PFHpA)	4.1	J	47.7	44.7		ng/L		85	70 - 130	27	30
Perfluorobutanesulfonic acid (PFBS)	29	J	442	407		ng/L		86	70 - 130	23	30
		<b>MSD</b>	<b>MSD</b>								
<b>Surrogate</b>		<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>							
13C2 PFHxA		77		70 - 130							
13C2 PFDA		86		70 - 130							

# QC Association Summary

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

## LCMS

### Prep Batch: 242479

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42363-1	NAWC-082118-RW-228	Total/NA	Water	537	
320-42363-2	NAWC-082118-FRB-228	Total/NA	Water	537	
320-42363-3	NAWC-082118-RW-175	Total/NA	Water	537	
320-42363-4	NAWC-082118-FRB-175	Total/NA	Water	537	
320-42363-5	NAWC-082118-RW-098	Total/NA	Water	537	
320-42363-5 - RA	NAWC-082118-RW-098	Total/NA	Water	537	
320-42363-6	NAWC-082118-FRB-098	Total/NA	Water	537	
320-42363-7	WGNA-082118-RW-0488	Total/NA	Water	537	
320-42363-8	WGNA-082118-FRB-0488	Total/NA	Water	537	
320-42363-9	NAWC-082118-RW-265	Total/NA	Water	537	
320-42363-10	NAWC-082118-FRB-265	Total/NA	Water	537	
320-42363-11	WGNA-082118-RW-3556	Total/NA	Water	537	
320-42363-12	WGNA-082118-FRB-3556	Total/NA	Water	537	
MB 320-242479/1-A	Method Blank	Total/NA	Water	537	
LCS 320-242479/2-A	Lab Control Sample	Total/NA	Water	537	
320-42363-1 MS	NAWC-082118-RW-228	Total/NA	Water	537	
320-42363-1 MSD	NAWC-082118-RW-228	Total/NA	Water	537	

### Analysis Batch: 242992

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42363-1	NAWC-082118-RW-228	Total/NA	Water	537	242479
320-42363-2	NAWC-082118-FRB-228	Total/NA	Water	537	242479
320-42363-3	NAWC-082118-RW-175	Total/NA	Water	537	242479
320-42363-4	NAWC-082118-FRB-175	Total/NA	Water	537	242479
320-42363-5	NAWC-082118-RW-098	Total/NA	Water	537	242479
320-42363-6	NAWC-082118-FRB-098	Total/NA	Water	537	242479
MB 320-242479/1-A	Method Blank	Total/NA	Water	537	242479
LCS 320-242479/2-A	Lab Control Sample	Total/NA	Water	537	242479
320-42363-1 MS	NAWC-082118-RW-228	Total/NA	Water	537	242479
320-42363-1 MSD	NAWC-082118-RW-228	Total/NA	Water	537	242479

### Analysis Batch: 242994

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42363-8	WGNA-082118-FRB-0488	Total/NA	Water	537	242479
320-42363-9	NAWC-082118-RW-265	Total/NA	Water	537	242479
320-42363-10	NAWC-082118-FRB-265	Total/NA	Water	537	242479
320-42363-11	WGNA-082118-RW-3556	Total/NA	Water	537	242479
320-42363-12	WGNA-082118-FRB-3556	Total/NA	Water	537	242479

### Analysis Batch: 243340

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42363-5 - RA	NAWC-082118-RW-098	Total/NA	Water	537	242479
320-42363-7	WGNA-082118-RW-0488	Total/NA	Water	537	242479

# Lab Chronicle

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

**Client Sample ID: NAWC-082118-RW-228**

**Date Collected: 08/21/18 09:10**

**Date Received: 08/22/18 09:30**

**Lab Sample ID: 320-42363-1**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			242479	08/28/18 06:42	HJA	TAL SAC
Total/NA	Analysis	537		1	242992	08/30/18 07:01	JRB	TAL SAC

**Client Sample ID: NAWC-082118-FRB-228**

**Date Collected: 08/21/18 09:05**

**Date Received: 08/22/18 09:30**

**Lab Sample ID: 320-42363-2**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			242479	08/28/18 06:42	HJA	TAL SAC
Total/NA	Analysis	537		1	242992	08/30/18 07:15	JRB	TAL SAC

**Client Sample ID: NAWC-082118-RW-175**

**Date Collected: 08/21/18 10:10**

**Date Received: 08/22/18 09:30**

**Lab Sample ID: 320-42363-3**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			242479	08/28/18 06:42	HJA	TAL SAC
Total/NA	Analysis	537		1	242992	08/30/18 07:20	JRB	TAL SAC

**Client Sample ID: NAWC-082118-FRB-175**

**Date Collected: 08/21/18 10:05**

**Date Received: 08/22/18 09:30**

**Lab Sample ID: 320-42363-4**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			242479	08/28/18 06:42	HJA	TAL SAC
Total/NA	Analysis	537		1	242992	08/30/18 07:24	JRB	TAL SAC

**Client Sample ID: NAWC-082118-RW-098**

**Date Collected: 08/21/18 10:40**

**Date Received: 08/22/18 09:30**

**Lab Sample ID: 320-42363-5**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			242479	08/28/18 06:42	HJA	TAL SAC
Total/NA	Analysis	537		1	242992	08/30/18 07:29	JRB	TAL SAC
Total/NA	Prep	537	RA		242479	08/28/18 06:42	HJA	TAL SAC
Total/NA	Analysis	537	RA	1	243340	08/31/18 08:18	JRB	TAL SAC

# Lab Chronicle

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

**Client Sample ID: NAWC-082118-FRB-098**

**Date Collected: 08/21/18 10:35**

**Date Received: 08/22/18 09:30**

**Lab Sample ID: 320-42363-6**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			242479	08/28/18 06:42	HJA	TAL SAC
Total/NA	Analysis	537		1	242992	08/30/18 07:34	JRB	TAL SAC

**Client Sample ID: WGNA-082118-RW-0488**

**Date Collected: 08/21/18 11:40**

**Date Received: 08/22/18 09:30**

**Lab Sample ID: 320-42363-7**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			242479	08/28/18 06:42	HJA	TAL SAC
Total/NA	Analysis	537		1	243340	08/31/18 08:22	JRB	TAL SAC

**Client Sample ID: WGNA-082118-FRB-0488**

**Date Collected: 08/21/18 11:35**

**Date Received: 08/22/18 09:30**

**Lab Sample ID: 320-42363-8**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			242479	08/28/18 06:42	HJA	TAL SAC
Total/NA	Analysis	537		1	242994	08/30/18 07:52	JRB	TAL SAC

**Client Sample ID: NAWC-082118-RW-265**

**Date Collected: 08/21/18 12:10**

**Date Received: 08/22/18 09:30**

**Lab Sample ID: 320-42363-9**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			242479	08/28/18 06:42	HJA	TAL SAC
Total/NA	Analysis	537		1	242994	08/30/18 07:57	JRB	TAL SAC

**Client Sample ID: NAWC-082118-FRB-265**

**Date Collected: 08/21/18 12:05**

**Date Received: 08/22/18 09:30**

**Lab Sample ID: 320-42363-10**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			242479	08/28/18 06:42	HJA	TAL SAC
Total/NA	Analysis	537		1	242994	08/30/18 08:02	JRB	TAL SAC

**Client Sample ID: WGNA-082118-RW-3556**

**Date Collected: 08/21/18 12:40**

**Date Received: 08/22/18 09:30**

**Lab Sample ID: 320-42363-11**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			242479	08/28/18 06:42	HJA	TAL SAC
Total/NA	Analysis	537		1	242994	08/30/18 08:06	JRB	TAL SAC

TestAmerica Sacramento

# Lab Chronicle

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

**Client Sample ID: WGNA-082118-FRB-3556**

**Lab Sample ID: 320-42363-12**

**Date Collected: 08/21/18 12:35**

**Matrix: Water**

**Date Received: 08/22/18 09:30**

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Prepared or Analyzed</u>	<u>Analyst</u>	<u>Lab</u>
Total/NA	Prep	537			242479	08/28/18 06:42	HJA	TAL SAC
Total/NA	Analysis	537		1	242994	08/30/18 08:11	JRB	TAL SAC

**Laboratory References:**

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

# Accreditation/Certification Summary

Client: Tetra Tech, Inc.  
 Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

## Laboratory: TestAmerica Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD ELAP		L2468	01-20-21
Arizona	State Program	9	AZ0708	08-11-19
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-19
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-19
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Illinois	NELAP	5	200060	03-17-19
Kansas	NELAP	7	E-10375	10-31-18
Louisiana	NELAP	6	30612	06-30-19
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-19
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-19
New York	NELAP	2	11666	03-31-19
Oregon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-19
Texas	NELAP	6	T104704399	05-31-19
US Fish & Wildlife	Federal		LE148388-0	07-31-19
USDA	Federal		P330-18-00239	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-19
Vermont	State Program	1	VT-4040	04-30-19
Virginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-19
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

# Method Summary

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

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<b>Method</b>	<b>Method Description</b>	<b>Protocol</b>	<b>Laboratory</b>
537	Perfluorinated Alkyl Acids (LC/MS)	EPA	TAL SAC
537	Extraction of Perfluorinated Alkyl Acids	EPA	TAL SAC

**Protocol References:**

EPA = US Environmental Protection Agency

**Laboratory References:**

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600



# Sample Summary

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-42363-1

Project/Site: Warminster: PFAS, NAS JRB Willow Grove

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-42363-1	NAWC-082118-RW-228	Water	08/21/18 09:10	08/22/18 09:30
320-42363-2	NAWC-082118-FRB-228	Water	08/21/18 09:05	08/22/18 09:30
320-42363-3	NAWC-082118-RW-175	Water	08/21/18 10:10	08/22/18 09:30
320-42363-4	NAWC-082118-FRB-175	Water	08/21/18 10:05	08/22/18 09:30
320-42363-5	NAWC-082118-RW-098	Water	08/21/18 10:40	08/22/18 09:30
320-42363-6	NAWC-082118-FRB-098	Water	08/21/18 10:35	08/22/18 09:30
320-42363-7	WGNA-082118-RW-0488	Water	08/21/18 11:40	08/22/18 09:30
320-42363-8	WGNA-082118-FRB-0488	Water	08/21/18 11:35	08/22/18 09:30
320-42363-9	NAWC-082118-RW-265	Water	08/21/18 12:10	08/22/18 09:30
320-42363-10	NAWC-082118-FRB-265	Water	08/21/18 12:05	08/22/18 09:30
320-42363-11	WGNA-082118-RW-3556	Water	08/21/18 12:40	08/22/18 09:30
320-42363-12	WGNA-082118-FRB-3556	Water	08/21/18 12:35	08/22/18 09:30

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Analysis Batch Number: 240166

Lab Sample ID: IC 320-240166/2 Client Sample ID: \_\_\_\_\_

Date Analyzed: 08/15/18 18:21 Lab File ID: 2018.08.15\_537CURVE\_003.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluoroheptanoic acid (PFHpA)	1.65	Baseline	roycea	08/15/18 18:53

Lab Sample ID: CCVL 320-240166/9 Client Sample ID: \_\_\_\_\_

Date Analyzed: 08/15/18 18:53 Lab File ID: 2018.08.15\_537CURVE\_010.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluoroheptanoic acid (PFHpA)	1.65	Baseline	roycea	08/15/18 19:08

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Analysis Batch Number: 242992

Lab Sample ID: 320-42363-1 MS Client Sample ID: NAWC-082118-RW-228 MS

Date Analyzed: 08/30/18 07:06 Lab File ID: 2018.08.29\_537B\_059.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanoic acid (PFOA)	1.81	Incomplete Integration	barnettj	08/30/18 15:46

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration					
					Reagent ID	Volume Added							
<b>LC537-HSP_00029</b>	10/06/18	04/06/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	849 uL	Perfluorobutanesulfonic acid (PFBS)	1250.86 ng/mL					
					LCPFHpA_00009	81 uL	Perfluoroheptanoic acid (PFHpA)	135 ng/mL					
					LCPFHxS-br_00005	277 uL	Perfluorohexane Sulfonate	420.117 ng/mL					
							Perfluorohexanesulfonic acid (PFHxS)	420.117 ng/mL					
					LCPFNA_00009	165 uL	Perfluorononanoic acid (PFNA)	275 ng/mL					
					LCPFOA_00010	165 uL	Perfluorooctanoic acid (PFOA)	275 ng/mL					
		LCPFOS-br_00005	355 uL	Perfluorooctanesulfonic acid (PFOS)	549.067 ng/mL								
.LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116			(Purchased Reagent)	Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL						
.LCPFHpA_00009	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)	Perfluoroheptanoic acid (PFHpA)	50 ug/mL						
.LCPFHxS-br_00005	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)	Perfluorohexane Sulfonate	45.5 ug/mL						
						Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL						
.LCPFNA_00009	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)	Perfluorononanoic acid (PFNA)	50 ug/mL						
.LCPFOA_00010	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)	Perfluorooctanoic acid (PFOA)	50 ug/mL						
.LCPFOS-br_00005	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)	Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL						
<b>LC537-ICV_00032</b>	08/15/18	06/23/18	MeOH/H2O, Lot 197626	10 mL	LC537-IS_00074	1000 uL	13C2-PFOA	10 ng/mL					
							13C4 PFOS	28.68 ng/mL					
					.LC537-IS_00074	12/16/18	06/16/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL
									LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL	
						(Purchased Reagent)	13C2-PFOA	50 ug/mL					
						(Purchased Reagent)	13C4 PFOS	47.8 ug/mL					
<b>LC537-ICV_00032</b>	08/15/18	06/23/18	MeOH/H2O, Lot 197626	10 mL	LC537-SU_00072	1000 uL	13C2 PFDA	10 ng/mL					
							13C2 PFHxA	10 ng/mL					
							LC537ICIM2_00001	400 uL	Perfluorobutanesulfonic acid (PFBS)	100.092 ng/mL			
									Perfluoroheptanoic acid (PFHpA)	10 ng/mL			
									Perfluorohexanesulfonic acid (PFHxS)	20.1619 ng/mL			
									Perfluorononanoic acid (PFNA)	20.1641 ng/mL			
									Perfluorooctanoic acid (PFOA)	20.167 ng/mL			
									Perfluorooctanesulfonic acid (PFOS)	20.1702 ng/mL			
.LC537-SU_00072	12/16/18	06/16/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL					
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL					
						(Purchased Reagent)	13C2 PFDA	50 ug/mL					
						(Purchased Reagent)	13C2 PFHxA	50 ug/mL					
.LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916											
.LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116											
.LC537ICIM2_00001	08/15/18	02/15/18	Methanol, Lot 090285	10 mL	LC537ICIM_00020	0.5 mL	Perfluorobutanesulfonic acid (PFBS)	2.5023 ug/mL					
							Perfluoroheptanoic acid (PFHpA)	0.25 ug/mL					

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorohexanesulfonic acid (PFHxS)	0.504047 ug/mL
							Perfluorononanoic acid (PFNA)	0.504103 ug/mL
							Perfluorooctanoic acid (PFOA)	0.504176 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.504255 ug/mL
..LC537ICIM_00020	08/15/18	02/15/18	Methanol, Lot 090285	25 mL	LC537-PFBS2_00009	0.625 mL	Perfluorobutanesulfonic acid (PFBS)	50.0459 ug/mL
					LC537-PFHpa2_00012	0.0625 mL	Perfluoroheptanoic acid (PFHpA)	5 ug/mL
					LC537-PFHxS2_00009	0.126 mL	Perfluorohexanesulfonic acid (PFHxS)	10.0809 ug/mL
					LC537-PFNA2_00010	0.126 mL	Perfluorononanoic acid (PFNA)	10.0821 ug/mL
					LC537-PFOA2_00011	0.126 mL	Perfluorooctanoic acid (PFOA)	10.0835 ug/mL
					LC537-PFOS2_00011	0.126 mL	Perfluorooctanesulfonic acid (PFOS)	10.0851 ug/mL
...LC537-PFBS2_00009	08/15/18	02/15/18	Methanol, Lot 090285	17.1 mL	LC537_PFBS2_00002	0.0343 g	Perfluorobutanesulfonic acid (PFBS)	2001.84 ug/mL
....LC537_PFBS2_00002	09/08/22	Santa Cruz Biotechnology, Lot F0917			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	0.998 g/g
..LC537-PFHpa2_00012	08/15/18	02/15/18	Methanol, Lot 09092	23.95 mL	LC537_PFHpa2_00002	0.0479 g	Perfluoroheptanoic acid (PFHpA)	2000 ug/mL
....LC537_PFHpa2_00002	06/13/22	Afla Aesar, Lot 10200390			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	1 g/g
..LC537-PFHxS2_00009	08/15/18	02/15/18	Methanol, Lot 090285	25.87 mL	LC537_PFHxS2_00002	0.0569 g	Perfluorohexanesulfonic acid (PFHxS)	2000.19 ug/mL
....LC537_PFHxS2_00002	06/08/22	Santa Cruz Biotechnology, Lot G2516			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	0.9094 g/g
..LC537-PFNA2_00010	08/15/18	02/15/18	Methanol, Lot 090285	16.58 mL	LC537 PFNA2_00002	0.0333 g	Perfluorononanoic acid (PFNA)	2000.41 ug/mL
...LC537 PFNA2_00002	06/14/22	Aldrich, Lot MKCC0699			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	0.996 g/g
..LC537-PFOA2_00011	08/15/18	02/15/18	Methanol, Lot 090285	22.96 mL	LC537 PFOA2_00002	0.0464 g	Perfluorooctanoic acid (PFOA)	2000.7 ug/mL
...LC537 PFOA2_00002	06/09/22	Afla Aesar, Lot 10199078			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	0.99 g/g
..LC537-PFOS2_00011	08/15/18	02/15/18	Methanol, Lot 090285	14.71 mL	LC537_PFOS2_00002	0.0378 g	Perfluorooctanesulfonic acid (PFOS)	2001.01 ug/mL
....LC537_PFOS2_00002	06/14/22	Sigma, Lot BCBQ0108V			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	0.7787 g/g
<b>LC537-ICV_00033</b>	01/05/19	08/30/18	MeOH/H2O, Lot 197626	10 mL	LC537-IS_00081	1000 uL	13C2-PFOA	10 ng/mL
.LC537-IS_00081	02/02/19	08/27/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C4 PFOS	28.68 ng/mL
					LCMPFOS_00024	180 uL	13C2-PFOA	0.1 ug/mL
..LCM2PFOA_00010	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C4 PFOS	0.2868 ug/mL
..LCMPFOS_00024	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C2-PFOA	50 ug/mL
<b>LC537-ICV_00033</b>	01/05/19	08/30/18	MeOH/H2O, Lot 197626	10 mL	LC537-SU_00078	1000 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
					LC537ICIM2_00002	400 uL	Perfluorobutanesulfonic acid (PFBS)	88.4 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluoroheptanoic acid (PFHpA)	10 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	18.92 ng/mL
							Perfluorononanoic acid (PFNA)	20 ng/mL
							Perfluorooctanoic acid (PFOA)	20.02 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	18.56 ng/mL
.LC537-SU_00078	01/05/19	08/27/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
.LC537ICIM2_00002	02/28/19	08/30/18	Methanol, Lot 090285	10 mL	LCPFBS_00009	500 uL	Perfluorobutanesulfonic acid (PFBS)	2.21 ug/mL
					LCPFHpA_00010	50 uL	Perfluoroheptanoic acid (PFHpA)	0.25 ug/mL
					LCPFHxSA_00002	100 uL	Perfluorohexanesulfonic acid (PFHxS)	0.473 ug/mL
					LCPFNA_00010	100 uL	Perfluorononanoic acid (PFNA)	0.5 ug/mL
					LCPFOA_00010	100 uL	Perfluorooctanoic acid (PFOA)	0.5005 ug/mL
					LCPFOS-br_00006	100 uL	Perfluorooctanesulfonic acid (PFOS)	0.464 ug/mL
..LCPFBS_00009	09/21/22	Wellington Laboratories, Lot LPFBS0917			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFHpA_00010	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHxSA_00002	09/20/22	Wellington Laboratories, Lot LPFHxS0917			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	47.3 ug/mL
..LCPFNA_00010	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00010	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	0.05 ug/mL
..LCPFOS-br_00006	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
<b>LC537-IS_00081</b>	02/02/19	08/27/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL
.LCM2PFOA_00010	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
.LCMPFOS_00024	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
<b>LC537-L1_00022</b>	09/30/18	04/02/18	MeOH/H2O, Lot 090285	5 mL	LC537-IS_00065	500 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
					LC537-MSP_00033	60 uL	Perfluorobutanesulfonic acid (PFBS)	8.99912 ng/mL
							Perfluoroheptanoic acid (PFHpA)	0.96 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	3.003 ng/mL
							Perfluorononanoic acid (PFNA)	1.98 ng/mL
							Perfluorooctanoic acid (PFOA)	1.98 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanesulfonic acid (PFOS)	3.95328 ng/mL
					LC537-SU_00064	500 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
.LC537-IS_00065	10/02/18	04/02/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL
..LCM2PFOA_00010	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
..LCMPFOS_00024	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LC537-MSP_00033	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	509 uL	Perfluorobutanesulfonic acid (PFBS)	749.927 ng/mL
					LCPFHpA_00009	48 uL	Perfluoroheptanoic acid (PFHpA)	80 ng/mL
					LCPFHxS-br_00005	165 uL	Perfluorohexanesulfonic acid (PFHxS)	250.25 ng/mL
					LCPFNA_00009	99 uL	Perfluorononanoic acid (PFNA)	165 ng/mL
					LCPFOA_00010	99 uL	Perfluorooctanoic acid (PFOA)	165 ng/mL
					LCPFOS-br_00005	213 uL	Perfluorooctanesulfonic acid (PFOS)	329.44 ng/mL
..LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFHpA_00009	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHxS-br_00005	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00009	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00010	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFOS-br_00005	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LC537-SU_00064	10/02/18	04/02/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
<b>LC537-L2_00022</b>	09/30/18	04/02/18	MeOH/H2O, Lot 090285	20 mL	LC537-HSP_00028	320 uL	Perfluorobutanesulfonic acid (PFBS)	20.0138 ng/mL
							Perfluoroheptanoic acid (PFHpA)	2.16 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	6.72187 ng/mL
							Perfluorononanoic acid (PFNA)	4.4 ng/mL
							Perfluorooctanoic acid (PFOA)	4.4 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	8.78507 ng/mL
					LC537-IS_00065	2 mL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
					LC537-SU_00064	2 mL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
.LC537-HSP_00028	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	849 uL	Perfluorobutanesulfonic acid (PFBS)	1250.86 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCPFHpA_00009	81 uL	Perfluoroheptanoic acid (PFHpA)	135 ng/mL
					LCPFHxS-br_00005	277 uL	Perfluorohexanesulfonic acid (PFHxS)	420.117 ng/mL
					LCPFNA 00009	165 uL	Perfluorononanoic acid (PFNA)	275 ng/mL
					LCPFOA 00010	165 uL	Perfluorooctanoic acid (PFOA)	275 ng/mL
					LCPFOS-br_00005	355 uL	Perfluorooctanesulfonic acid (PFOS)	549.067 ng/mL
..LCPFBSA_00002	12/02/21		Wellington Laboratories, Lot LPFBS1116		(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFHpA_00009	12/02/21		Wellington Laboratories, Lot PFHpA1216		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHxS-br_00005	01/04/22		Wellington Laboratories, Lot brPFHxSK0117		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA 00009	07/20/22		Wellington Laboratories, Lot PFNA0717		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA 00010	09/27/22		Wellington Laboratories, Lot PFOA0917		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFOS-br_00005	01/12/22		Wellington Laboratories, Lot brPFOSK0117		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LC537-IS_00065	10/02/18	04/02/18	Methanol, Lot 090285	30000 uL	LCM2PFOA 00010	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS 00024	180 uL	13C4 PFOS	0.2868 ug/mL
..LCM2PFOA 00010	02/12/21		Wellington Laboratories, Lot M2PFOA0216		(Purchased Reagent)		13C2-PFOA	50 ug/mL
..LCMPFOS 00024	05/19/22		Wellington Laboratories, Lot MPFOS517		(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LC537-SU_00064	10/02/18	04/02/18	Methanol, Lot 104453	30000 uL	LCMPFDA 00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA 00015	60 uL	13C2 PFHxA	0.1 ug/mL
..LCMPFDA 00012	09/30/21		Wellington Laboratories, Lot MPFDA0916		(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFHxA 00015	11/22/21		Wellington Laboratories, Lot MPFHxA1116		(Purchased Reagent)		13C2 PFHxA	50 ug/mL
<b>LC537-L3_00025</b>	09/30/18	04/02/18	MeOH/H2O, Lot 090285	20 mL	LC537-HSP_00028	720 uL	Perfluorobutanesulfonic acid (PFBS)	45.031 ng/mL
							Perfluoroheptanoic acid (PFHpA)	4.86 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	15.1242 ng/mL
							Perfluorononanoic acid (PFNA)	9.9 ng/mL
							Perfluorooctanoic acid (PFOA)	9.9 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	19.7664 ng/mL
					LC537-IS_00065	2 mL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
					LC537-SU_00064	2 mL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
.LC537-HSP_00028	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	849 uL	Perfluorobutanesulfonic acid (PFBS)	1250.86 ng/mL
					LCPFHpA_00009	81 uL	Perfluoroheptanoic acid (PFHpA)	135 ng/mL
					LCPFHxS-br_00005	277 uL	Perfluorohexanesulfonic acid (PFHxS)	420.117 ng/mL
					LCPFNA 00009	165 uL	Perfluorononanoic acid (PFNA)	275 ng/mL
					LCPFOA_00010	165 uL	Perfluorooctanoic acid (PFOA)	275 ng/mL



REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration		
					Reagent ID	Volume Added				
					LCPFOS-br_00005	355 uL	Perfluorooctanesulfonic acid (PFOS)	549.067 ng/mL		
..LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL		
..LCPFHpA_00009	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL		
..LCPFHxS-br_00005	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL		
..LCPFNA_00009	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL		
..LCPFOA_00010	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL		
..LCPFOS-br_00005	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL		
.LC537-IS_00065	10/02/18	04/02/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL		
					LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL		
..LCM2PFOA_00010	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL		
..LCMPFOS_00024	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL		
.LC537-SU_00064	10/02/18	04/02/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL		
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL		
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL		
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL		
<b>LC537-L4_00022</b>	09/30/18	04/02/18	MeOH/H2O, Lot 090285	5 mL	LC537-HSP_00028	360 uL	Perfluorobutanesulfonic acid (PFBS)	90.0619 ng/mL		
							Perfluoroheptanoic acid (PFHpA)	9.72 ng/mL		
							Perfluorohexanesulfonic acid (PFHxS)	30.2484 ng/mL		
							Perfluorononanoic acid (PFNA)	19.8 ng/mL		
							Perfluorooctanoic acid (PFOA)	19.8 ng/mL		
Perfluorooctanesulfonic acid (PFOS)	39.5328 ng/mL									
.LC537-IS_00065					500 uL	13C2-PFOA	10 ng/mL			
						13C4 PFOS	28.68 ng/mL			
						13C2 PFDA	10 ng/mL			
.LC537-SU_00064					500 uL	13C2 PFDA	10 ng/mL			
						13C2 PFHxA	10 ng/mL			
.LC537-HSP_00028	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	849 uL	Perfluorobutanesulfonic acid (PFBS)	1250.86 ng/mL		
							LCPFHpA_00009	81 uL	Perfluoroheptanoic acid (PFHpA)	135 ng/mL
							LCPFHxS-br_00005	277 uL	Perfluorohexanesulfonic acid (PFHxS)	420.117 ng/mL
							LCPFNA_00009	165 uL	Perfluorononanoic acid (PFNA)	275 ng/mL
							LCPFOA_00010	165 uL	Perfluorooctanoic acid (PFOA)	275 ng/mL
							LCPFOS-br_00005	355 uL	Perfluorooctanesulfonic acid (PFOS)	549.067 ng/mL
..LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL		
..LCPFHpA_00009	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL		

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFHxS-br_00005	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA 00009	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA 00010	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFOS-br_00005	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LC537-IS_00065	10/02/18	04/02/18	Methanol, Lot 090285	30000 uL	LCM2PFOA 00010	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS 00024	180 uL	13C4 PFOS	0.2868 ug/mL
..LCM2PFOA 00010	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
..LCMPFOS 00024	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LC537-SU_00064	10/02/18	04/02/18	Methanol, Lot 104453	30000 uL	LCMPFDA 00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA 00015	60 uL	13C2 PFHxA	0.1 ug/mL
..LCMPFDA 00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFHxA 00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
<b>LC537-L5_00026</b>	09/30/18	04/02/18	MeOH/H2O, Lot 090285	20 mL	LC537-HSP_00028	2160 uL	Perfluorobutanesulfonic acid (PFBS)	135.093 ng/mL
							Perfluoroheptanoic acid (PFHpA)	14.58 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	45.3726 ng/mL
							Perfluorononanoic acid (PFNA)	29.7 ng/mL
							Perfluorooctanoic acid (PFOA)	29.7 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	59.2992 ng/mL
					LC537-IS_00065	2 mL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
					LC537-SU_00064	2 mL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
.LC537-HSP_00028	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	849 uL	Perfluorobutanesulfonic acid (PFBS)	1250.86 ng/mL
					LCPFHpA_00009	81 uL	Perfluoroheptanoic acid (PFHpA)	135 ng/mL
					LCPFHxS-br_00005	277 uL	Perfluorohexanesulfonic acid (PFHxS)	420.117 ng/mL
					LCPFNA 00009	165 uL	Perfluorononanoic acid (PFNA)	275 ng/mL
					LCPFOA 00010	165 uL	Perfluorooctanoic acid (PFOA)	275 ng/mL
					LCPFOS-br_00005	355 uL	Perfluorooctanesulfonic acid (PFOS)	549.067 ng/mL
..LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFHpA_00009	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHxS-br_00005	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA 00009	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA 00010	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFOS-br_00005	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LC537-IS_00065	10/02/18	04/02/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration		
					Reagent ID	Volume Added				
..LCM2PFOA_00010	02/12/21	Wellington Laboratories, Lot M2PFOA0216			LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL		
..LCMPFOS_00024	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C2-PFOA	50 ug/mL		
..LC537-SU_00064	10/02/18	04/02/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL		
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL		
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFDA	50 ug/mL		
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL		
<b>LC537-L6_00022</b>	09/30/18	04/02/18	MeOH/H2O, Lot 090285	5 mL	LC537-HSP_00028	720 uL	Perfluorobutanesulfonic acid (PFBS)	180.124 ng/mL		
							Perfluoroheptanoic acid (PFHpA)	19.44 ng/mL		
							Perfluorohexanesulfonic acid (PFHxS)	60.4968 ng/mL		
							Perfluorononanoic acid (PFNA)	39.6 ng/mL		
							Perfluorooctanoic acid (PFOA)	39.6 ng/mL		
							Perfluorooctanesulfonic acid (PFOS)	79.0656 ng/mL		
..LC537-HSP_00028	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	849 uL	Perfluorobutanesulfonic acid (PFBS)	1250.86 ng/mL		
							LCPFHpA_00009	81 uL	Perfluoroheptanoic acid (PFHpA)	135 ng/mL
							LCPFHxS-br_00005	277 uL	Perfluorohexanesulfonic acid (PFHxS)	420.117 ng/mL
..LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL		
							Perfluoroheptanoic acid (PFHpA)	50 ug/mL		
							Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL		
							Perfluorononanoic acid (PFNA)	50 ug/mL		
							Perfluorooctanoic acid (PFOA)	50 ug/mL		
..LCPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL		
..LCPFOS-br_00005	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL		
..LCPFNA_00009	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL		
..LCPFOA_00010	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL		
..LC537-IS_00065	10/02/18	04/02/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL		
..LCM2PFOA_00010	02/12/21	Wellington Laboratories, Lot M2PFOA0216			LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL		
..LCMPFOS_00024	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C2-PFOA	50 ug/mL		
..LC537-SU_00064	10/02/18	04/02/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL		
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL		
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFDA	50 ug/mL		
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL		

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

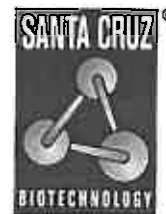
Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
<b>LC537-SU_00078</b>	01/05/19	08/27/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL
.LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
.LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL

Reagent

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**LC537\_PFB2\_00002**

P: 6.8.17 SW



# CERTIFICATE OF ANALYSIS

*The Power to Question*

Catalog Number: sc-236187  
Lot Number: F0917  
Product Name: Nonafluorobutane-1-sulfonic acid  
CAS Number: 375-73-5  
Molecular Formula:  $C_4HF_9O_3S$   
Molecular Weight: 300.10

Test	Specification	Result
Appearance	Colorless liquid	Complies
Identification (19F-NMR)	Conforms to structure	Complies
Purity (Sodium Hydroxide Titration)	$\geq 97\%$	101.3%
Infrared Spectrum	Conforms to structure	Complies

Reagent

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**LC537\_PFHpA2\_00002**

# Certificate of analysis

R:6.13.17 SW

Product No.: A12092  
Product: Perfluoroheptanoic acid, 98+%  
Lot No.: 10200390

PFHpA

Appearance: White fused solid  
Water Content (Karl-Fischer): 0.30%  
Melting Point: 32.0-34.3°C  
Assay (Aqueous acid-base titration): 99.7%  
Identification (FTIR): Conforms

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Reagent

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**LC537\_PFHxS2\_00002**

n: 6-E-17SKV

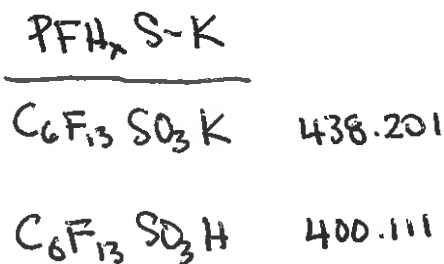


The Future is Custom

# CERTIFICATE OF ANALYSIS

Catalog Number: sc-237289  
 Lot Number: G2516  
 Product Name: Tridecafluorohexane-1-sulfonic acid potassium salt  
 CAS Number: 3871-99-6  
 Molecular Formula:  $C_6F_{13}KO_3S$   
 Molecular Weight: 438.20

Test	Specification	Result
Appearance	White to faint beige powder or crystals	White powder
Identification (Infrared Spectrum)	Consistent with structure	Complies
Purity (Titration, Ion Exchange)	≥ 98.0%	100.4%



MW correction =  $\frac{400.11}{438.201} = 0.91307$  PFH<sub>2</sub>S  
 cas# 355-46-4

Purity  $\frac{1}{MW}$  correction = 90.9%

**This document was produced electronically and is valid without a signature.**

Reagent

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**LC537\_PFN2\_00002**

P: 6.14.17 SKW

3050 Spruce Street, Saint Louis, MO 63103, USA  
Website: www.sigmaaldrich.com  
Email USA: techserv@sial.com  
Outside USA: eurtechserv@sial.com

## Certificate of Analysis

Product Name:  
Perfluorononanoic acid - 97%

Product Number: 394459  
Batch Number: MKCC0699  
Brand: ALDRICH  
CAS Number: 375-95-1  
MDL Number: MFCD00039605  
Formula: C<sub>9</sub>HF<sub>17</sub>O<sub>2</sub>  
Formula Weight: 464.08 g/mol  
Quality Release Date: 07 DEC 2016



Test	Specification	Result
Appearance (Color)	White to Off-White	White
Appearance (Form)	Powder or Crystals or Crystalline Chunk(s) or Granule or Flakes or Solid	Powder
Infrared Spectrum	Conforms to Structure	Conforms
GC (area %)	> 96.5 %	98.2 %

Michael Grady, Manager  
Quality Control  
Milwaukee, WI US

PFNA

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Reagent

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**LC537\_PFOA2\_00002**

# Certificate of analysis

P: 6/9/17 SW

Product No.: L08862  
Product: Perfluorooctanoic acid, 95%  
Lot No.: 10199078

PFOA

Appearance: White powder  
Water Content (Karl-Fischer): 1.30%  
Melting Point: 47.6-54.0°C  
Assay (Aqueous acid-base titration): 98.4%  
Assay (GC Silyl Deriv): 97.2%

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**ThermoFisher**  
SCIENTIFIC

Reagent

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**LC537\_PFOs2\_00002**

N: 6.14.17 SKV

**Certificate of Analysis**

**Product Name:** HEPTADEC AFLUORO OCTANESULFONIC ACID TETRAETHYLAMMONIUM SALT  
 98 %  
**Product Number:** 365289  
**Batch Number:** BCBQ0108V  
**Brand:** Aldrich  
**CAS Number:** 56773-42-3  
**Formula:**  $CF_3(CF_2)_6CF_2SO_3N(C_2H_5)_4$   
**Formula Weight:** 629.37  
**Quality Release Date:** 11 JUN 2015

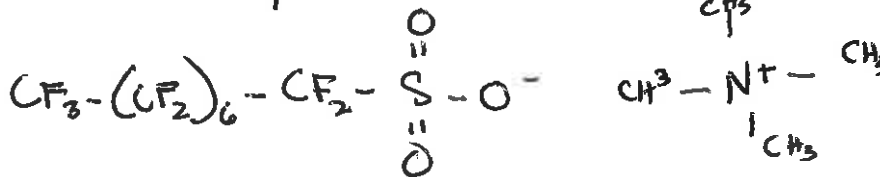
TEST	SPECIFICATION	RESULT
APPEARANCE (COLOR)	WHITE TO OFF WHITE	OFF-WHITE
APPEARANCE (FORM)	POWDER OR POWDER WITH CHUNK(S)	POWDER
CARBON CONTENT	29.77 % - 31.29 %	29.97 %
INFRARED SPECTRUM	CONFORMS TO STRUCTURE	CONFORMS

*Claudia Geitner*

Dr. Claudia Geitner  
 Manager Quality Control  
 Buchs, Switzerland

MW correction:  $\frac{500.125}{629.37} = 0.7946$

Purity & MW correction = 77.87%



	$C_{17}F_{17}SO_3 + H$	$C_8H_{20}N$
C = 12.011	96.088	96.088
F = 18.998	322.966	—
S = 32.066	32.066	—
O = 16.999	47.997	—
H = 1.008	1.008	20.460
N = 14.007	—	14.007
	<hr/>	<hr/>
	500.125	130.255



Reagent

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**LCM2PFOA\_00010**

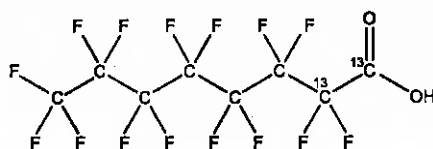


# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** M2PFOA **LOT NUMBER:** M2PFOA0216  
**COMPOUND:** Perfluoro-n-[1,2-<sup>13</sup>C<sub>2</sub>]octanoic acid

**STRUCTURE:** **CAS #:** Not available



**MOLECULAR FORMULA:** <sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>8</sub>HF<sub>16</sub>O<sub>2</sub> **MOLECULAR WEIGHT:** 416.05  
**CONCENTRATION:** 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol  
 Water (<1%)  
**CHEMICAL PURITY:** >98% **ISOTOPIC PURITY:** ≥99%<sup>13</sup>C  
 (1,2-<sup>13</sup>C<sub>2</sub>)  
**LAST TESTED:** (mm/dd/yyyy) 02/12/2016  
**EXPIRY DATE:** (mm/dd/yyyy) 02/12/2021  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place


### DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)  
 Figure 2: LC/MS/MS Data (Selected MRM Transitions)

### ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

**Certified By:**   
 B.G. Chittim **Date:** 02/24/2016  
 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA  
 519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

**INTENDED USE:**

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

**HAZARDS:**

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

**SYNTHESIS / CHARACTERIZATION:**

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

**HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

**UNCERTAINTY:**

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where  $x$  is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

**TRACEABILITY:**

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

**EXPIRY DATE / PERIOD OF VALIDITY:**

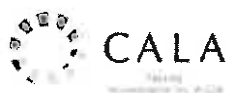
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

**LIMITED WARRANTY:**

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

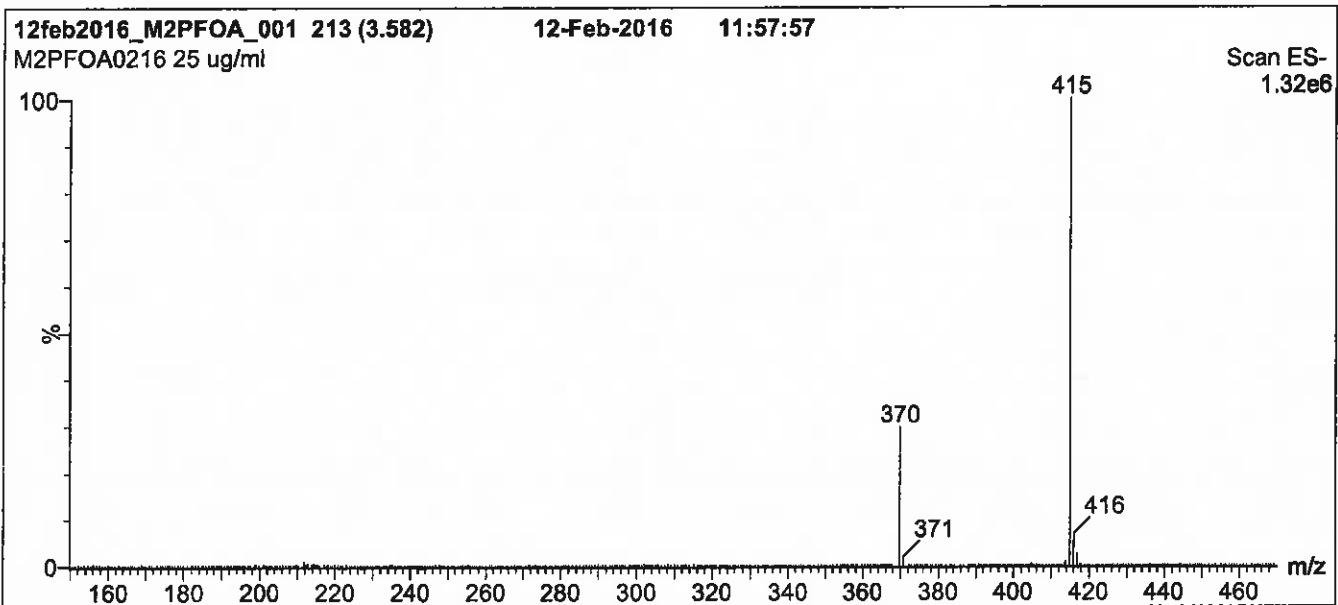
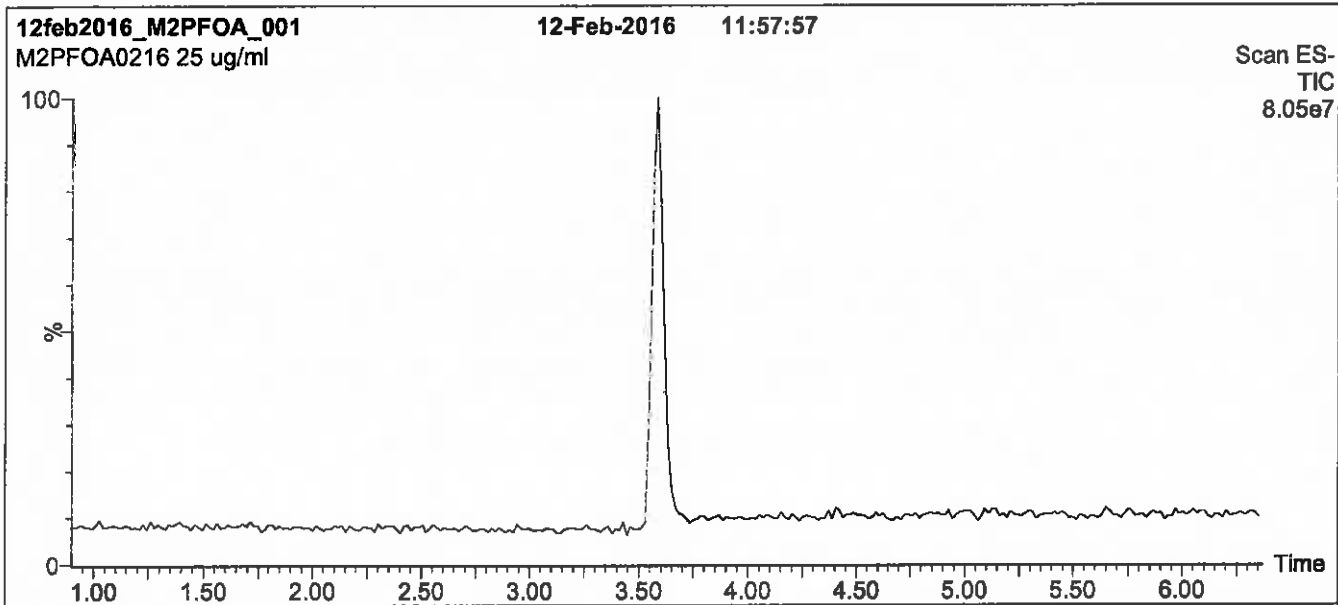
**QUALITY MANAGEMENT:**

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

**Figure 1: M2PFOA; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro *micro* API MS

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

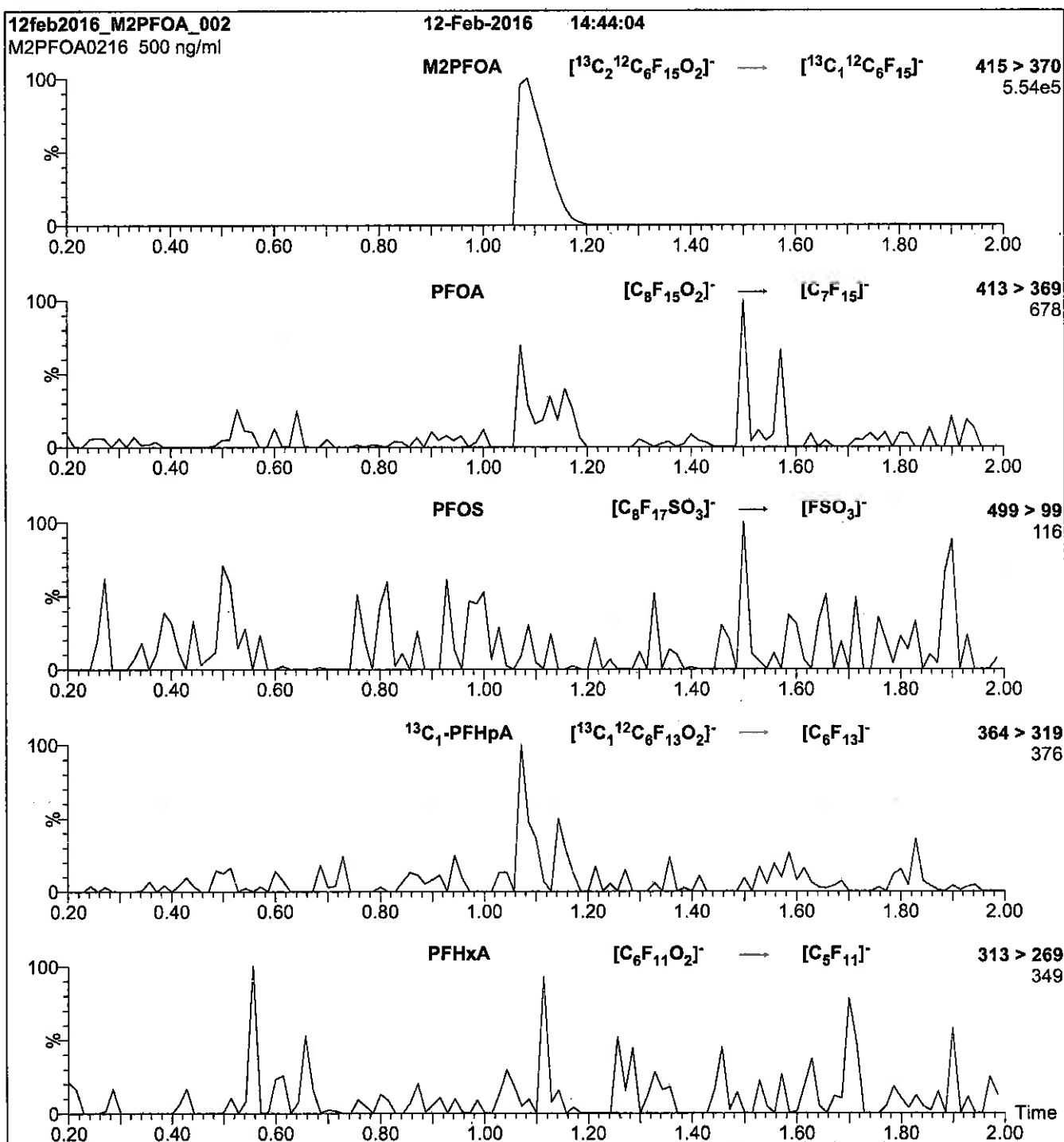
Mobile phase: Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 7.5 min and hold for 1.5 min  
before returning to initial conditions in 0.5 min.  
Time: 10 min

Flow: 300  $\mu$ l/min

**MS Parameters**

Experiment: Full Scan (150 - 850 amu)  
Source: Electrospray (negative)  
Capillary Voltage (kV) = 3.00  
Cone Voltage (V) = 15.00  
Cone Gas Flow (l/hr) = 100  
Desolvation Gas Flow (l/hr) = 750

**Figure 2: M2PFOA; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 2:**

Injection: Direct loop injection  
10  $\mu\text{l}$  (500 ng/ml M2PFOA)

Mobile phase: Isocratic 80% MeOH / 20%  $\text{H}_2\text{O}$

Flow: 300  $\mu\text{l}/\text{min}$

**MS Parameters**

Collision Gas (mbar) = 3.39e-3  
Collision Energy (eV) = 10

Reagent

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**LCMPFDA\_00012**

R: SBC 12/21/16



814255

ID: LCMFDA\_00012

Exp: 09/30/21 Prpd: SBC

13C2-Perfluorodecanoic a

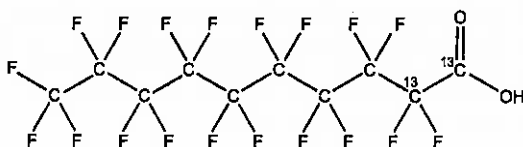


# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** MPFDA      **LOT NUMBER:** MPFDA0916  
**COMPOUND:** Perfluoro-n-[1,2-<sup>13</sup>C<sub>2</sub>]decanoic acid

**STRUCTURE:**      **CAS #:** Not available



**MOLECULAR FORMULA:** <sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>8</sub>HF<sub>19</sub>O<sub>2</sub>  
**CONCENTRATION:** 50 ± 2.5 µg/ml

**MOLECULAR WEIGHT:** 516.07  
**SOLVENT(S):** Methanol  
Water (<1%)

**CHEMICAL PURITY:** >98%

**ISOTOPIC PURITY:** ≥99% <sup>13</sup>C  
(1,2-<sup>13</sup>C<sub>2</sub>)

**LAST TESTED:** (mm/dd/yyyy) 09/30/2016

**EXPIRY DATE:** (mm/dd/yyyy) 09/30/2021

**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

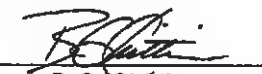
**DOCUMENTATION/ DATA ATTACHED:**

- Figure 1: LC/MS Data (TIC and Mass Spectrum)
- Figure 2: LC/MS/MS Data (Selected MRM Transitions)

**ADDITIONAL INFORMATION:**

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains < 0.1% of <sup>13</sup>C<sub>1</sub>-PFNA.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

**Certified By:**   
B.G. Chrifim      **Date:** 10/07/2016  
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA  
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

### **INTENDED USE:**

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

### **HAZARDS:**

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

### **SYNTHESIS / CHARACTERIZATION:**

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

### **UNCERTAINTY:**

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The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where  $x$  is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

### **TRACEABILITY:**

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

### **EXPIRY DATE / PERIOD OF VALIDITY:**

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

### **LIMITED WARRANTY:**

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

### **QUALITY MANAGEMENT:**

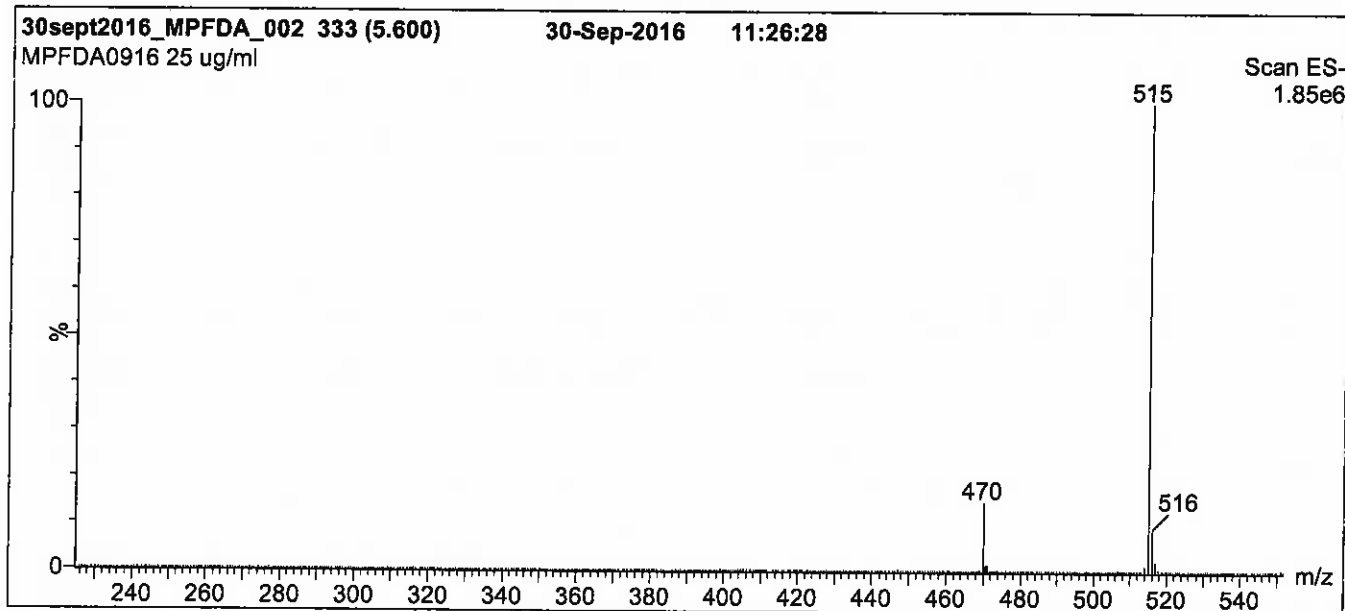
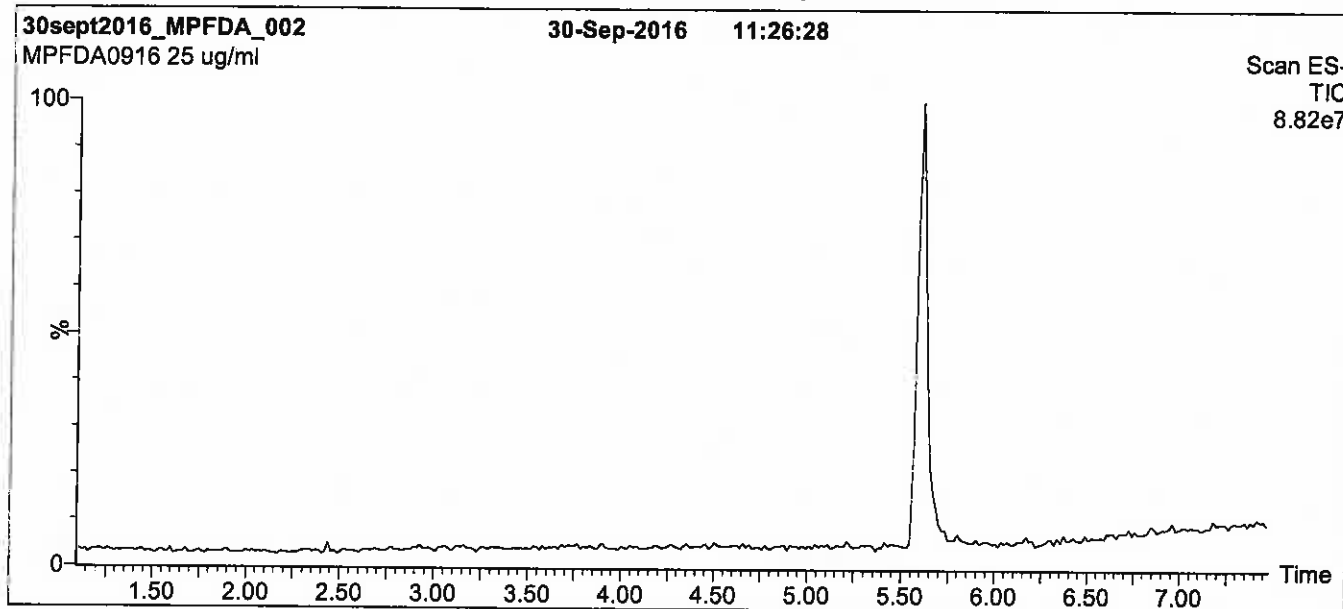
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*



**Figure 1: MPFDA; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro *micro* API MS

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 7 min and hold for 1.5 min  
before returning to initial conditions in 0.5 min.  
Time: 10 min

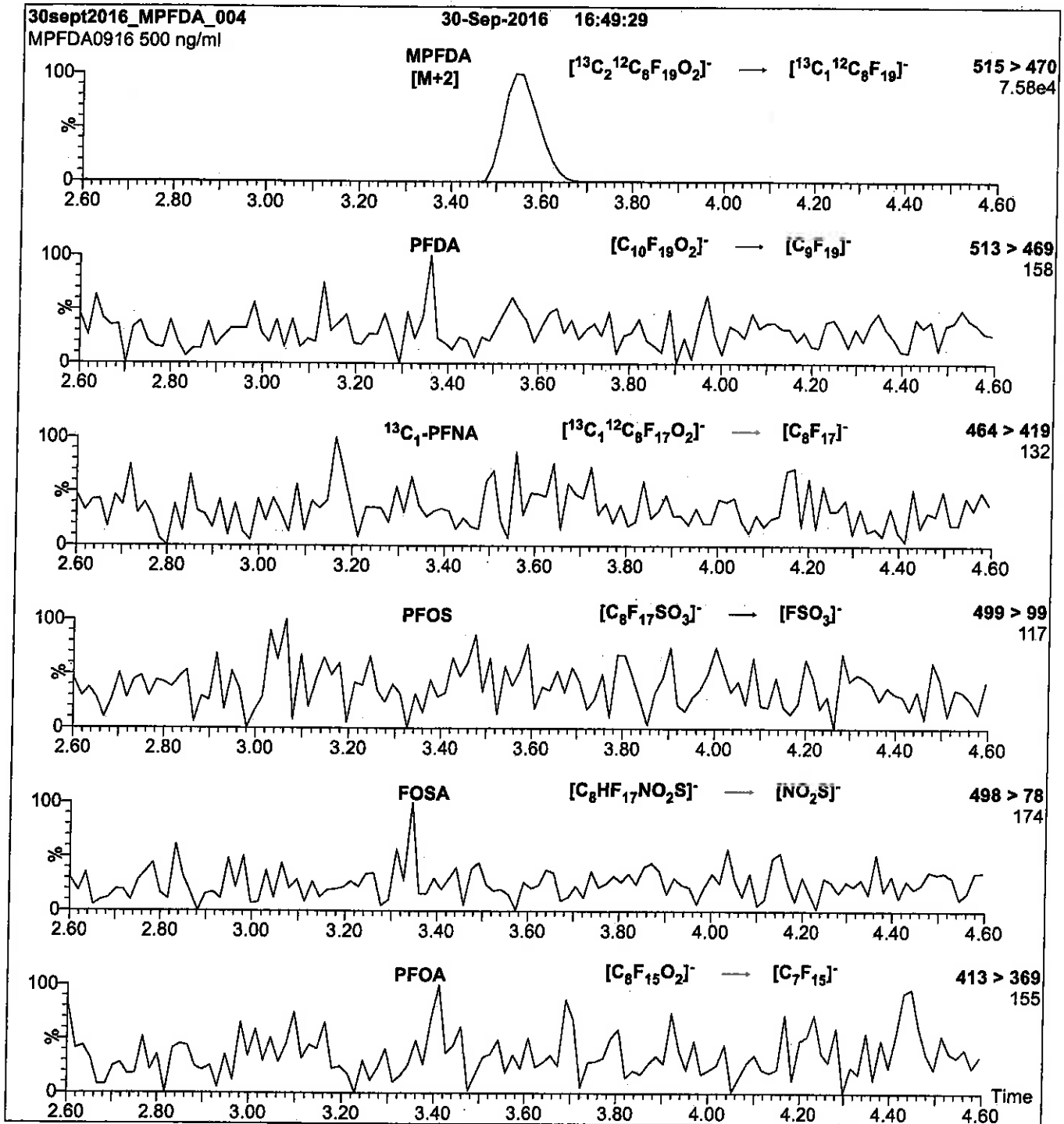
Flow: 300  $\mu$ l/min

**MS Parameters**

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)  
Capillary Voltage (kV) = 2.00  
Cone Voltage (V) = 15.00  
Cone Gas Flow (l/hr) = 50  
Desolvation Gas Flow (l/hr) = 750

**Figure 2: MPFDA; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 2:**

Injection: Direct loop injection  
10  $\mu$ l (500 ng/ml MPFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300  $\mu$ l/min

**MS Parameters**

Collision Gas (mbar) = 3.31e-3  
Collision Energy (eV) = 13

Reagent

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**LCMPFHxA\_00015**

r: 5/13/17 SKJ



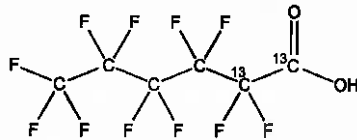
# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** MPFHxA **LOT NUMBER:** MPFHxA1116

**COMPOUND:** Perfluoro-n-[1,2-<sup>13</sup>C<sub>2</sub>]hexanoic acid

**STRUCTURE:** **CAS #:** Not available



**MOLECULAR FORMULA:** <sup>13</sup>C<sub>2</sub><sup>12</sup>C<sub>4</sub>HF<sub>11</sub>O<sub>2</sub>

**CONCENTRATION:** 50 ± 2.5 µg/ml

**MOLECULAR WEIGHT:** 316.04

**SOLVENT(S):** Methanol  
Water (<1%)

**CHEMICAL PURITY:** >98%

**ISOTOPIC PURITY:** ≥99%<sup>13</sup>C  
(1,2-<sup>13</sup>C<sub>2</sub>)

**LAST TESTED:** (mm/dd/yyyy) 11/22/2016

**EXPIRY DATE:** (mm/dd/yyyy) 11/22/2021

**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

### DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)

### ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains < 0.1% of perfluoro-n-hexanoic acid and ~ 0.3% of perfluoro-n-octanoic acid.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

**Certified By:**   
B.G. Chittim

**Date:** 12/13/2016  
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA  
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

### **INTENDED USE:**

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$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where  $x$  is expressed as a relative standard uncertainty of the individual parameter.

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### **TRACEABILITY:**

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

### **EXPIRY DATE / PERIOD OF VALIDITY:**

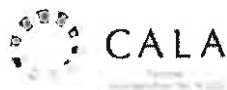
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

### **LIMITED WARRANTY:**

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

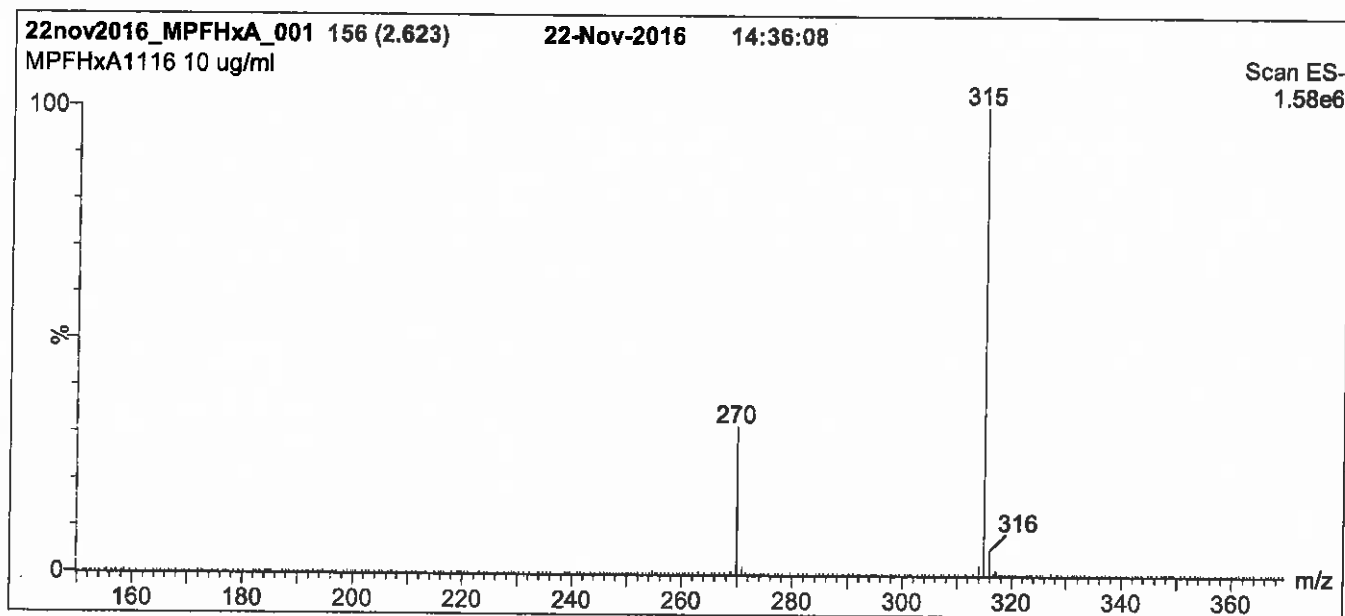
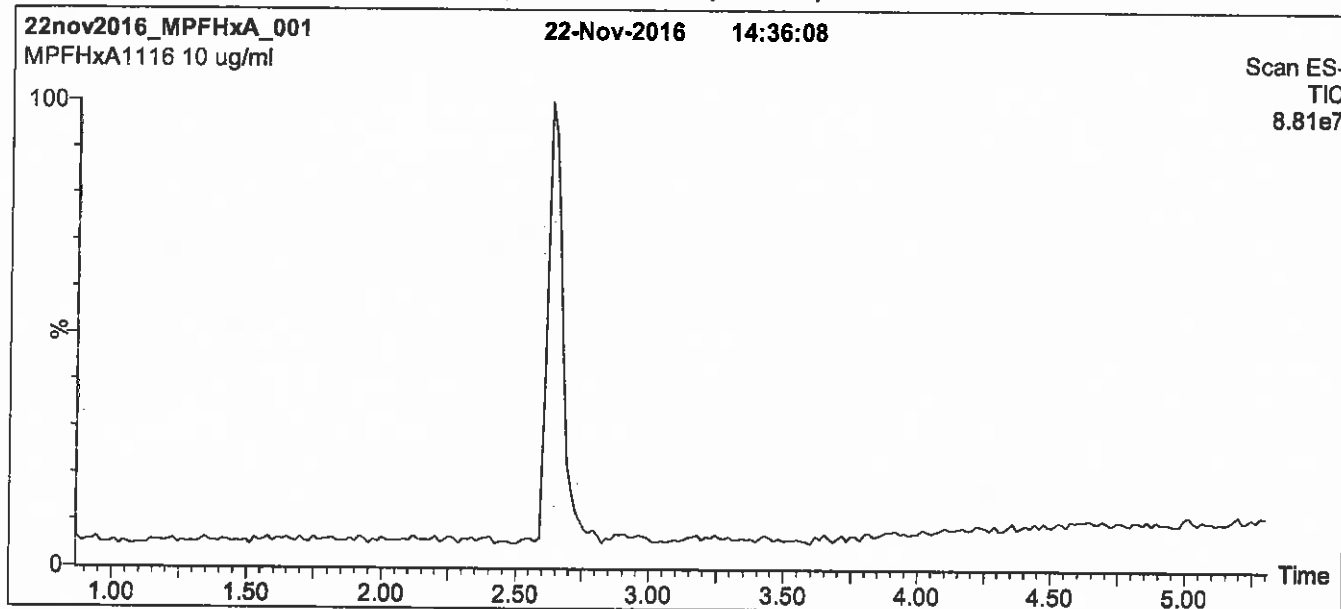
### **QUALITY MANAGEMENT:**

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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**Figure 1: MPFHxA; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro *micro* API MS

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

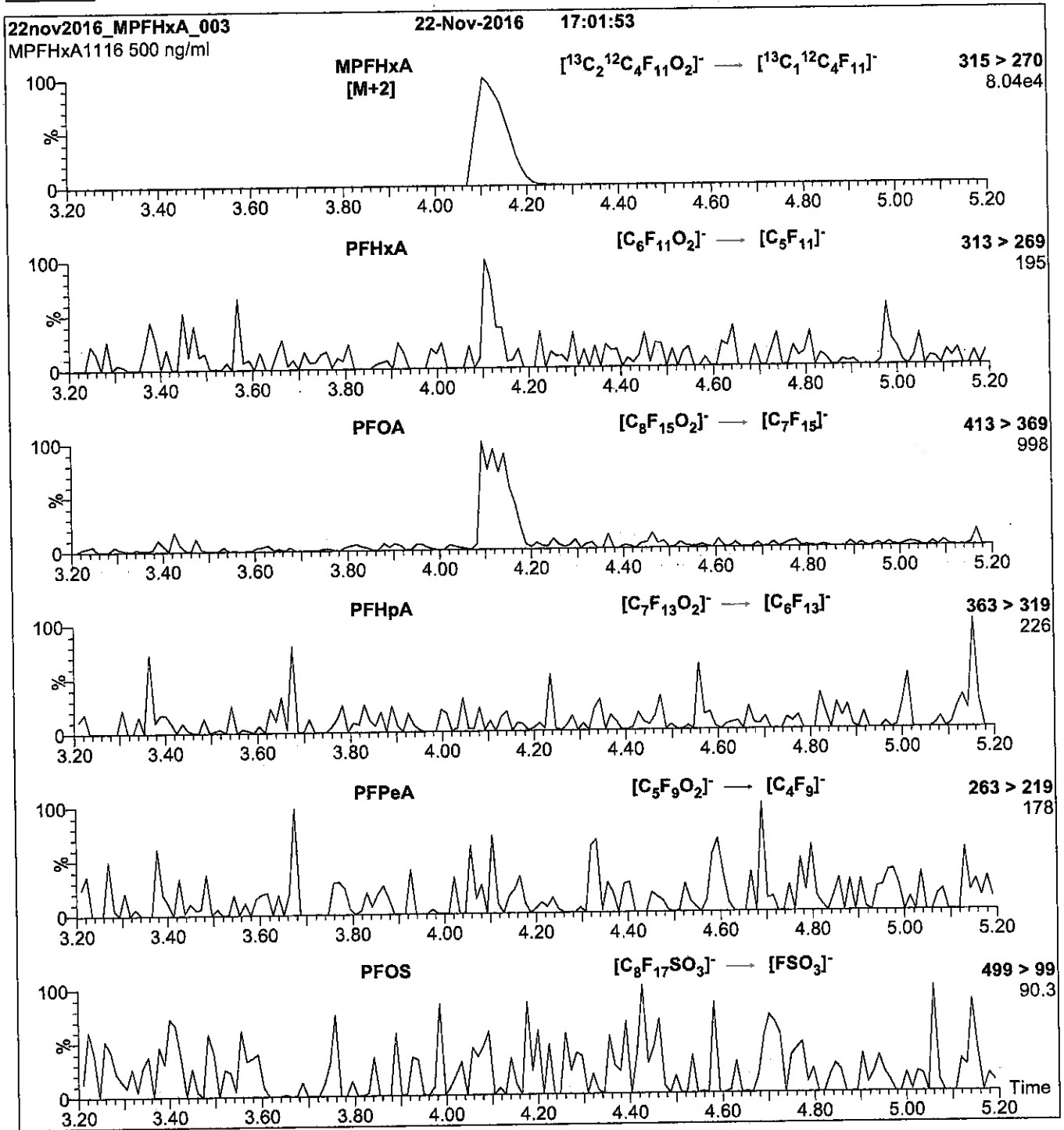
Mobile phase: Gradient  
Start: 40% (80:20 MeOH:ACN) / 60% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 7 min and hold for 2 min  
before returning to initial conditions over 0.5 min.  
Time: 10 min

Flow: 300  $\mu$ l/min

**MS Parameters**

Experiment: Full Scan (150 - 850 amu)  
Source: Electrospray (negative)  
Capillary Voltage (kV) = 2.00  
Cone Voltage (V) = 15.00  
Cone Gas Flow (l/hr) = 100  
Desolvation Gas Flow (l/hr) = 750

**Figure 2: MPFHxA; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 2:**

Injection: Direct loop injection  
 10  $\mu$ l (500 ng/ml MPFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300  $\mu$ l/min

**MS Parameters**

Collision Gas (mbar) = 3.46e-3  
 Collision Energy (eV) = 10

Reagent

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**LCMPFOS\_00024**

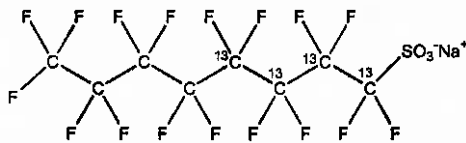




# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** MPFOS **LOT NUMBER:** MPFOS0517  
**COMPOUND:** Sodium perfluoro-1-[1,2,3,4-<sup>13</sup>C<sub>4</sub>]octanesulfonate  
**STRUCTURE:** **CAS #:** Not available



**MOLECULAR FORMULA:** <sup>13</sup>C<sub>4</sub><sup>12</sup>C<sub>4</sub>F<sub>17</sub>SO<sub>3</sub>Na **MOLECULAR WEIGHT:** 526.08  
**CONCENTRATION:** 50.0 ± 2.5 µg/ml (Na salt) **SOLVENT(S):** Methanol  
 47.8 ± 2.4 µg/ml (MPFOS anion)  
**CHEMICAL PURITY:** >98% **ISOTOPIC PURITY:** ≥99% <sup>13</sup>C  
**LAST TESTED:** (mm/dd/yyyy) 05/19/2017 (1,2,3,4-<sup>13</sup>C<sub>4</sub>)  
**EXPIRY DATE:** (mm/dd/yyyy) 05/19/2022  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

### DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)  
 Figure 2: LC/MS/MS Data (Selected MRM Transitions)

### ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.8% Sodium perfluoro-1-[1,2,3-<sup>13</sup>C<sub>3</sub>]heptanesulfonate.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

**Certified By:**   
 B.G. Chittim, General Manager **Date:** 05/30/2017  
(mm/dd/yyyy)

**Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA**  
 519-822-2436 • Fax: 519-822-2849 • [info@well-labs.com](mailto:info@well-labs.com)

**INTENDED USE:**

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

**HAZARDS:**

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

**SYNTHESIS / CHARACTERIZATION:**

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

**HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

**UNCERTAINTY:**

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters

$x_1, x_2, \dots, x_n$  on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where  $x$  is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

**TRACEABILITY:**

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

**EXPIRY DATE / PERIOD OF VALIDITY:**

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

**LIMITED WARRANTY:**

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

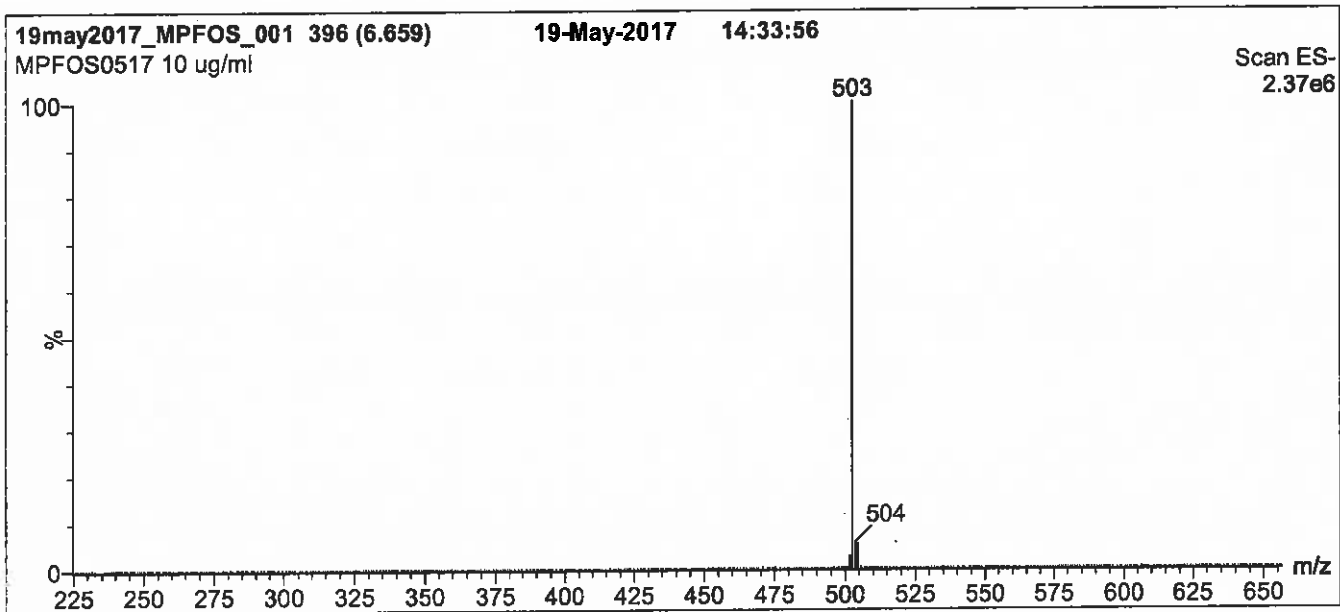
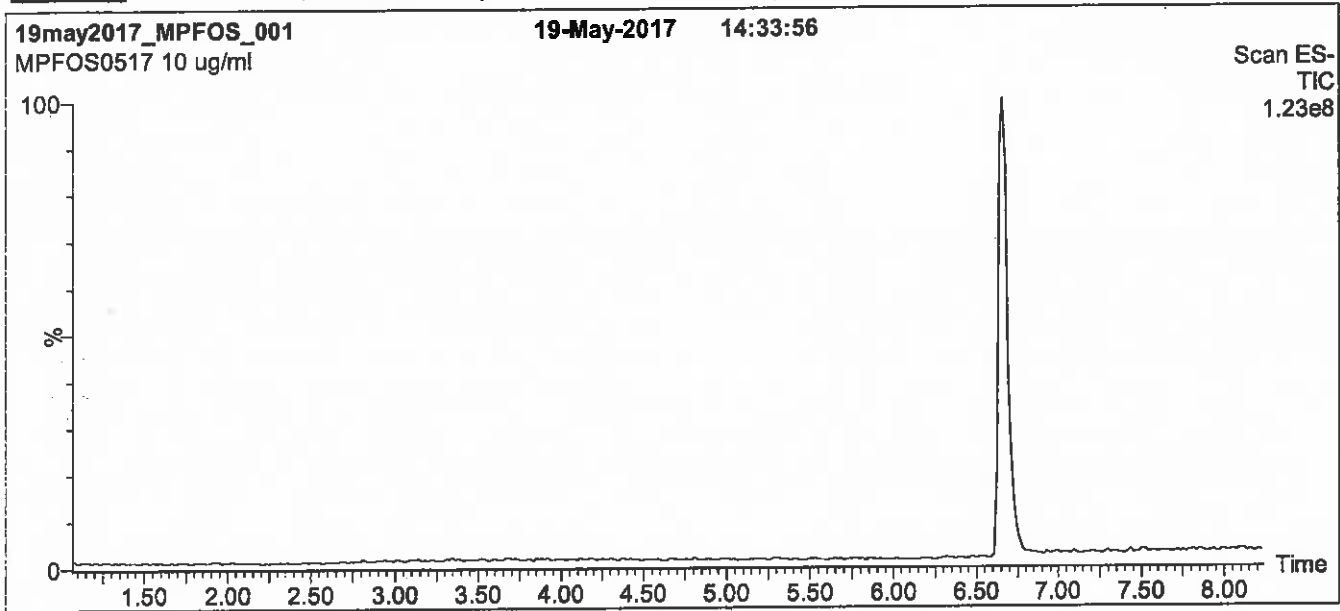
**QUALITY MANAGEMENT:**

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

**Figure 1: MPFOS; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro *micro* API MS

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7 μm, 2.1 x 100 mm

**Mobile phase:** Gradient  
 Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)  
 Ramp to 90% organic over 8 min and hold for 1 min  
 before returning to initial conditions in 0.5 min.  
 Time: 10 min

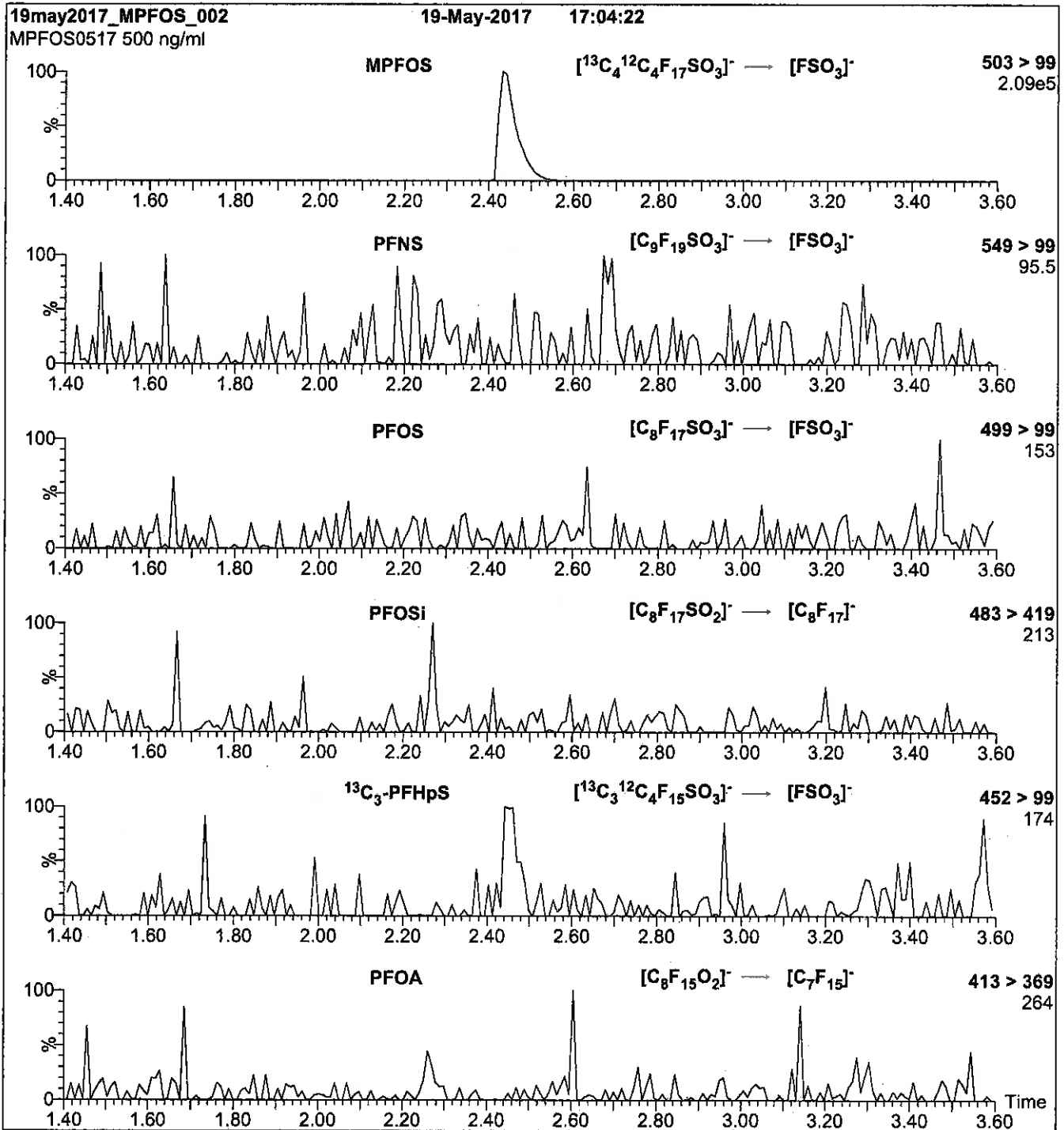
**Flow:** 300 μl/min

**MS Parameters**

**Experiment:** Full Scan (225 - 850 amu)

**Source:** Electrospray (negative)  
 Capillary Voltage (kV) = 3.00  
 Cone Voltage (V) = 60.00  
 Cone Gas Flow (l/hr) = 50  
 Desolvation Gas Flow (l/hr) = 750

**Figure 2: MPFOS; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 2:**

Injection: Direct loop injection  
10  $\mu\text{l}$  (500 ng/ml MPFOS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20%  $\text{H}_2\text{O}$   
(both with 10 mM  $\text{NH}_4\text{OAc}$  buffer)

Flow: 300  $\mu\text{l}/\text{min}$

**MS Parameters**

Collision Gas (mbar) = 3.31e-3  
Collision Energy (eV) = 40

Reagent

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**LCPFBS\_00009**

D: 2/16/18 SW



# WELLINGTON LABORATORIES

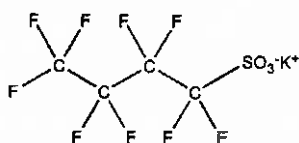
## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** L-PFBS  
**COMPOUND:** Potassium perfluoro-1-butanesulfonate

**LOT NUMBER:** LPFBS0917

**STRUCTURE:**

**CAS #:** 29420-49-3



**MOLECULAR FORMULA:**  $C_4F_9SO_3K$   
**CONCENTRATION:**  $50.0 \pm 2.5 \mu\text{g/ml}$  (K salt)  
 $44.2 \pm 2.2 \mu\text{g/ml}$  (PFBS anion)  
**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 09/21/2017  
**EXPIRY DATE:** (mm/dd/yyyy) 09/21/2022  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

**MOLECULAR WEIGHT:** 338.19  
**SOLVENT(S):** Methanol

**DOCUMENTATION/ DATA ATTACHED:**

- Figure 1: LC/MS Data (TIC and Mass Spectrum)
- Figure 2: LC/MS/MS Data (Selected MRM Transitions)

**ADDITIONAL INFORMATION:**

• See page 2 for further details.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

**Certified By:**   
B.G. Chittim, General Manager  
**Date:** 09/22/2017  
(mm/dd/yyyy)

**Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA**  
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

### **INTENDED USE:**

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

### **HAZARDS:**

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

### **SYNTHESIS / CHARACTERIZATION:**

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

### **UNCERTAINTY:**

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where  $x$  is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

### **TRACEABILITY:**

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

### **EXPIRY DATE / PERIOD OF VALIDITY:**

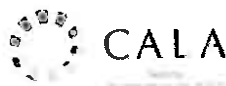
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

### **LIMITED WARRANTY:**

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

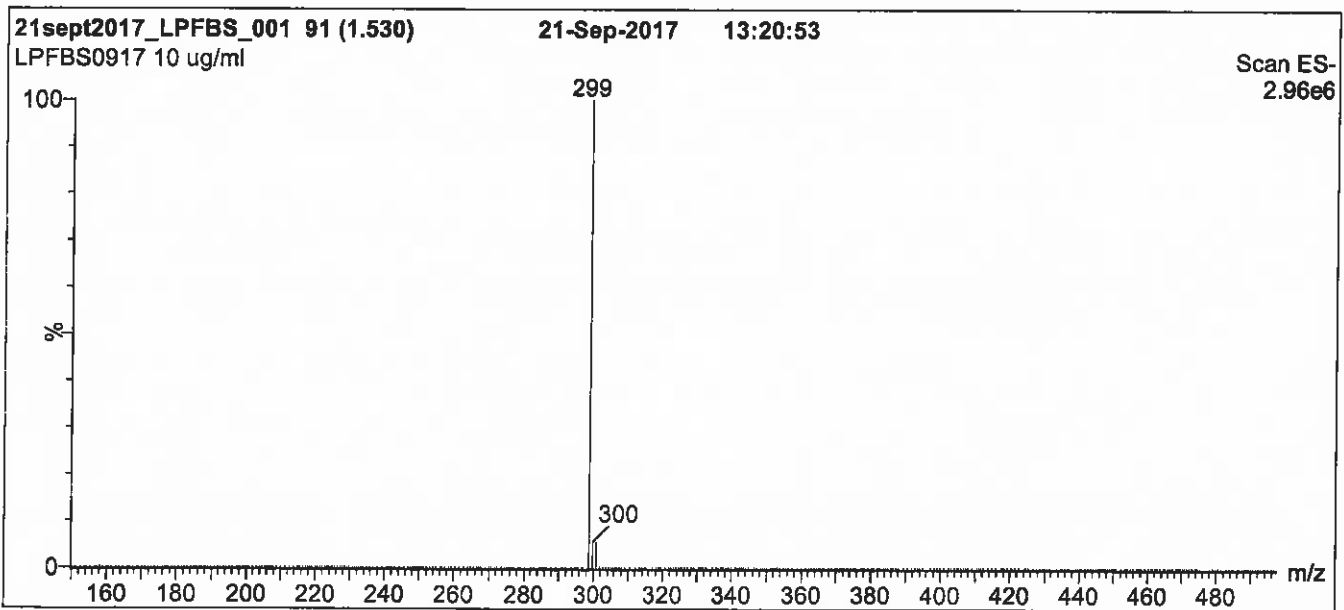
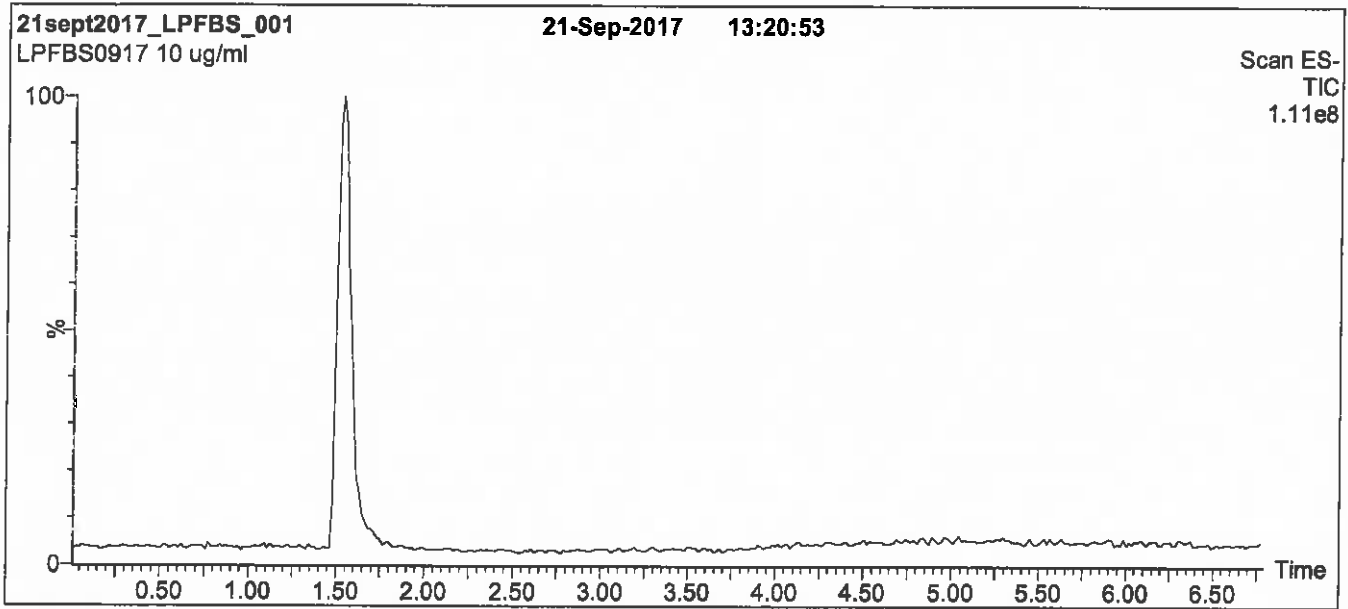
### **QUALITY MANAGEMENT:**

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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**Figure 1: L-PFBS; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro micro API MS

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 7 min: and hold for 2 min  
before returning to initial conditions in 0.5 min.  
Time: 10 min

Flow: 300  $\mu$ l/min

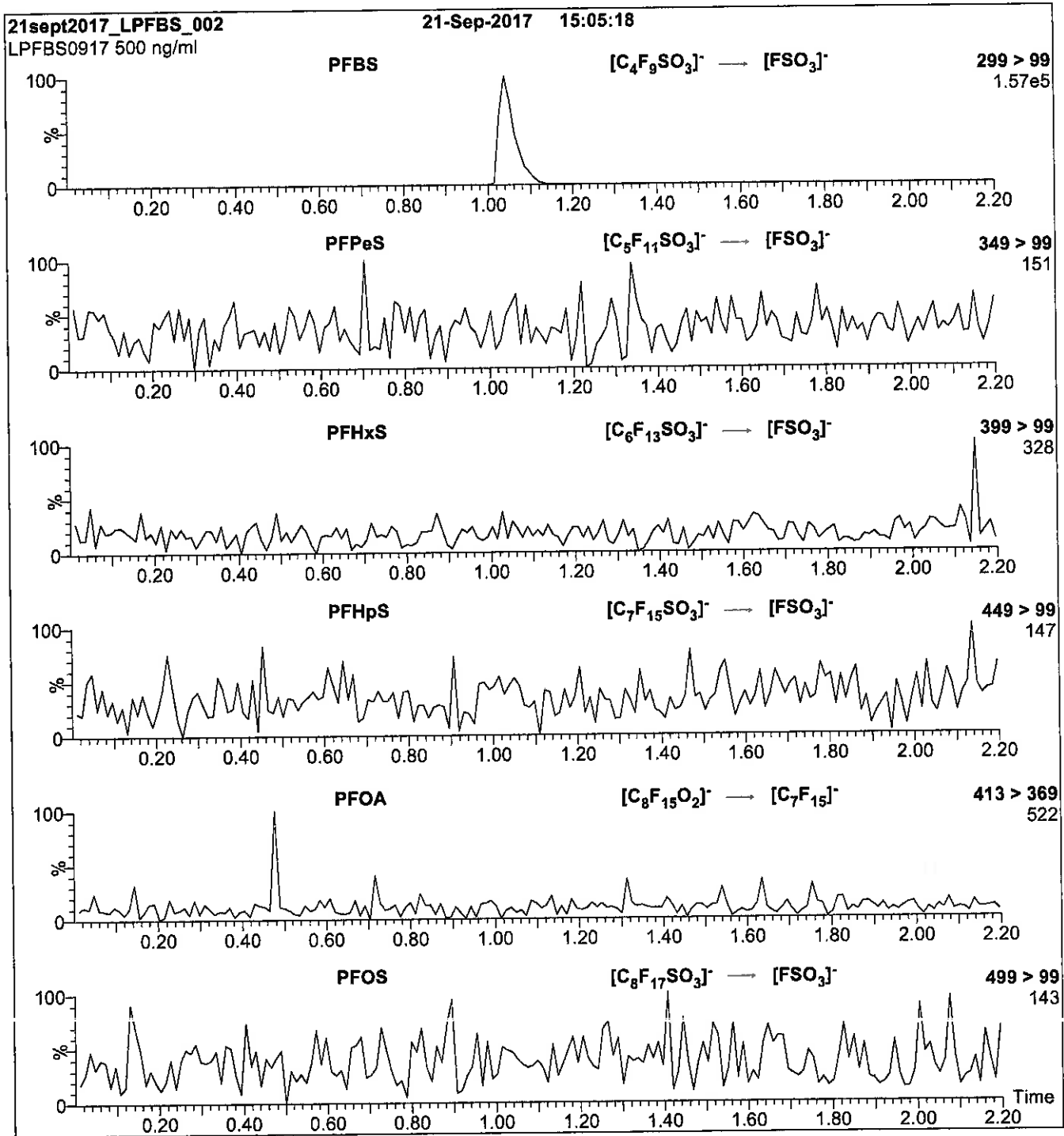
**MS Parameters**

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)  
Capillary Voltage (kV) = 3.00  
Cone Voltage (V) = 40.00  
Cone Gas Flow (l/hr) = 50  
Desolvation Gas Flow (l/hr) = 750



**Figure 2: L-PFBS; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
 10  $\mu$ l (500 ng/ml L-PFBS)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

Collision Gas (mbar) = 3.39e-3

Collision Energy (eV) = 25

Reagent

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**LCPFBSA\_00002**



### **INTENDED USE:**

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### **HAZARDS:**

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### **SYNTHESIS / CHARACTERIZATION:**

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

### **UNCERTAINTY:**

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The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  on which it depends is:

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where  $x$  is expressed as a relative standard uncertainty of the individual parameter.

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### **TRACEABILITY:**

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

### **EXPIRY DATE / PERIOD OF VALIDITY:**

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

### **LIMITED WARRANTY:**

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

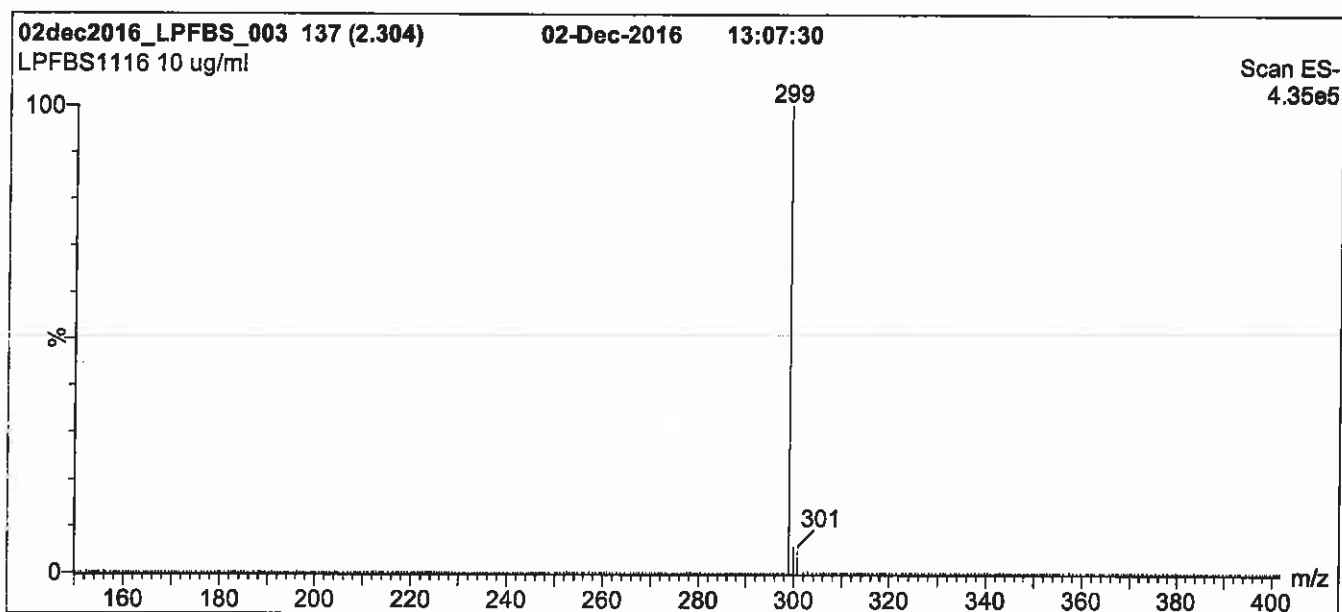
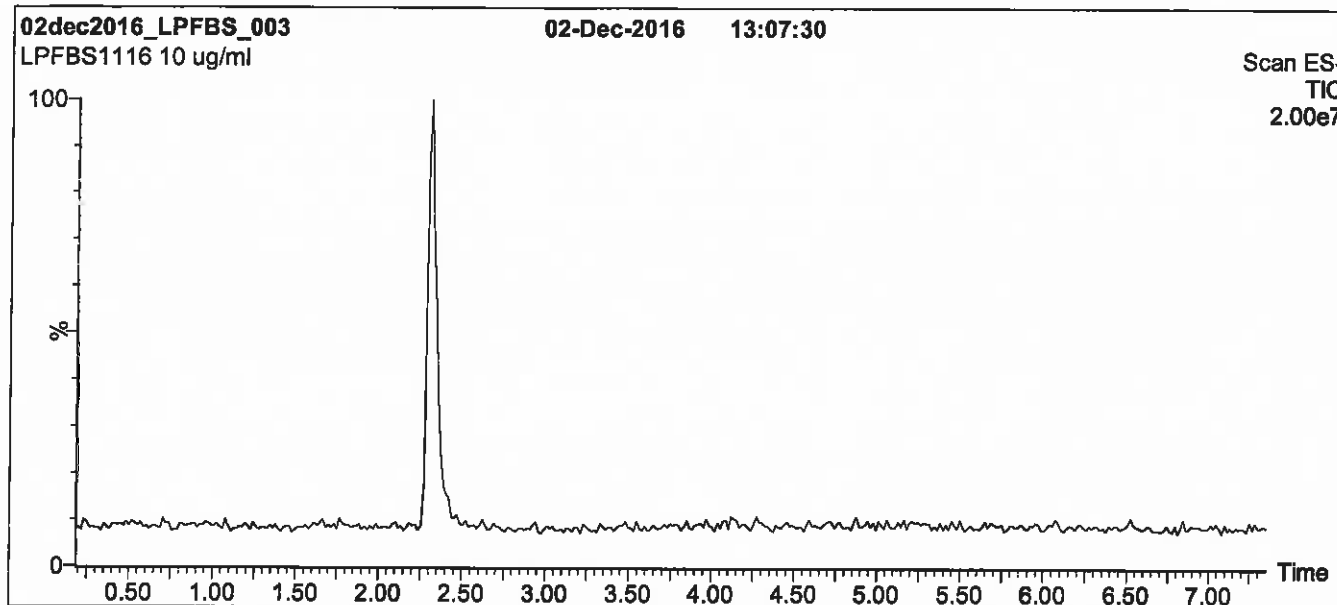
### **QUALITY MANAGEMENT:**

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**Figure 1: L-PFBS; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro *micro* API MS

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 40% (80:20 MeOH:ACN) / 60% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 7 min and hold for 2 min  
before returning to initial conditions in 0.5 min.  
Time: 10 min

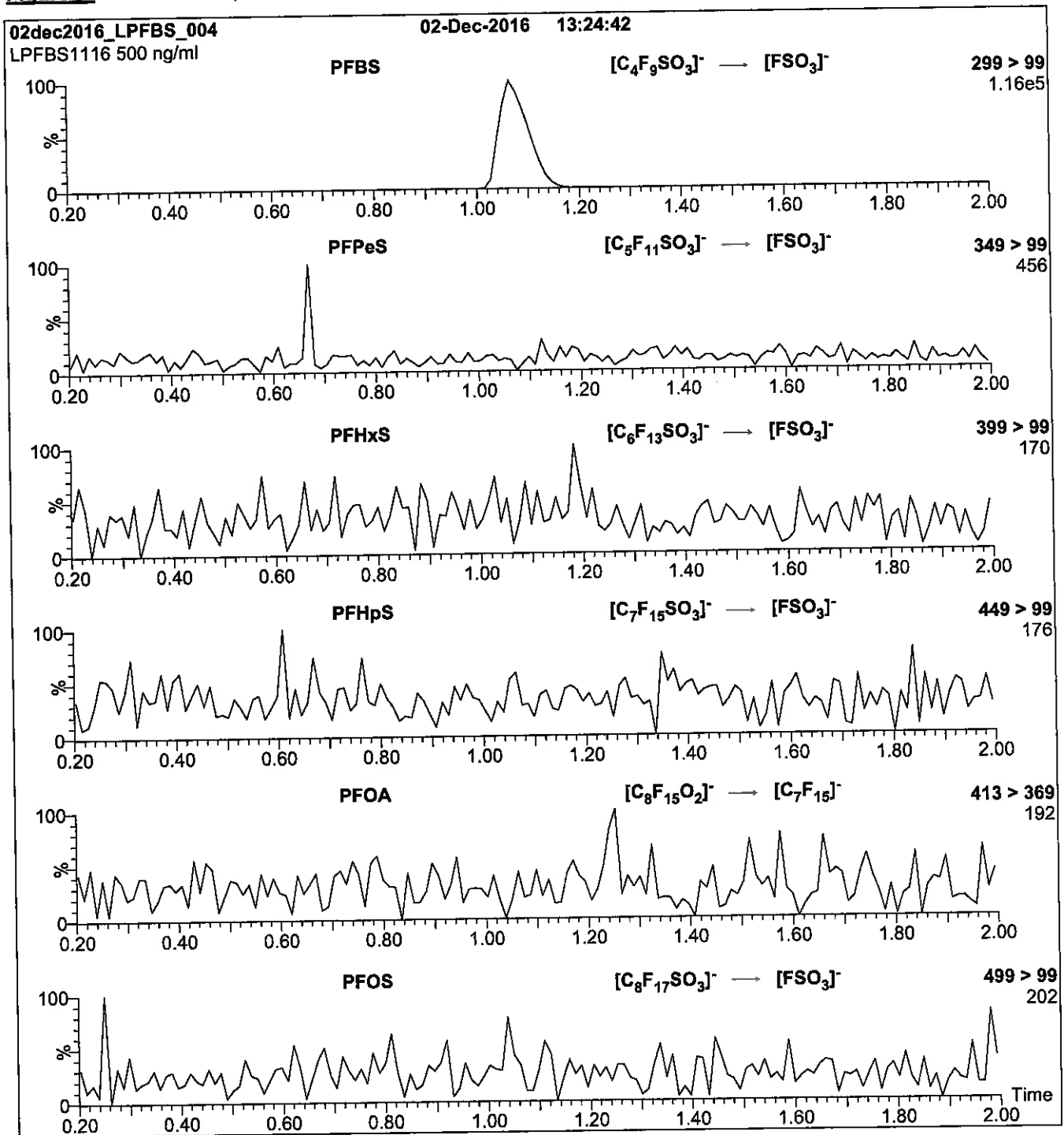
**Flow:** 300  $\mu$ l/min

**MS Parameters**

**Experiment:** Full Scan (150 - 850 amu)

**Source:** Electrospray (negative)  
**Capillary Voltage (kV) =** 2.00  
**Cone Voltage (V) =** 40.00  
**Cone Gas Flow (l/hr) =** 50  
**Desolvation Gas Flow (l/hr) =** 750

**Figure 2: L-PFBS; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
 10  $\mu$ l (500 ng/ml L-PFBS)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

Collision Gas (mbar) = 3.28e-3  
 Collision Energy (eV) = 25

Reagent

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**LCPFHpA\_00009**

P: 9/21/17 SKJ

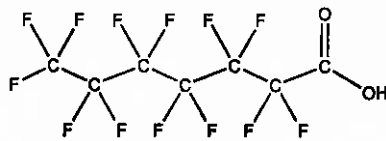


# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** PFHpA **LOT NUMBER:** PFHpA1216  
**COMPOUND:** Perfluoro-n-heptanoic acid

**STRUCTURE:** **CAS #:** 375-85-9



**MOLECULAR FORMULA:** C<sub>7</sub>HF<sub>13</sub>O<sub>2</sub> **MOLECULAR WEIGHT:** 364.06  
**CONCENTRATION:** 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol  
Water (<1%)  
**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 12/02/2016  
**EXPIRY DATE:** (mm/dd/yyyy) 12/02/2021  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

### DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)  
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

### ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

**Certified By:**   
B.G. Chittim **Date:** 12/12/2016  
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA  
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com



**INTENDED USE:**

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**SYNTHESIS / CHARACTERIZATION:**

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

**HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

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where  $x$  is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

**TRACEABILITY:**

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

**EXPIRY DATE / PERIOD OF VALIDITY:**

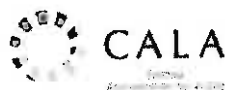
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

**LIMITED WARRANTY:**

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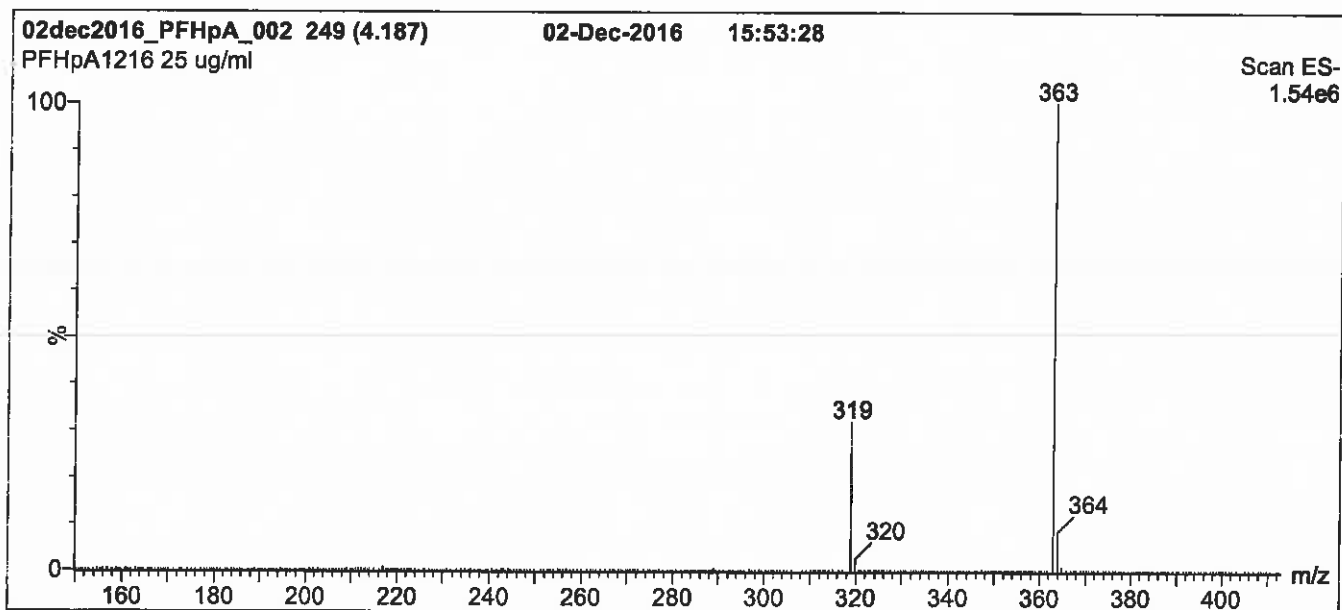
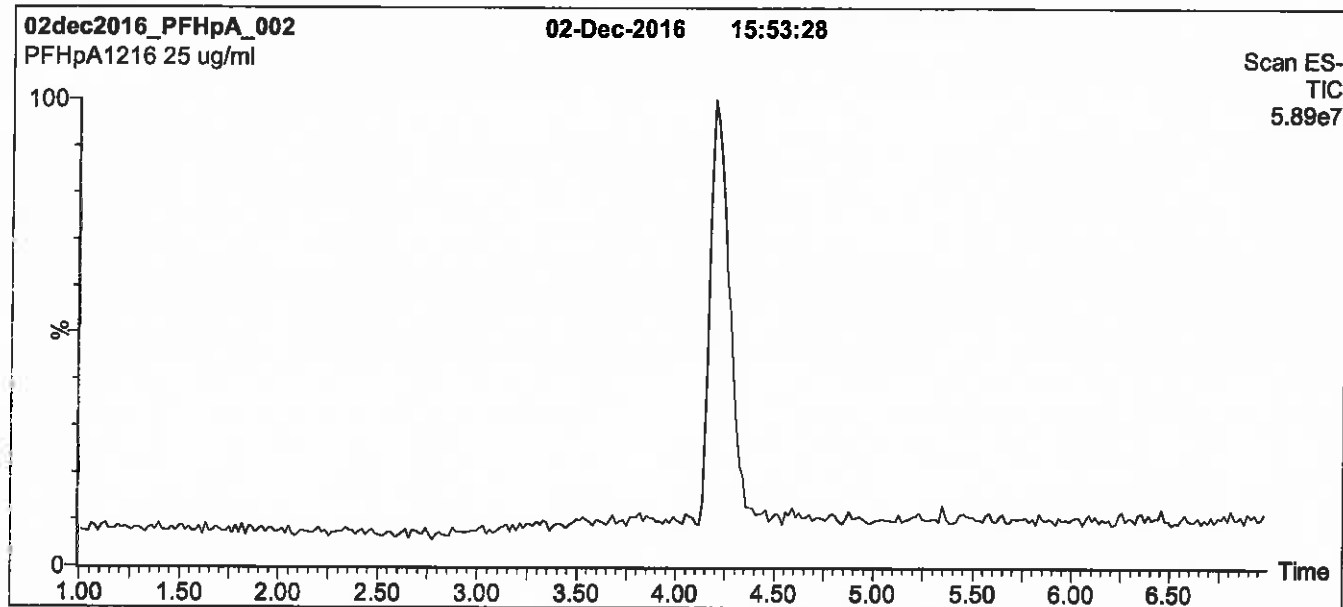
**QUALITY MANAGEMENT:**

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

**Figure 1: PFHpA; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro micro API MS

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
 Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)  
 Ramp to 90% organic over 7.5 min and hold for  
 1.5 min before returning to initial conditions in 0.5 min.  
 Time: 10 min

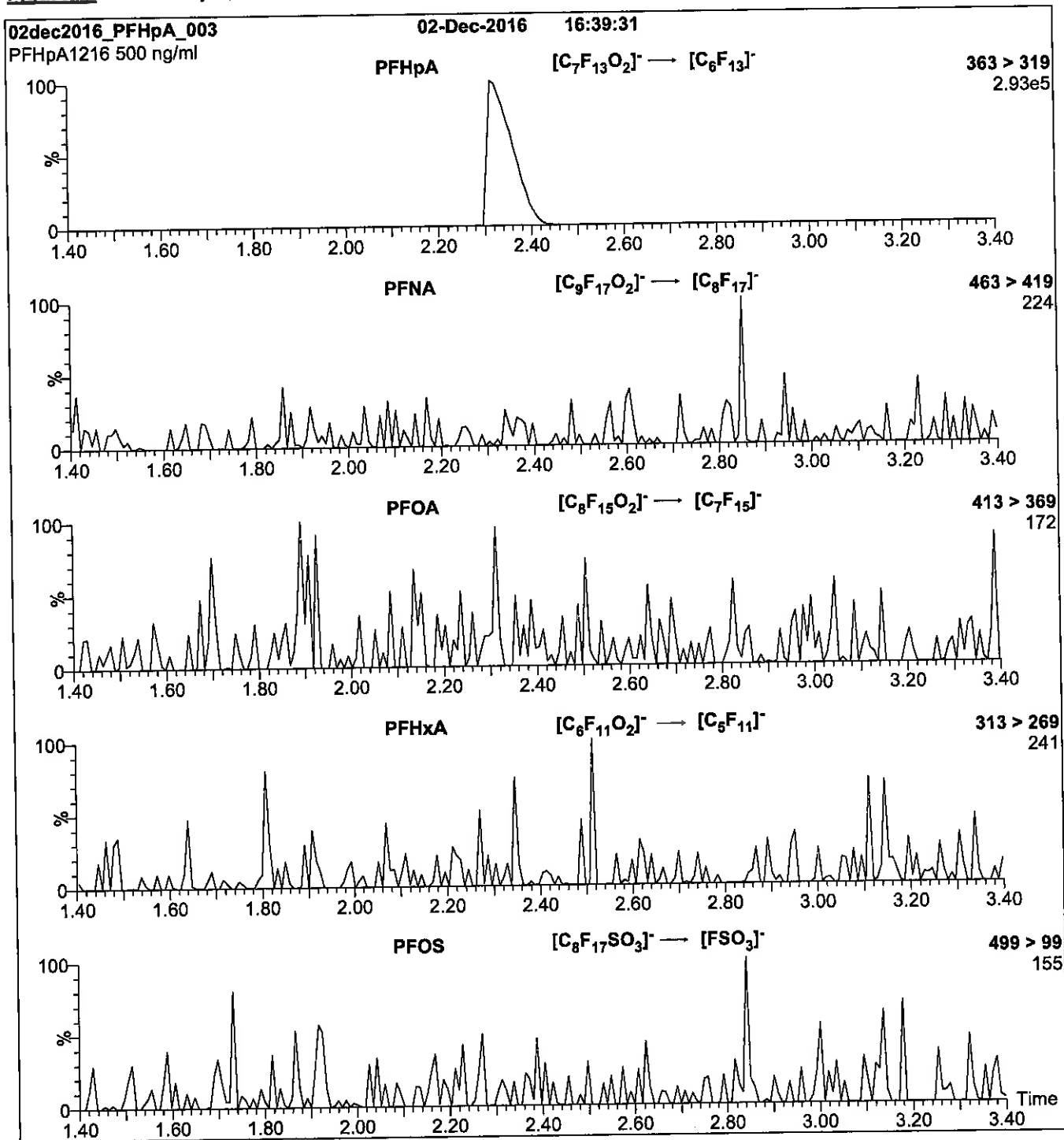
Flow: 300  $\mu$ l/min

**MS Parameters**

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)  
 Capillary Voltage (kV) = 2.00  
 Cone Voltage (V) = 15.00  
 Cone Gas Flow (l/hr) = 50  
 Desolvation Gas Flow (l/hr) = 750

**Figure 2: PFHpA; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
 10  $\mu$ l (500 ng/ml PFHpA)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

Collision Gas (mbar) = 3.50e-3  
 Collision Energy (eV) = 11

Reagent

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**LCPFHpA\_00010**

P: 9/21/17 SKJ



# WELLINGTON LABORATORIES

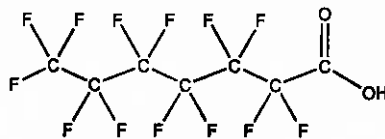
## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** PFHpA  
**COMPOUND:** Perfluoro-n-heptanoic acid

**LOT NUMBER:** PFHpA1216

**STRUCTURE:**

**CAS #:** 375-85-9



**MOLECULAR FORMULA:**  $C_7HF_{13}O_2$   
**CONCENTRATION:**  $50 \pm 2.5 \mu\text{g/ml}$

**MOLECULAR WEIGHT:** 364.06  
**SOLVENT(S):** Methanol  
Water (<1%)

**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 12/02/2016  
**EXPIRY DATE:** (mm/dd/yyyy) 12/02/2021  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

**DOCUMENTATION/ DATA ATTACHED:**

Figure 1: LC/MS Data (TIC and Mass Spectrum)  
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

**ADDITIONAL INFORMATION:**

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

Certified By:   
B.G. Chittim  
Date: 12/12/2016  
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA  
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

### **INTENDED USE:**

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

### **HAZARDS:**

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

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### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

### **UNCERTAINTY:**

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where  $x$  is expressed as a relative standard uncertainty of the individual parameter.

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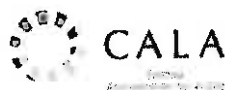
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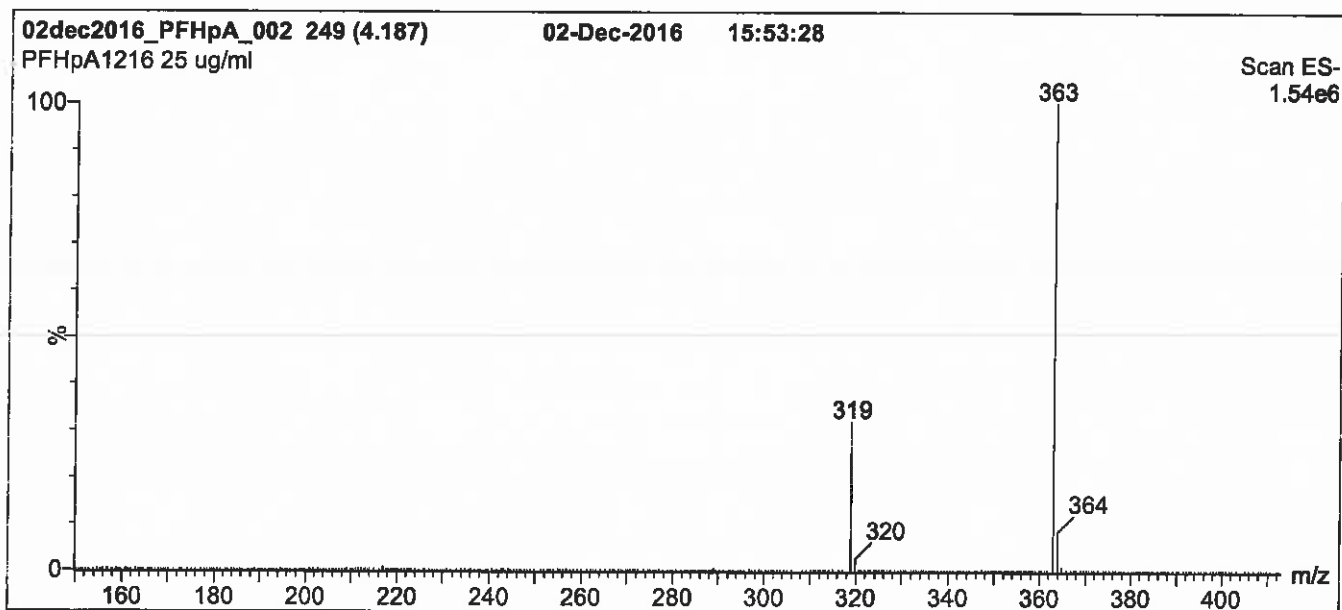
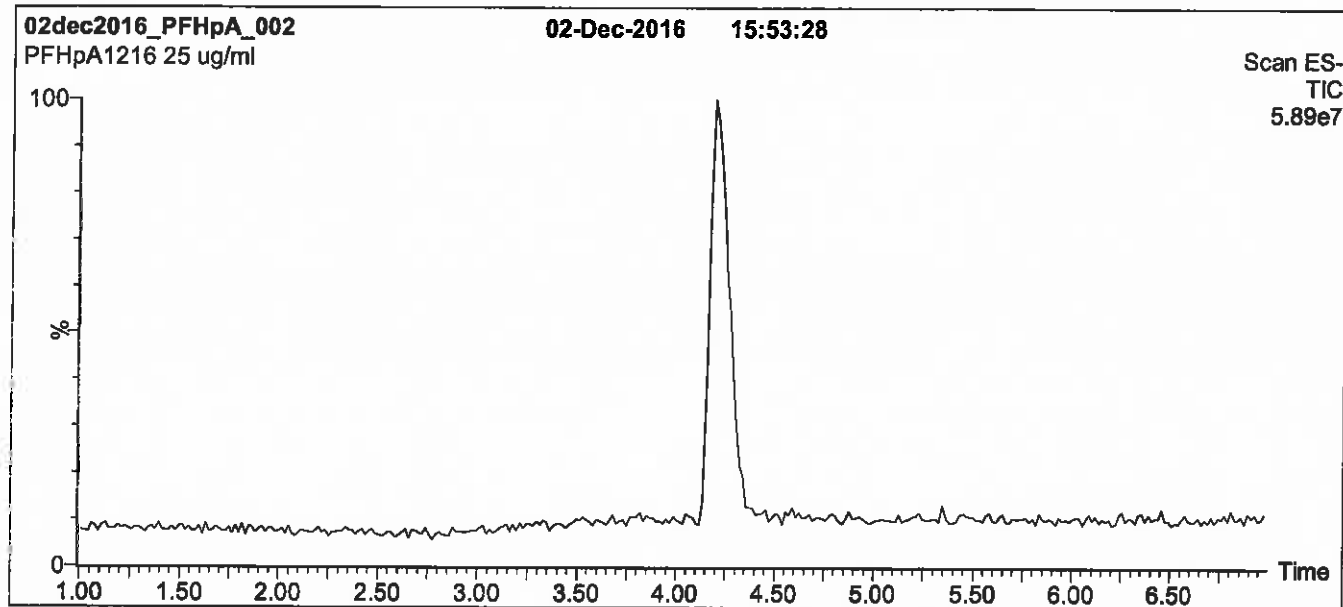
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**Figure 1: PFHpA; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro micro API MS

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 7.5 min and hold for  
1.5 min before returning to initial conditions in 0.5 min.  
Time: 10 min

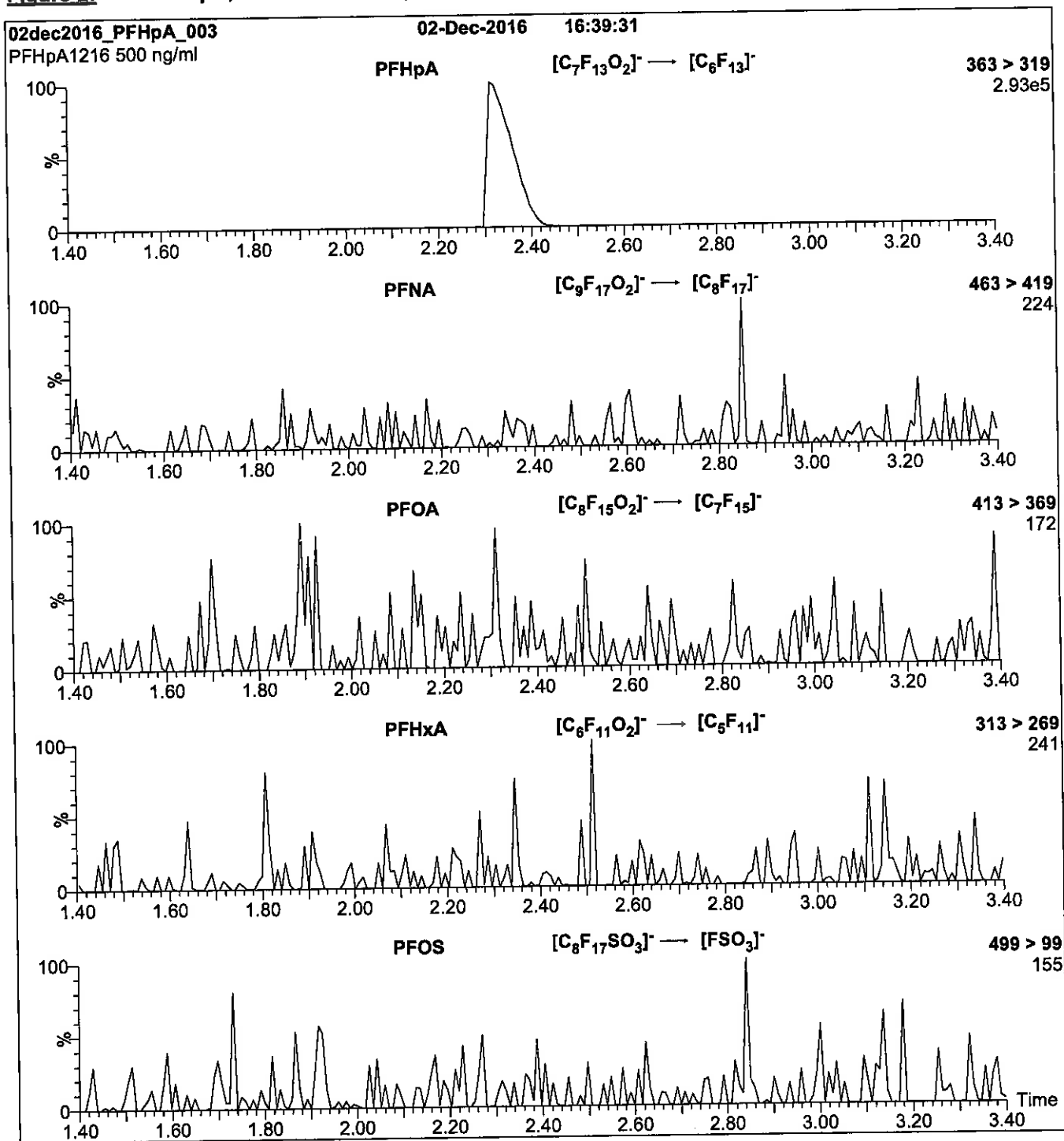
Flow: 300  $\mu$ l/min

**MS Parameters**

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)  
Capillary Voltage (kV) = 2.00  
Cone Voltage (V) = 15.00  
Cone Gas Flow (l/hr) = 50  
Desolvation Gas Flow (l/hr) = 750

**Figure 2: PFHpA; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
 10  $\mu$ l (500 ng/ml PFHpA)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

Collision Gas (mbar) = 3.50e-3  
 Collision Energy (eV) = 11



Reagent

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**LCPFHxS-br\_00005**

P: 10/2017 SKV



**WELLINGTON**  
LABORATORIES

**CERTIFICATE OF ANALYSIS**  
**DOCUMENTATION**

**br-PFHxSK**

**Potassium Perfluorohexanesulfonate**  
**Solution/Mixture of Linear and**  
**Branched Isomers**

**PRODUCT CODE:** br-PFHxSK  
**LOT NUMBER:** brPFHxSK0117  
**CONCENTRATION:** 50.0 ± 2.5 µg/ml (total potassium salt)  
45.5 ± 2.3 µg/ml (total PFHxS anion)  
**SOLVENT(S):** Methanol  
**DATE PREPARED:** (mm/dd/yyyy) 01/03/2017  
**LAST TESTED:** (mm/dd/yyyy) 01/04/2017  
**EXPIRY DATE:** (mm/dd/yyyy) 01/04/2022  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

**DESCRIPTION:**

The chemical purity has been determined to be ≥98% perfluorohexanesulfonate linear and branched isomers. The full name, structure and percent composition for each of the identified isomeric components are given in Table A.

**DOCUMENTATION/ DATA ATTACHED:**

Table A: Isomeric Components and Percent Composition by <sup>19</sup>F-NMR  
Figure 1: LC/MS Data (TIC and Mass Spectrum)  
Figure 2: LC/MS Data (SIR)  
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

**ADDITIONAL INFORMATION:**

- See page 2 for further details.
- Contains ~ 0.5% of perfluoro-1-pentanesulfonate and ~ 0.2% of perfluoro-1-octanesulfonate.
- CAS#: 3871-99-6 (for linear isomer; potassium salt).

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

**Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA**  
**519-822-2436 • Fax: 519-822-2849 • info@well-labs.com**

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**Table A: br-PFHxSK; Isomeric Components and Percent Composition (by <sup>19</sup>F-NMR)\***

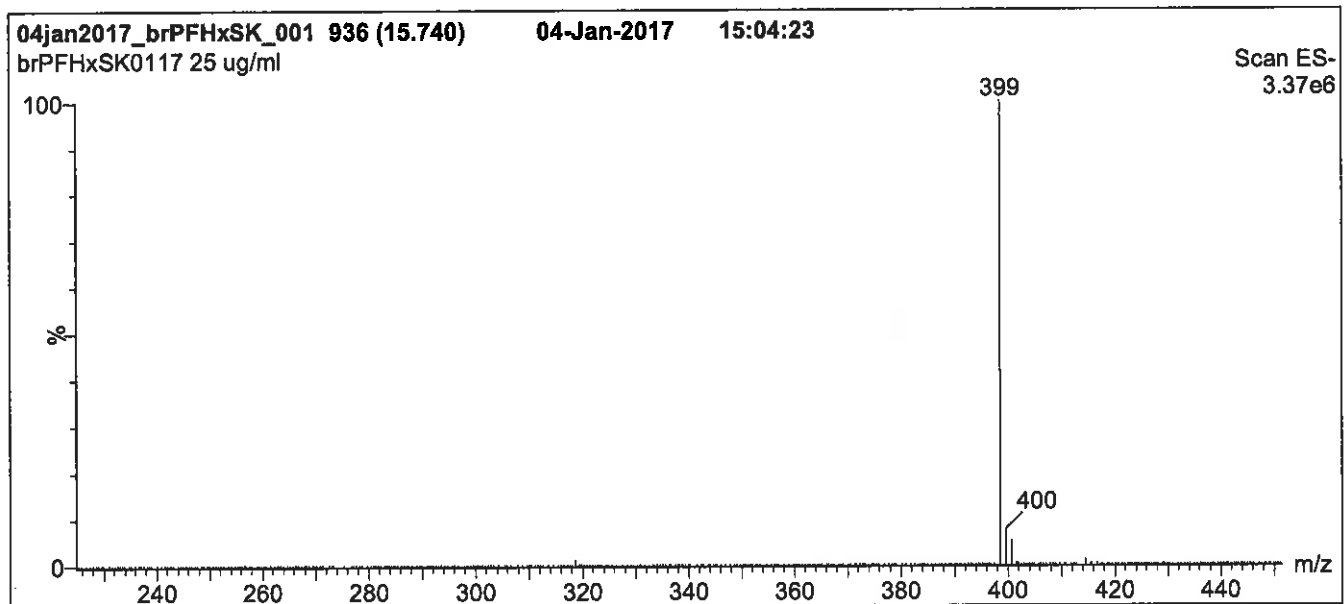
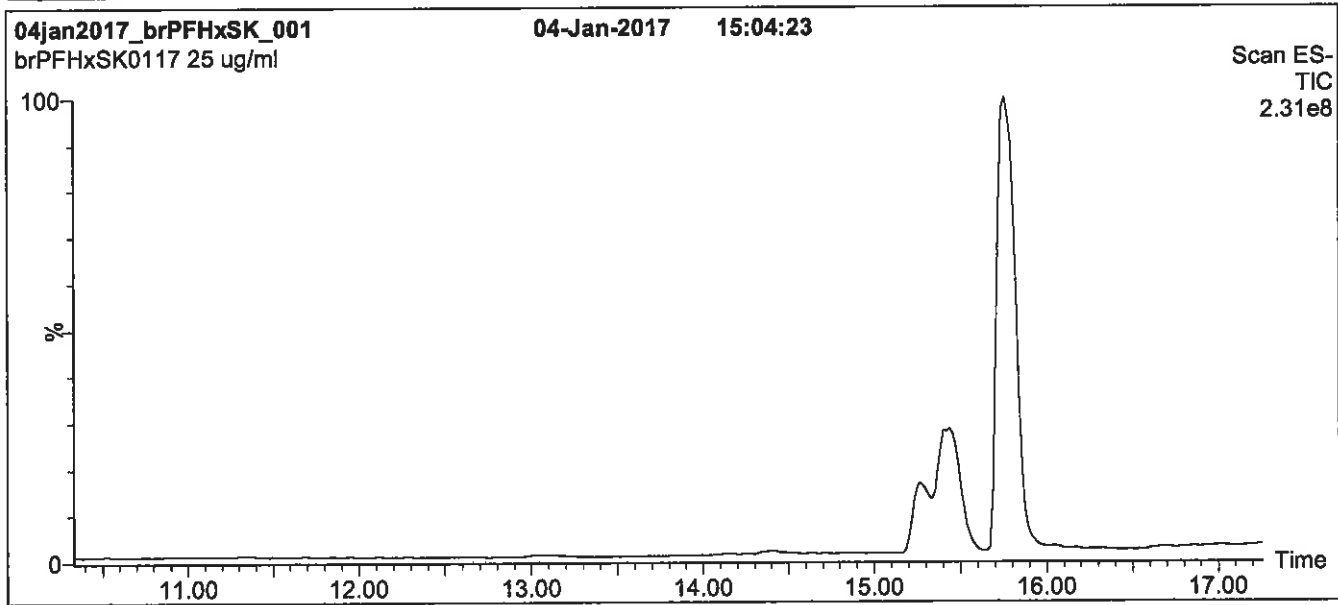
Isomer	Name	Structure	Percent Composition by <sup>19</sup> F-NMR
1	Potassium perfluoro-1-hexanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF(SO <sub>3</sub> <sup>-</sup> )K <sup>+</sup>   CF <sub>3</sub>	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF(CF <sub>3</sub> )SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF(CF <sub>3</sub> )CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	CF <sub>3</sub> CF(CF <sub>3</sub> )CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	CF <sub>3</sub>   CF <sub>3</sub> CCF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	0.2
7	Other Unidentified Isomers		0.5

\* Percent of total perfluorohexanesulfonate isomers only.  
 \*\* Systematic Name: Potassium perfluorohexane-2-sulfonate.

Certified By:   
 B.G. Chittim

Date: 01/20/2017  
(mm/dd/yyyy)

**Figure 1: br-PFHxSK; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro *micro* API MS

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 20% (80:20 MeOH:ACN) / 80% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 50% organic over 14 min. Ramp to  
90% organic over 3 min and hold for 1.5 min  
before returning to initial conditions in 0.5 min.  
Time: 20 min

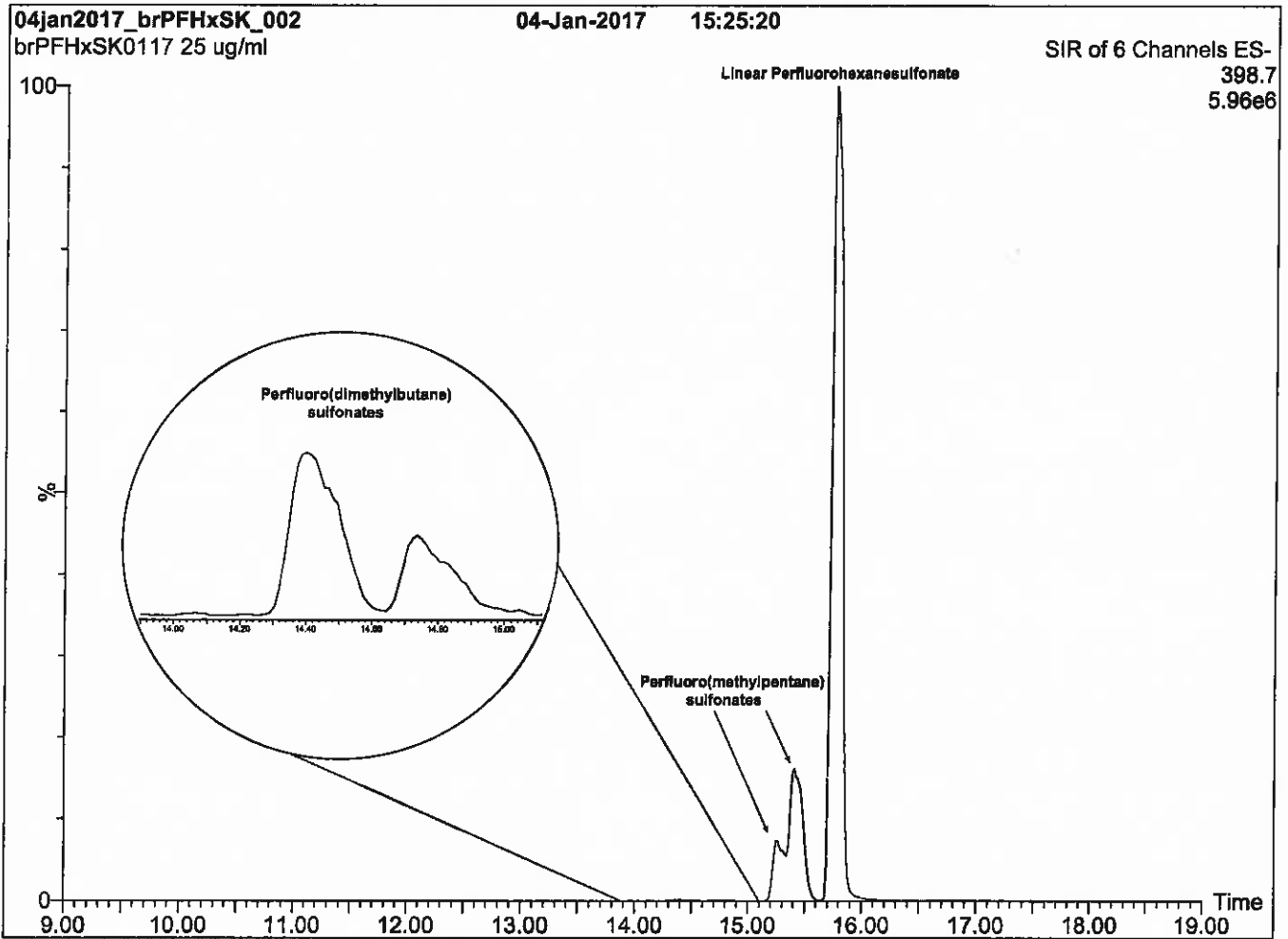
**Flow:** 300  $\mu$ l/min

**MS Parameters**

**Experiment:** Full Scan (225 - 850 amu)

**Source:** Electrospray (negative)  
**Capillary Voltage (kV)** = 3.00  
**Cone Voltage (V)** = 50.00  
**Cone Gas Flow (l/hr)** = 60  
**Desolvation Gas Flow (l/hr)** = 750

**Figure 2: br-PFHxSK; LC/MS Data (SIR)**



**Conditions for Figure 2:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro *micro* API MS

**Chromatographic Conditions**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

**Mobile phase:** Gradient  
Start: 20% (80:20 MeOH:ACN) / 80% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 50% organic over 14 min. Ramp to  
90% organic over 3 min and hold for 1.5 min  
before returning to initial conditions in 0.5 min.  
Time: 20 min

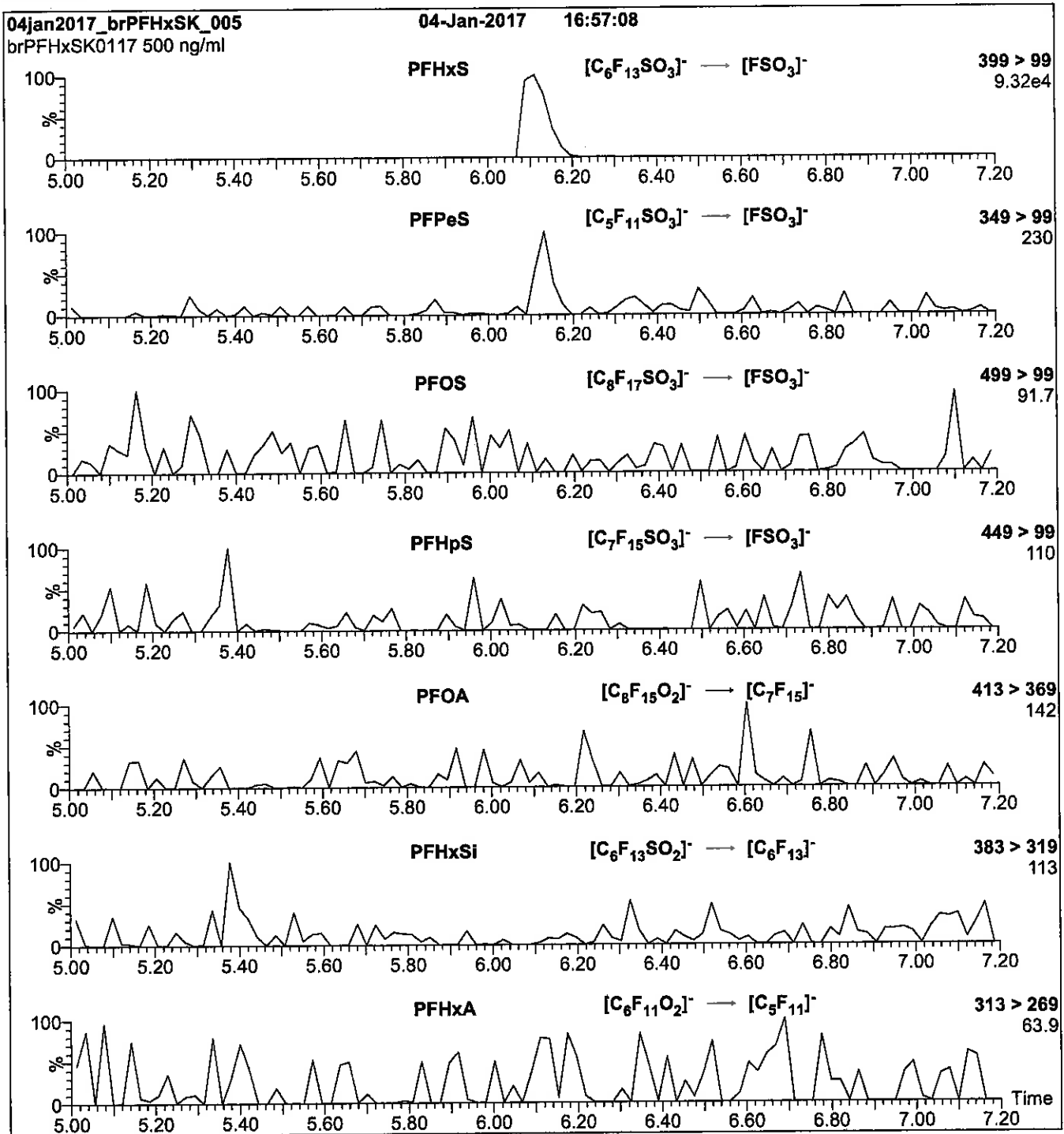
**Flow:** 300  $\mu$ l/min

**MS Parameters**

**Experiment:** SIR (6 channels)

**Source:** Electrospray (negative)  
**Capillary Voltage (kV)** = 3.00  
**Cone Voltage (V)** = variable (15-62)  
**Cone Gas Flow (l/hr)** = 60  
**Desolvation Gas Flow (l/hr)** = 750

**Figure 3: br-PFHxSK; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 3:**

Injection: Direct loop injection  
10  $\mu$ l (500 ng/ml br-PFHxSK)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300  $\mu$ l/min

**MS Parameters**

Collision Gas (mbar) = 3.35e-3  
Collision Energy (eV) = 30

Reagent

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**LCPFHxSA\_00002**



12/18/18 SKJ



# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:**

L-PFHxS

**LOT NUMBER:**

LPFHxS0917

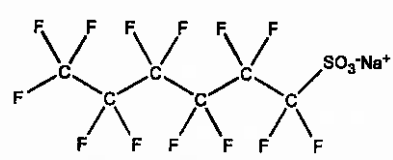
**COMPOUND:**

Sodium perfluoro-1-hexanesulfonate

**STRUCTURE:**

**CAS #:**

82382-12-5



**MOLECULAR FORMULA:**

C<sub>6</sub>F<sub>13</sub>SO<sub>3</sub>Na

**MOLECULAR WEIGHT:**

422.10

**CONCENTRATION:**

50.0 ± 2.5 µg/ml (Na salt)  
47.3 ± 2.4 µg/ml (PFHxS anion)

**SOLVENT(S):**

Methanol

**CHEMICAL PURITY:**

>98%

**LAST TESTED:** (mm/dd/yyyy)

09/21/2017

**EXPIRY DATE:** (mm/dd/yyyy)

09/21/2022

**RECOMMENDED STORAGE:**

Store ampoule in a cool, dark place

**DOCUMENTATION/ DATA ATTACHED:**

- Figure 1: LC/MS Data (TIC and Mass Spectrum)
- Figure 2: LC/MS/MS Data (Selected MRM Transitions)

**ADDITIONAL INFORMATION:**

See page 2 for further details.

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Certified By:   
B.G. Chittim, General Manager

Date: 09/22/2017  
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA  
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

### **UNCERTAINTY:**

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters

$x_1, x_2, \dots, x_n$  on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where  $x$  is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

### **TRACEABILITY:**

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

### **EXPIRY DATE / PERIOD OF VALIDITY:**

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

### **LIMITED WARRANTY:**

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

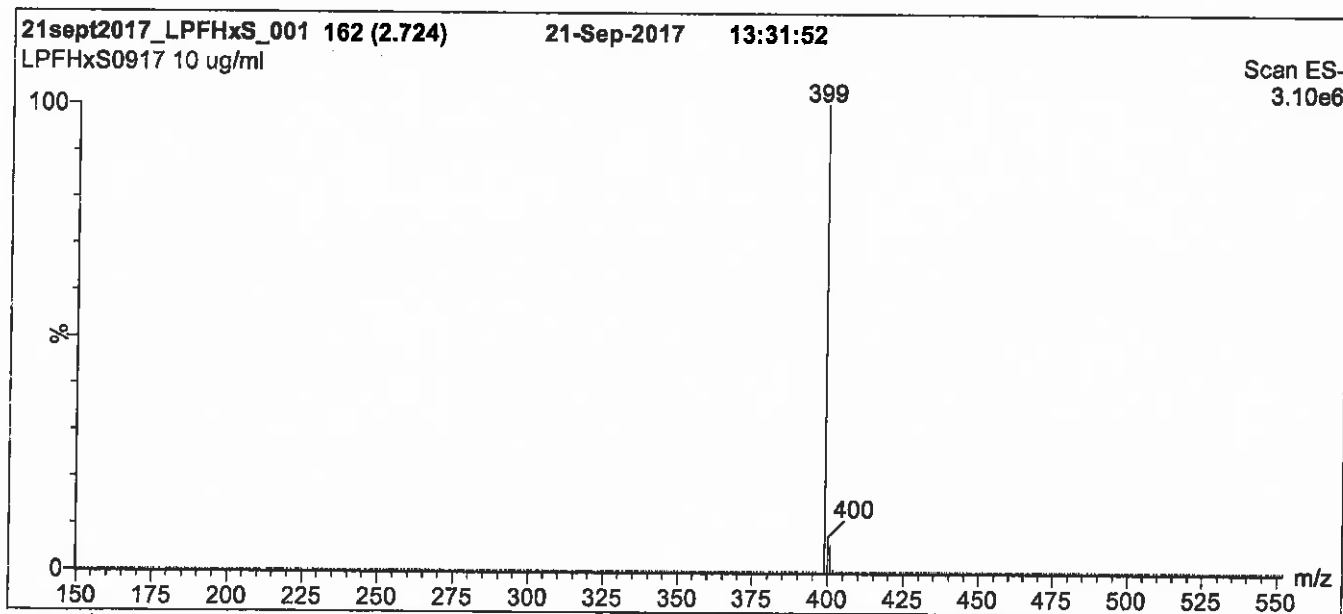
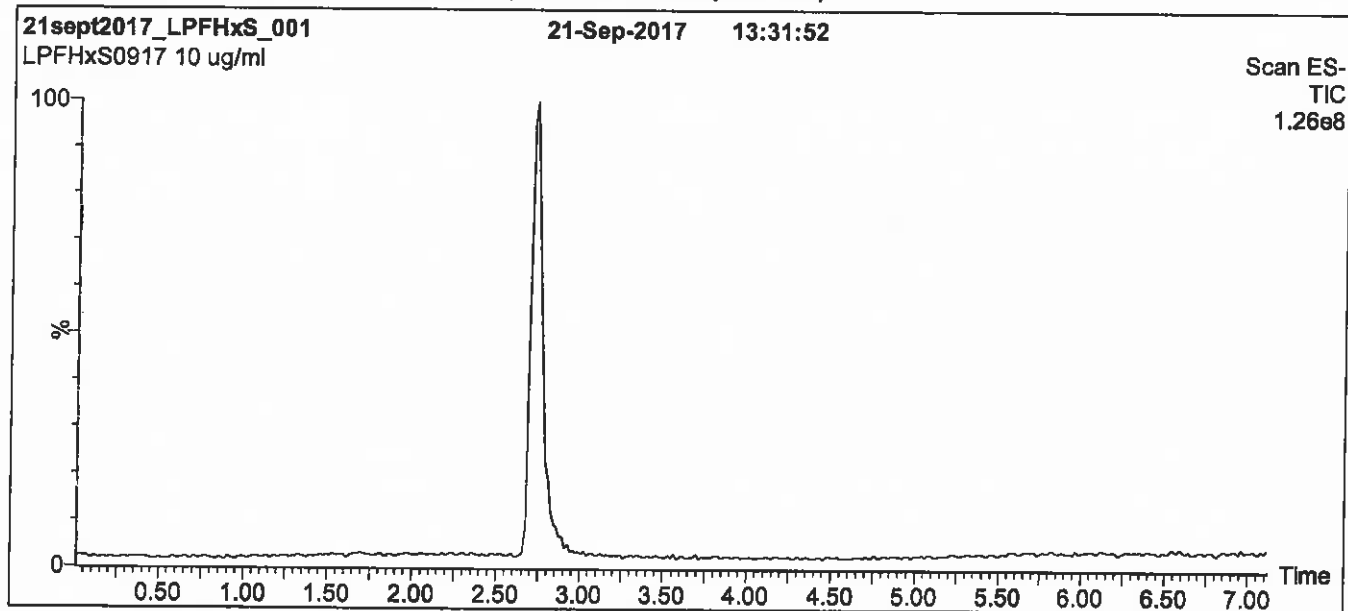
### **QUALITY MANAGEMENT:**

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

**Figure 1: L-PFHxS; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro *micro* API MS

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 7 min and hold for 2 min  
before returning to initial conditions in 0.5 min.  
Time: 10 min

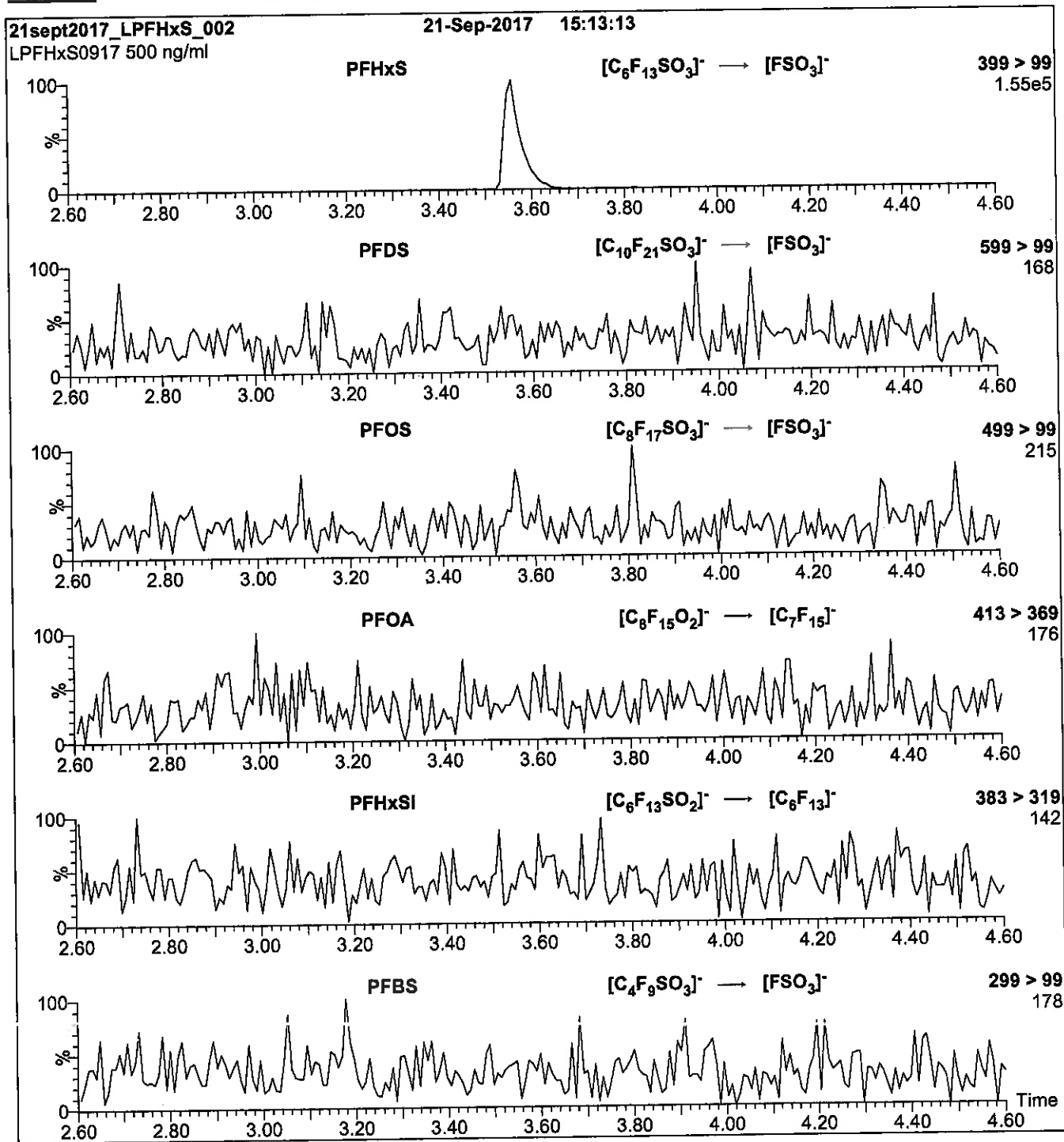
Flow: 300  $\mu$ l/min

**MS Parameters**

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)  
Capillary Voltage (kV) = 3.00  
Cone Voltage (V) = 50.00  
Cone Gas Flow (l/hr) = 60  
Desolvation Gas Flow (l/hr) = 750

**Figure 2: L-PFHxS; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
 10  $\mu$ l (500 ng/ml L-PFHxS)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

Collision Gas (mbar) = 3.43e-3  
 Collision Energy (eV) = 30

Reagent

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**LCPFNA\_00009**

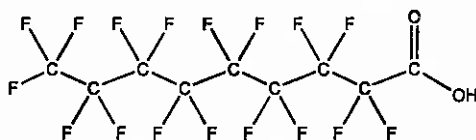
r: 9/2/17 skv



# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** PFNA  
**COMPOUND:** Perfluoro-n-nonanoic acid  
**LOT NUMBER:** PFNA0717  
**STRUCTURE:**  
**CAS #:** 375-95-1



**MOLECULAR FORMULA:**  $C_9HF_{17}O_2$   
**CONCENTRATION:**  $50 \pm 2.5 \mu\text{g/ml}$   
**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 07/20/2017  
**EXPIRY DATE:** (mm/dd/yyyy) 07/20/2022  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

**MOLECULAR WEIGHT:** 464.08  
**SOLVENT(S):** Methanol  
Water (<1%)


### DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)  
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

### ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% of perfluoro-n-octanoic acid (PFOA), < 0.1% of perfluoro-n-heptanoic acid (PFHpA), and < 0.1% of perfluoro-n-undecanoic acid (PFUdA).

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

**Certified By:**   
B.G. Chittim, General Manager  
**Date:** 07/24/2017  
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA  
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

**INTENDED USE:**

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

**HAZARDS:**

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

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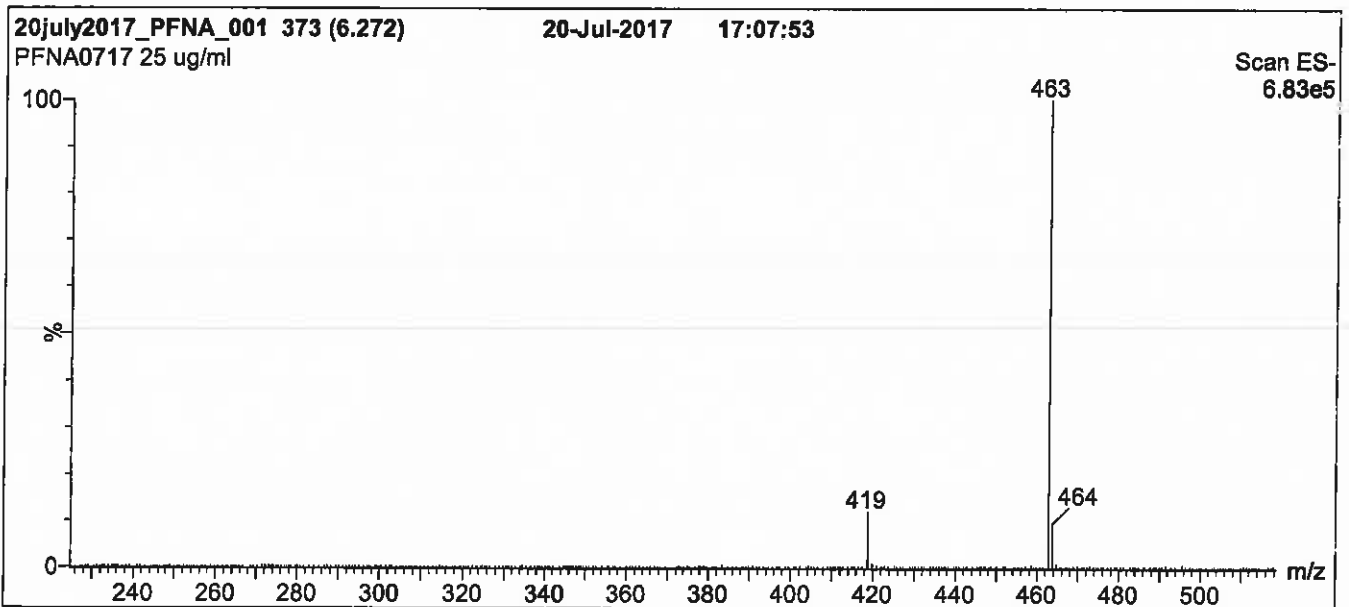
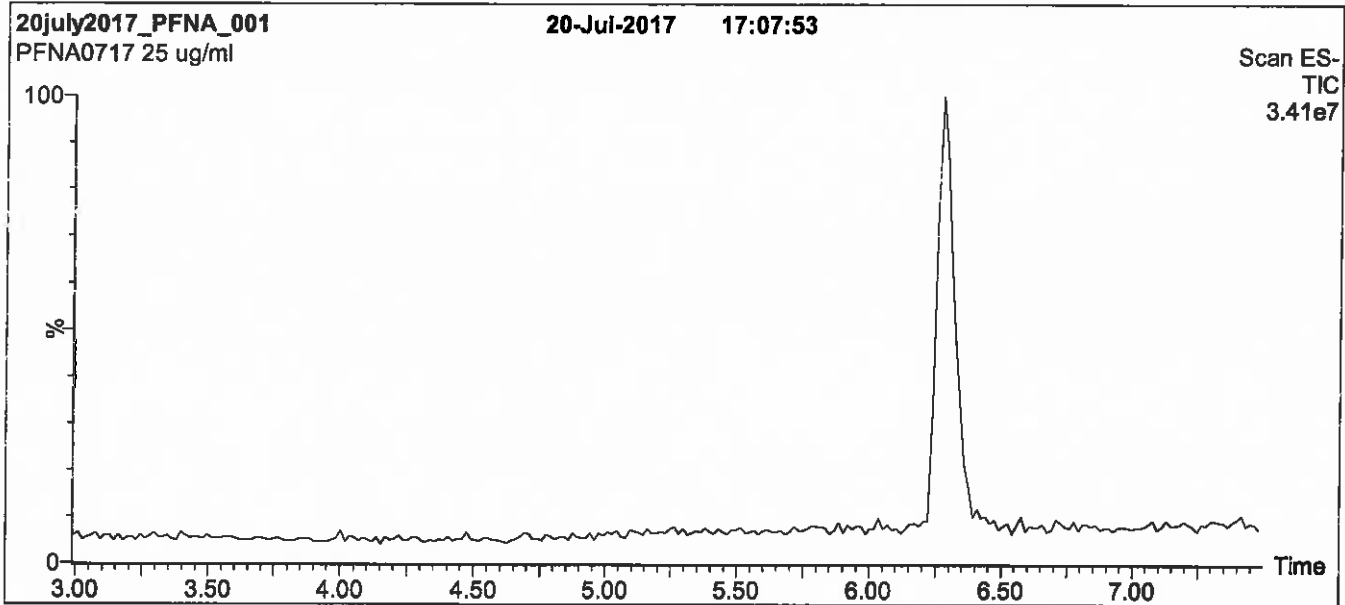
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**Figure 1: PFNA; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro micro API MS

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Hold for 1 min. Ramp to 90% organic over 7 min and hold  
for 1 min before returning to initial conditions in 0.5 min.  
Time: 10 min

Flow: 300 µl/min

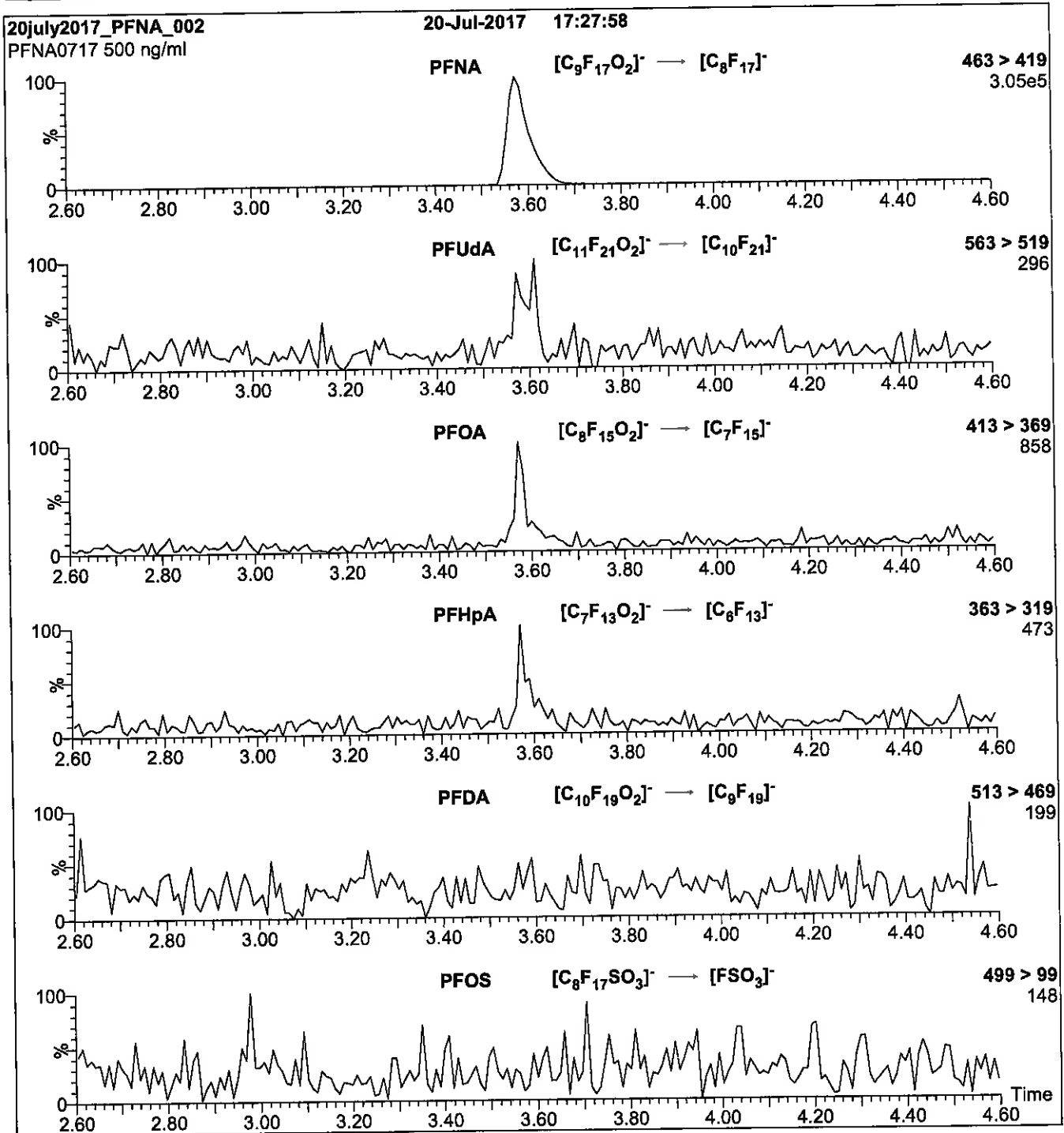
**MS Parameters**

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)  
Capillary Voltage (kV) = 2.00  
Cone Voltage (V) = 15.00  
Cone Gas Flow (l/hr) = 50  
Desolvation Gas Flow (l/hr) = 750



**Figure 2: PFNA; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
 10  $\mu$ l (500 ng/ml PFNA)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

Collision Gas (mbar) = 3.50e-3  
 Collision Energy (eV) = 11

Reagent

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**LCPFNA\_00010**

r: 2/16/18 SW



# WELLINGTON LABORATORIES

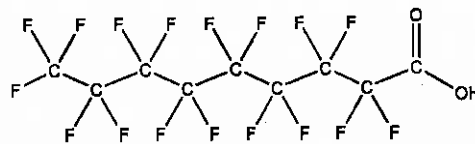
## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** PFNA  
**COMPOUND:** Perfluoro-n-nonanoic acid

**LOT NUMBER:** PFNA0717

**STRUCTURE:**

**CAS #:** 375-95-1



**MOLECULAR FORMULA:** C<sub>9</sub>H<sub>F<sub>17</sub></sub>O<sub>2</sub>  
**CONCENTRATION:** 50 ± 2.5 µg/ml

**MOLECULAR WEIGHT:** 464.08  
**SOLVENT(S):** Methanol  
Water (<1%)

**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 07/20/2017  
**EXPIRY DATE:** (mm/dd/yyyy) 07/20/2022  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

**DOCUMENTATION/ DATA ATTACHED:**

- Figure 1: LC/MS Data (TIC and Mass Spectrum)
- Figure 2: LC/MS/MS Data (Selected MRM Transitions)

**ADDITIONAL INFORMATION:**

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% of perfluoro-n-octanoic acid (PFOA), < 0.1% of perfluoro-n-heptanoic acid (PFHpA), and < 0.1% of perfluoro-n-undecanoic acid (PFUDA).

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**Certified By:**   
B.G. Chittim, General Manager

**Date:** 07/24/2017  
(mm/dd/yyyy)

**Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA**  
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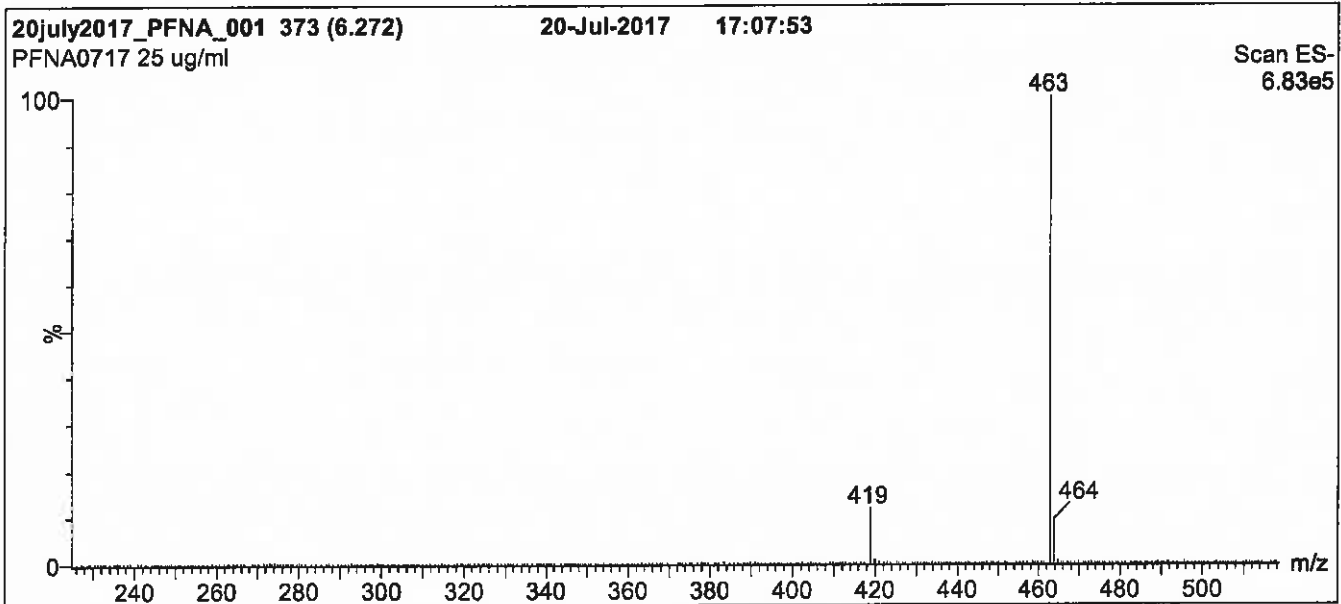
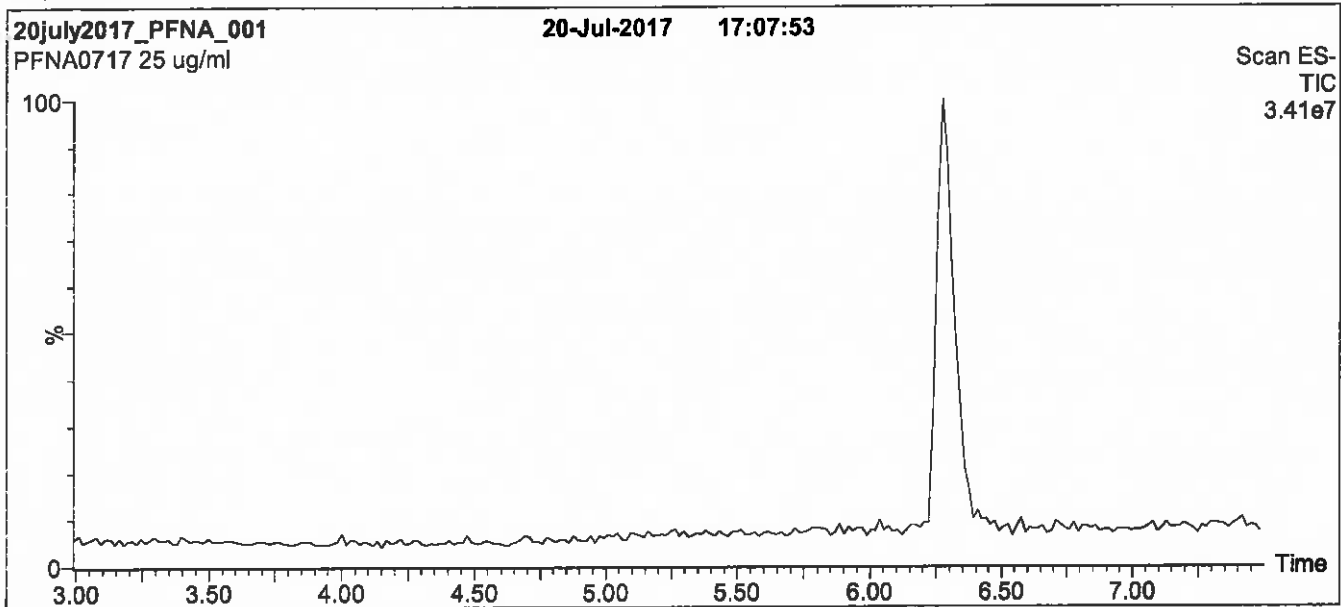
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**Figure 1: PFNA; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro *micro* API MS

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Hold for 1 min. Ramp to 90% organic over 7 min and hold  
for 1 min before returning to initial conditions in 0.5 min.  
Time: 10 min

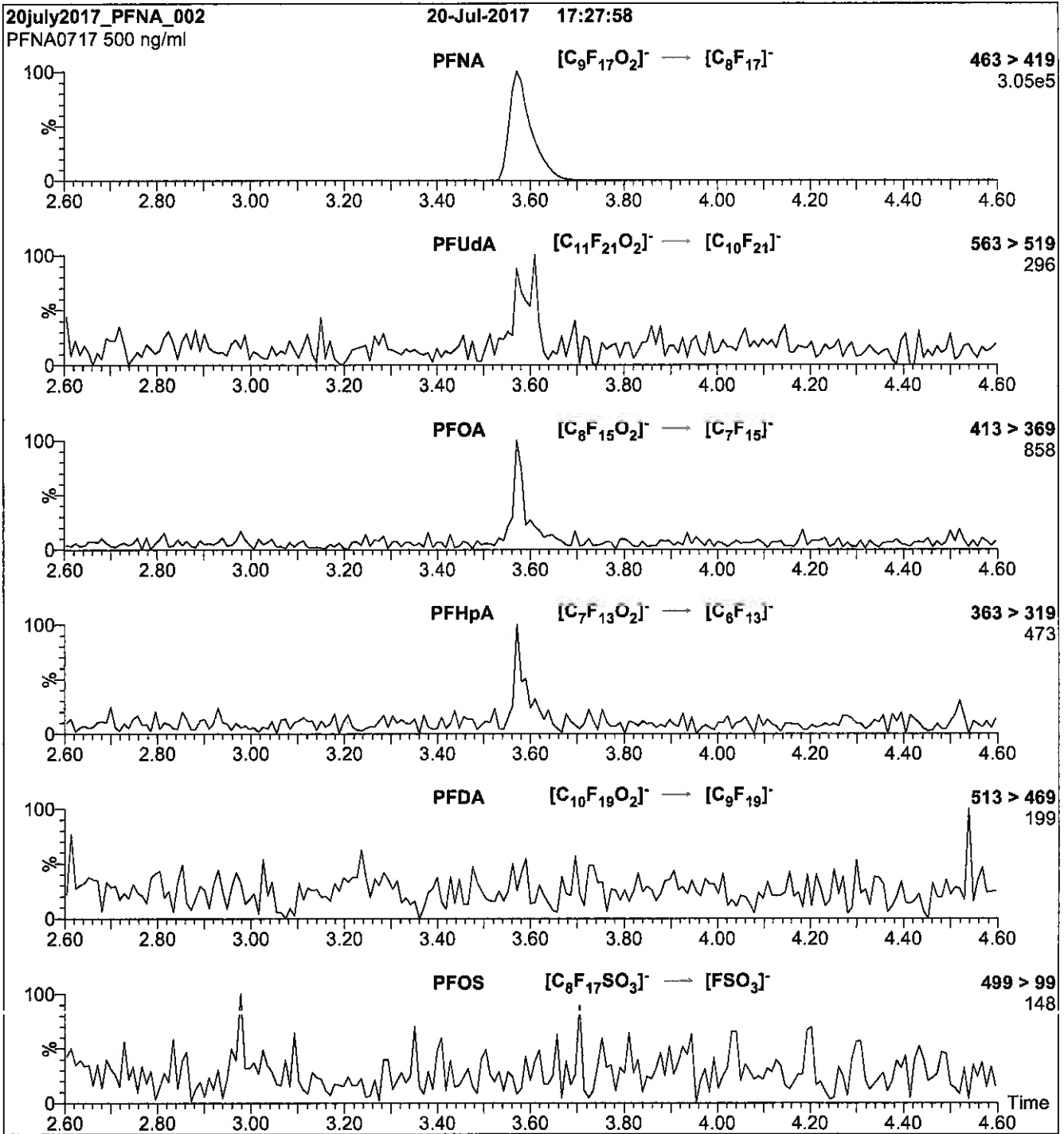
Flow: 300  $\mu$ l/min

**MS Parameters**

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)  
Capillary Voltage (kV) = 2.00  
Cone Voltage (V) = 15.00  
Cone Gas Flow (l/hr) = 50  
Desolvation Gas Flow (l/hr) = 750

**Figure 2: PFNA; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 2:**

**Injection:** Direct loop injection  
10  $\mu$ l (500 ng/ml PFNA)

**Mobile phase:** Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

**Flow:** 300  $\mu$ l/min

**MS Parameters**

Collision Gas (mbar) = 3.50e-3  
Collision Energy (eV) = 11

Reagent

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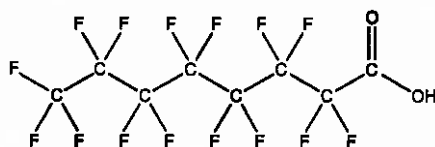
**LCPFOA\_00010**



# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

**PRODUCT CODE:** PFOA  
**COMPOUND:** Perfluoro-n-octanoic acid  
**LOT NUMBER:** PFOA0917  
**STRUCTURE:**  
**CAS #:** 335-67-1



**MOLECULAR FORMULA:**  $C_8HF_{15}O_2$   
**CONCENTRATION:**  $50 \pm 2.5 \mu\text{g/ml}$   
**MOLECULAR WEIGHT:** 414.07  
**SOLVENT(S):** Methanol  
 Water (<1%)  
**CHEMICAL PURITY:** >98%  
**LAST TESTED:** (mm/dd/yyyy) 09/27/2017  
**EXPIRY DATE:** (mm/dd/yyyy) 09/27/2022  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

### DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)  
 Figure 2: LC/MS/MS Data (Selected MRM Transitions)

### ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

**FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**

Certified By:

  
 B.G. Chittim, General Manager

Date: 09/28/2017  
 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA  
 519-822-2436 • Fax: 519-822-2849 • info@well-labs.com



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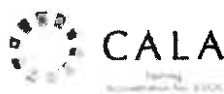
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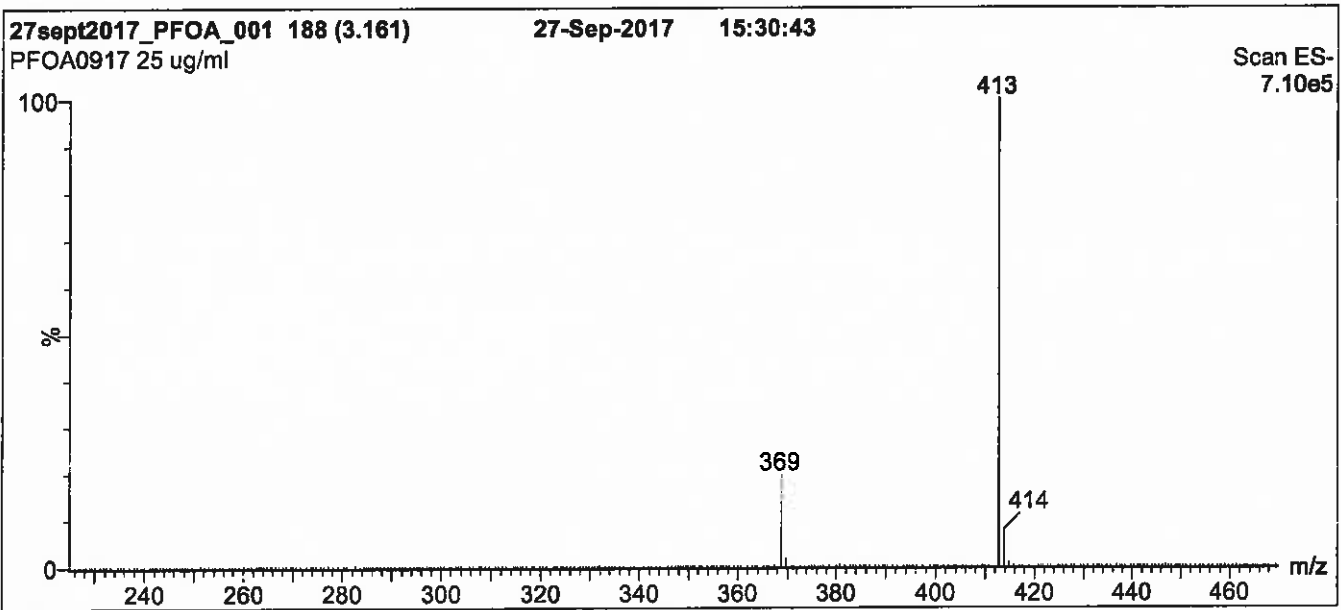
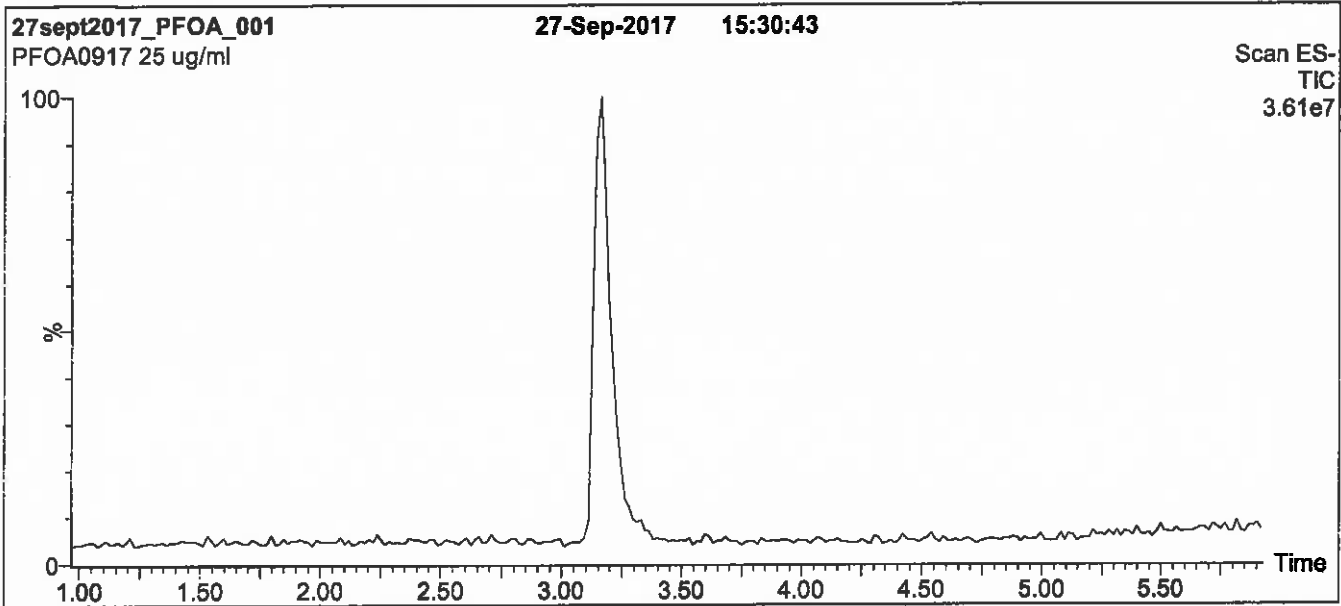
### **QUALITY MANAGEMENT:**

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



\*\*For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at [www.well-labs.com](http://www.well-labs.com) or contact us directly at [info@well-labs.com](mailto:info@well-labs.com)\*\*

**Figure 1: PFOA; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro *micro* API MS

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
Start: 50% (80:20 MeOH:ACN) / 50% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 7 min and hold for  
2 min before returning to initial conditions in 0.5 min.  
Time: 10 min

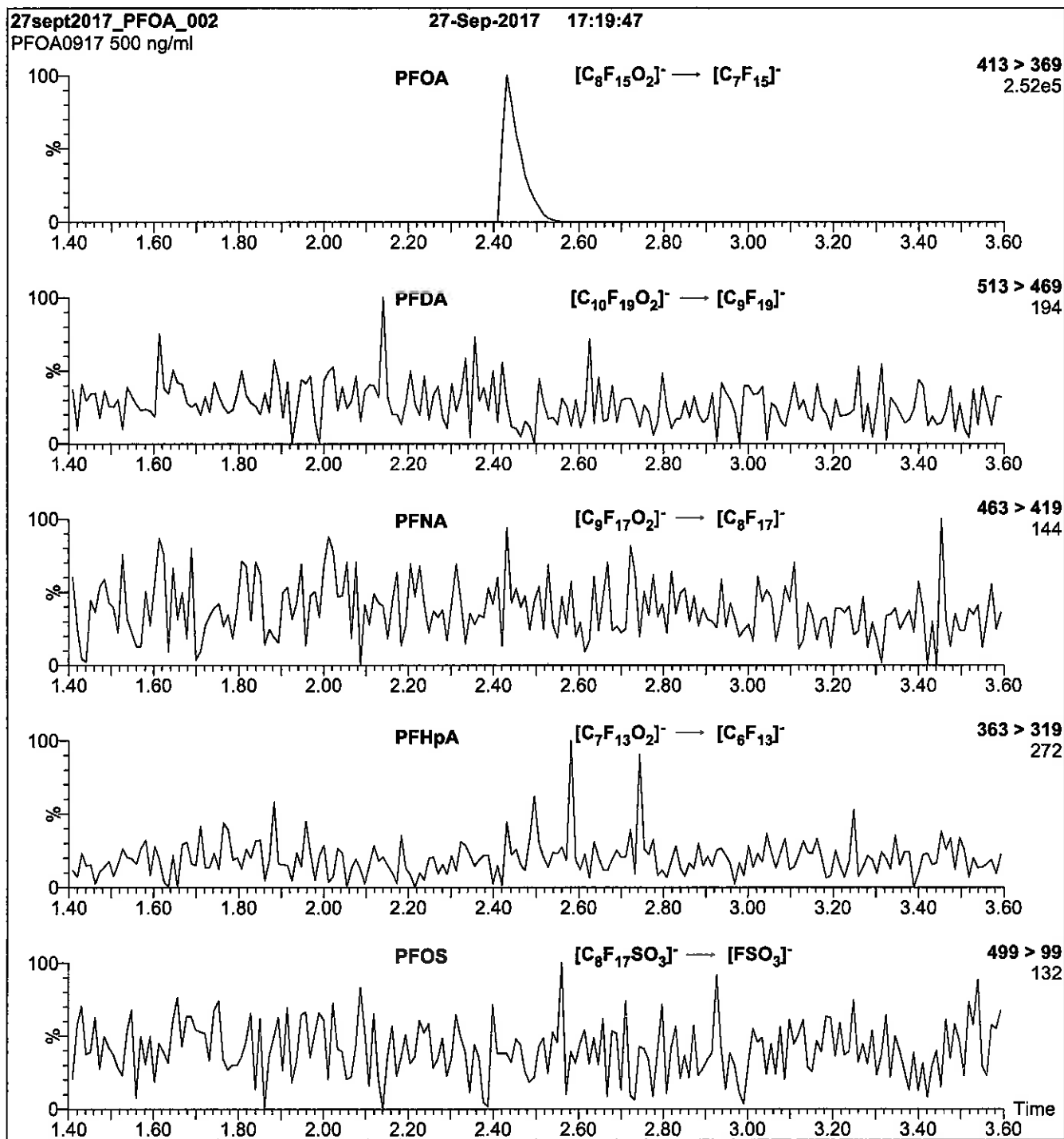
Flow: 300  $\mu$ l/min

**MS Parameters**

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)  
Capillary Voltage (kV) = 3.00  
Cone Voltage (V) = 15.00  
Cone Gas Flow (l/hr) = 100  
Desolvation Gas Flow (l/hr) = 750

**Figure 2: PFOA; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 2:**

Injection: Direct loop injection  
10  $\mu$ l (500 ng/ml PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H<sub>2</sub>O  
(both with 10 mM NH<sub>4</sub>OAc buffer)

Flow: 300  $\mu$ l/min

**MS Parameters**

Collision Gas (mbar) = 3.46e-3  
Collision Energy (eV) = 11

Reagent

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**LCPFOS-br\_00005**

P: 10/2017 SKV



# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

### br-PFOSK

#### Potassium Perfluorooctanesulfonate Solution/Mixture of Linear and Branched Isomers

<b><u>PRODUCT CODE:</u></b>	br-PFOSK
<b><u>LOT NUMBER:</u></b>	brPFOSK0117
<b><u>CONCENTRATION:</u></b>	50 ± 2.5 µg/ml (total potassium salt) 46.4 ± 2.3 µg/ml (total PFOS anion)
<b><u>SOLVENT(S):</u></b>	Methanol
<b><u>DATE PREPARED:</u></b> (mm/dd/yyyy)	01/09/2017
<b><u>LAST TESTED:</u></b> (mm/dd/yyyy)	01/12/2017
<b><u>EXPIRY DATE:</u></b> (mm/dd/yyyy)	01/12/2022
<b><u>RECOMMENDED STORAGE:</u></b>	Store ampoule in a cool, dark place

### DESCRIPTION:

The chemical purity has been determined to be ≥98% perfluorooctanesulfonate linear and branched isomers. The full name, structure and percent composition for each of the isomeric components are given in Table A.

### DOCUMENTATION/ DATA ATTACHED:

Table A: Isomeric Components and Percent Composition by <sup>19</sup>F-NMR  
Figure 1: LC/MS Data (TIC and Mass Spectrum)  
Figure 2: LC/MS Data (SIR)  
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

### ADDITIONAL INFORMATION:

- See page 2 for further details.
- A 5-point calibration curve was generated using linear PFOS (potassium salt) and mass-labelled PFOS as an internal standard to enable quantitation of br-PFOSK using isotopic dilution.
- CAS#: 2795-39-3 (for linear isomer; potassium salt).

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519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

### **INTENDED USE:**

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compounds it contains.

### **HAZARDS:**

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

### **SYNTHESIS / CHARACTERIZATION:**

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

### **UNCERTAINTY:**

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where  $x$  is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

### **TRACEABILITY:**

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

### **EXPIRY DATE / PERIOD OF VALIDITY:**

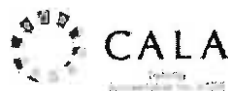
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

### **LIMITED WARRANTY:**

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

### **QUALITY MANAGEMENT:**

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).




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**Table A: br-PFOSK; Isomeric Components and Percent Composition (by <sup>19</sup>F-NMR)\***

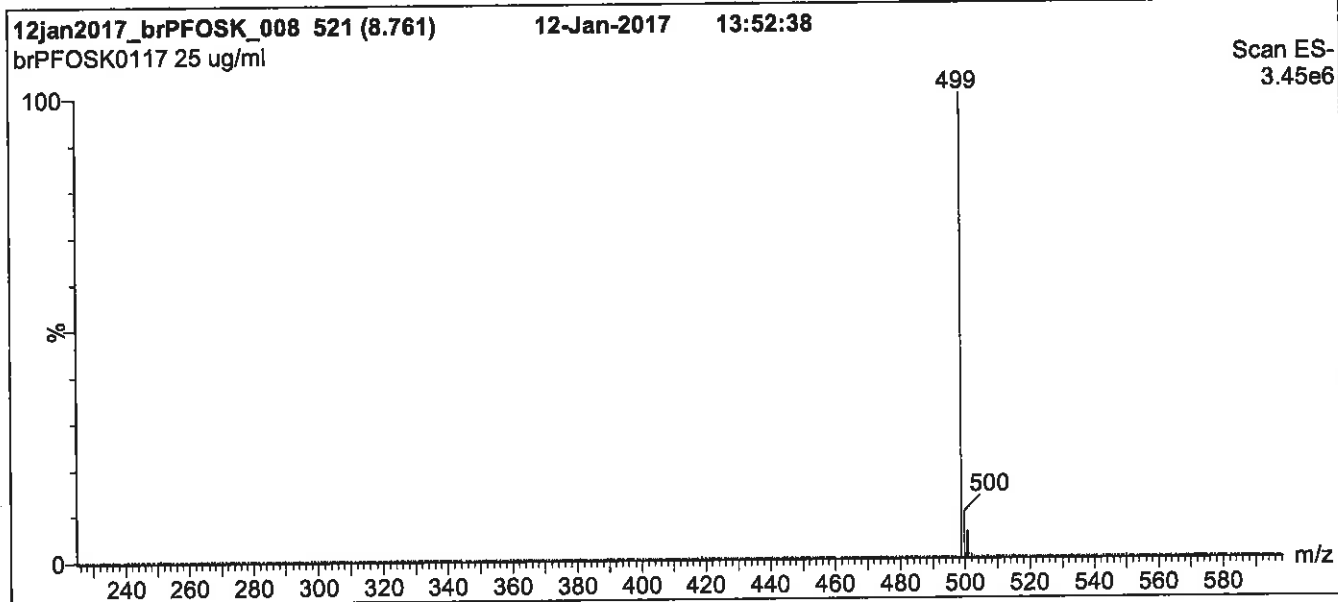
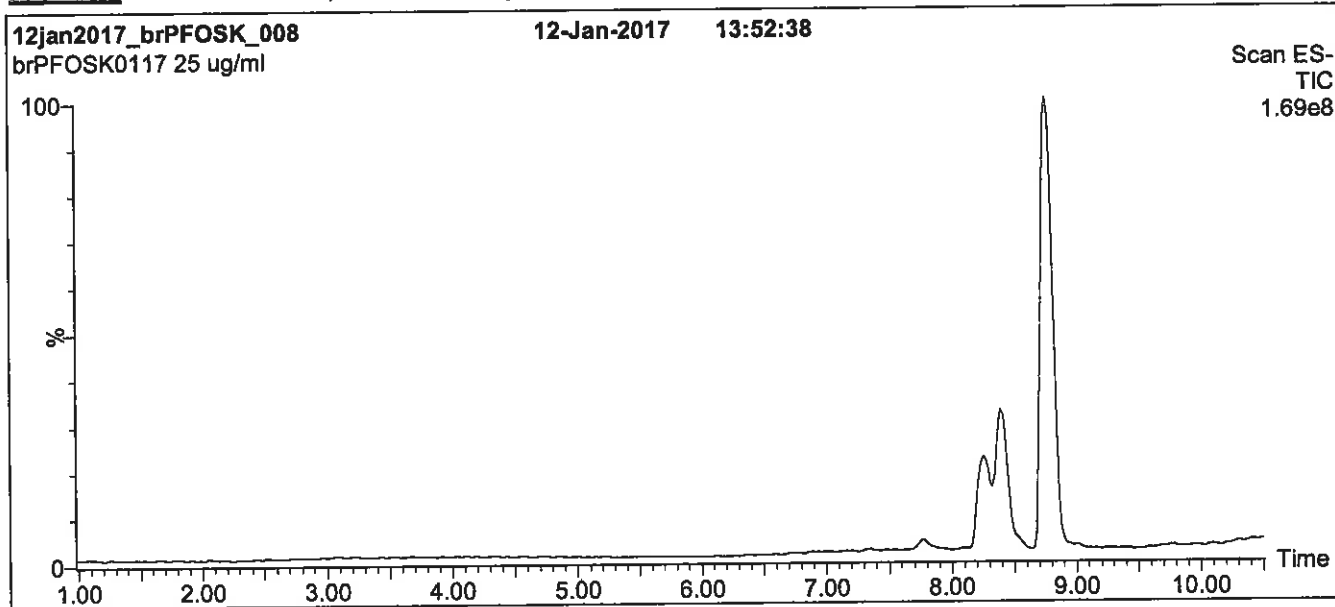
Isomer	Name	Structure	Percent Composition by <sup>19</sup> F-NMR
1	Potassium perfluoro-1-octanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>   CF <sub>3</sub>	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>   CF <sub>3</sub>	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>   CF <sub>3</sub>	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>   CF <sub>3</sub>	0.07

\* Percent of total perfluorooctanesulfonate isomers only. Isomers are labeled in Figure 2.  
 \*\* Systematic Name: Potassium perfluorooctane-2-sulfonate.

Certified By:   
 B.G. Chittim

Date: 01/20/2017  
 (mm/dd/yyyy)

**Figure 1: br-PFOSK; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro *micro* API MS

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
 Start: 45% (80:20 MeOH:ACN) / 55% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)  
 Ramp to 90% organic over 12 min and hold for 2 min.  
 Return to initial conditions over 0.5 min.  
 Time: 16 min

Flow: 300  $\mu$ l/min

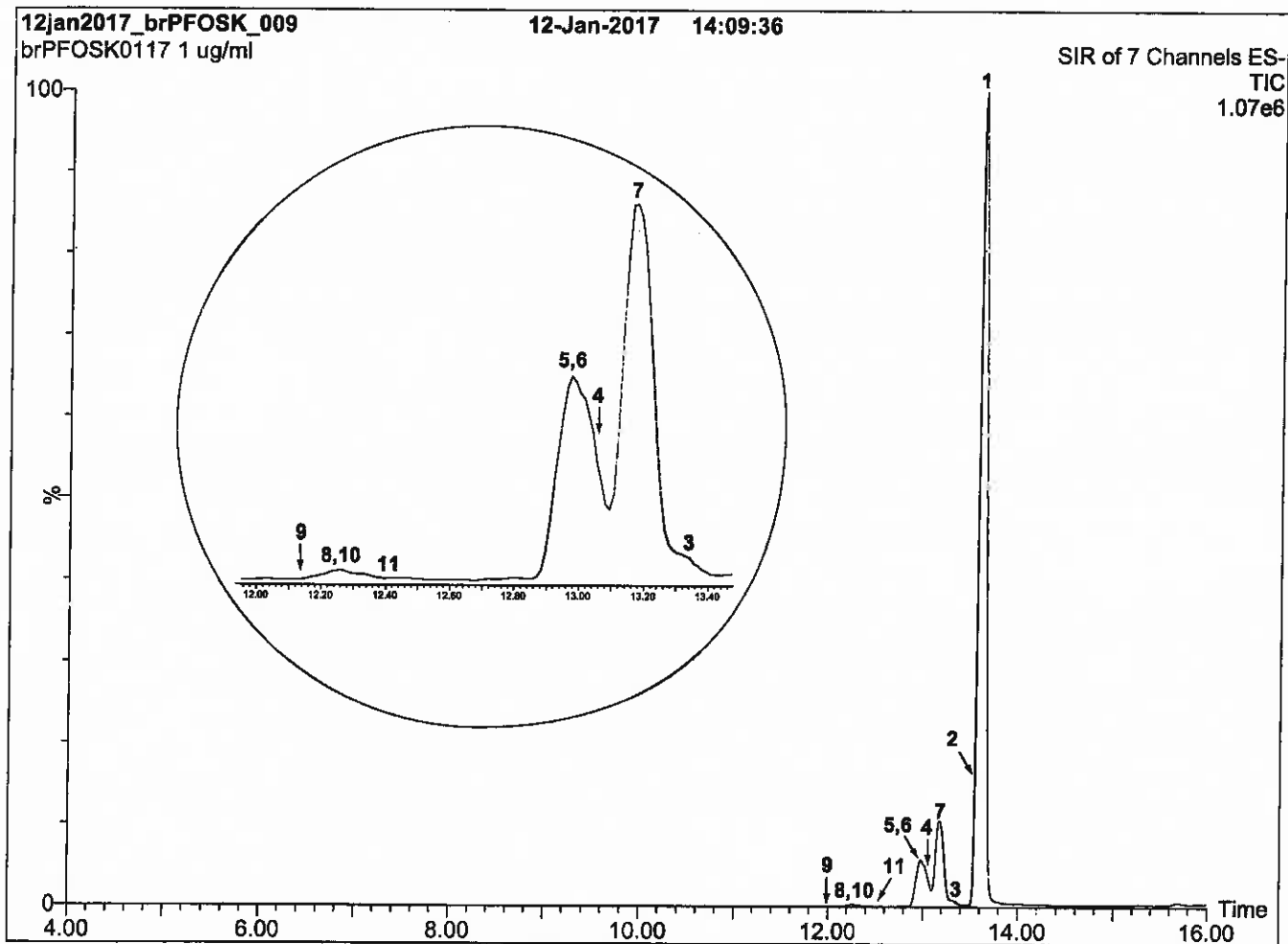
**MS Parameters**

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)  
 Capillary Voltage (kV) = 3.00  
 Cone Voltage (V) = 60.00  
 Cone Gas Flow (l/hr) = 50  
 Desolvation Gas Flow (l/hr) = 750



**Figure 2: br-PFOSK; LC/MS Data (SIR)**



**Conditions for Figure 2:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro *micro* API MS

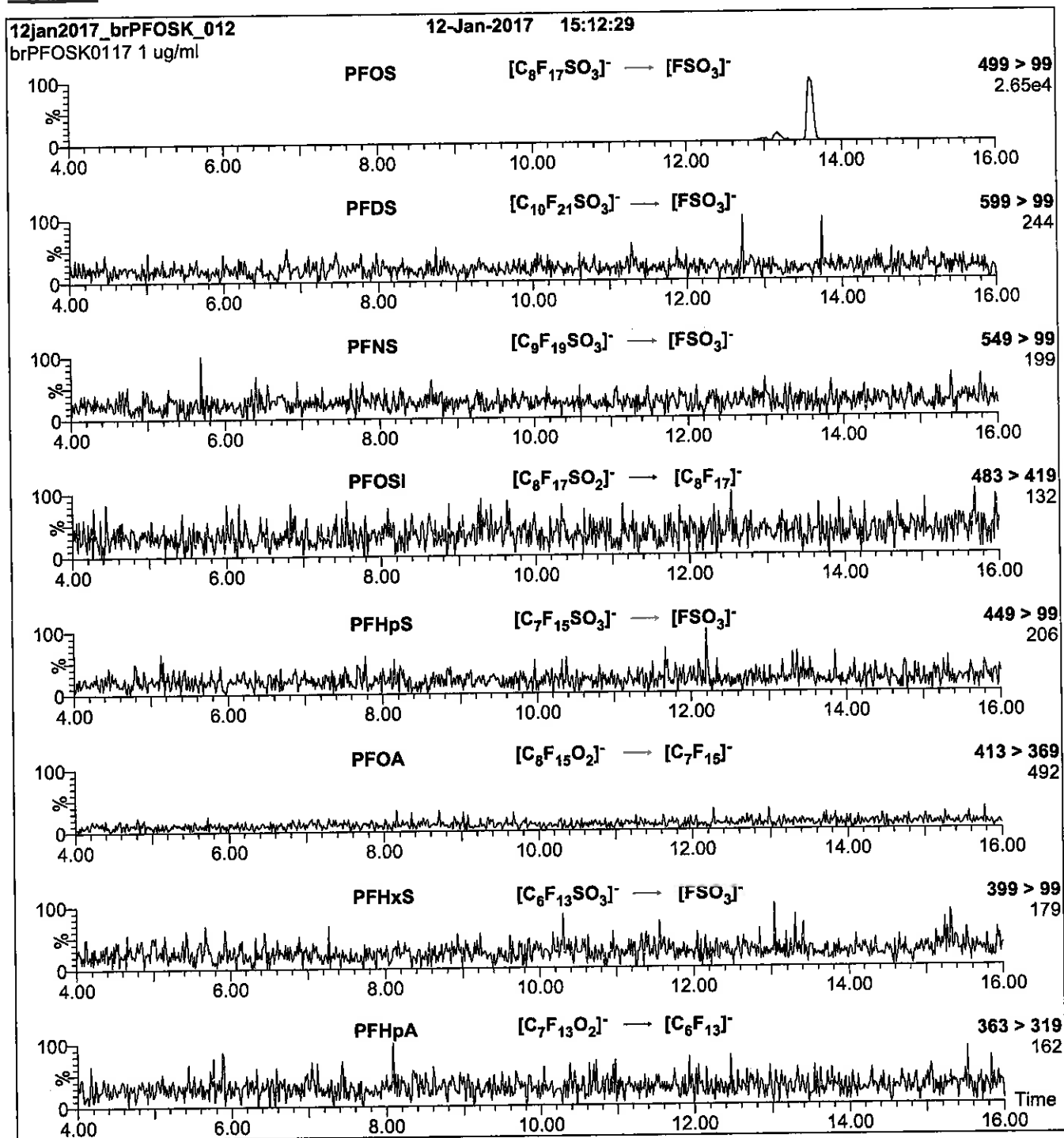
**Chromatographic Conditions:**

**Column:** Acquity UPLC BEH Shield RP<sub>18</sub> (1.7  $\mu$ m, 2.1 x 100 mm)  
**Injection:** 1.0  $\mu$ g/ml of br-PFOSK  
**Mobile Phase:** Gradient  
45% (80:20 MeOH:ACN) / 55% H<sub>2</sub>O (both with 10 mM NH<sub>4</sub>OAc buffer)  
Ramp to 90% organic over 15 min and hold for 3 min.  
Return to Initial conditions over 1 min.  
Time: 20 min  
**Flow:** 300  $\mu$ l/min

**MS Conditions:**

SIR (ES)  
Source = 110 °C  
Desolvation = 325 °C  
Cone Voltage = 60V

**Figure 3: br-PFOSK; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 3:**

Injection: On-column

Mobile phase: Same as Figure 2

Flow: 300  $\mu$ l/min

**MS Parameters**

Collision Gas (mbar) = 3.31e-3  
Collision Energy (eV) = 11-50 (variable)

Reagent

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**LCPFOS-br\_00006**

P: 10/2017 SKV



# WELLINGTON LABORATORIES

## CERTIFICATE OF ANALYSIS DOCUMENTATION

### br-PFOSK

#### Potassium Perfluorooctanesulfonate Solution/Mixture of Linear and Branched Isomers

**PRODUCT CODE:** br-PFOSK  
**LOT NUMBER:** brPFOSK0117  
**CONCENTRATION:** 50 ± 2.5 µg/ml (total potassium salt)  
46.4 ± 2.3 µg/ml (total PFOS anion)  
**SOLVENT(S):** Methanol  
**DATE PREPARED:** (mm/dd/yyyy) 01/09/2017  
**LAST TESTED:** (mm/dd/yyyy) 01/12/2017  
**EXPIRY DATE:** (mm/dd/yyyy) 01/12/2022  
**RECOMMENDED STORAGE:** Store ampoule in a cool, dark place

### DESCRIPTION:

The chemical purity has been determined to be ≥98% perfluorooctanesulfonate linear and branched isomers. The full name, structure and percent composition for each of the isomeric components are given in Table A.

### DOCUMENTATION/ DATA ATTACHED:

Table A: Isomeric Components and Percent Composition by <sup>19</sup>F-NMR  
Figure 1: LC/MS Data (TIC and Mass Spectrum)  
Figure 2: LC/MS Data (SIR)  
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

### ADDITIONAL INFORMATION:

- See page 2 for further details.
- A 5-point calibration curve was generated using linear PFOS (potassium salt) and mass-labelled PFOS as an internal standard to enable quantitation of br-PFOSK using isotopic dilution.
- CAS#: 2795-39-3 (for linear isomer; potassium salt).

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### **INTENDED USE:**

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### **HAZARDS:**

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

### **SYNTHESIS / CHARACTERIZATION:**

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

### **HOMOGENEITY:**

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

### **UNCERTAINTY:**

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty,  $u_c(y)$ , of a value  $y$  and the uncertainty of the independent parameters  $x_1, x_2, \dots, x_n$  on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where  $x$  is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of  $\pm 5\%$  (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

### **TRACEABILITY:**

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

### **EXPIRY DATE / PERIOD OF VALIDITY:**

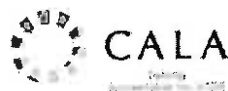
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

### **LIMITED WARRANTY:**

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

### **QUALITY MANAGEMENT:**

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).




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**Table A: br-PFOSK; Isomeric Components and Percent Composition (by <sup>19</sup>F-NMR)\***

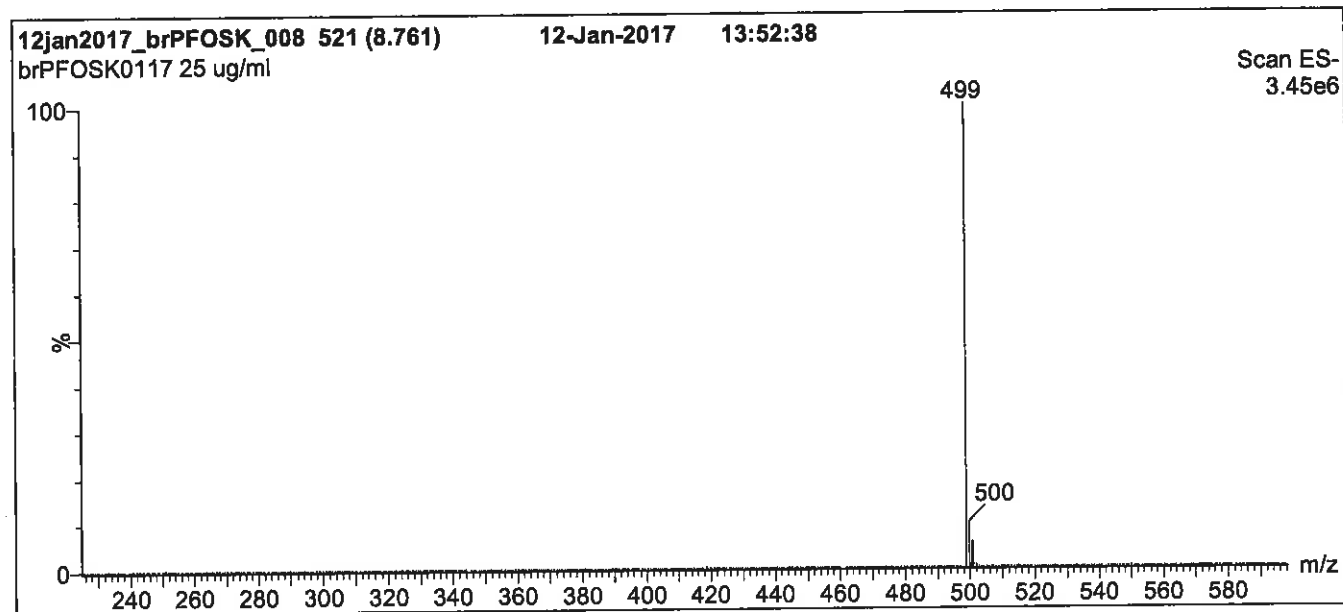
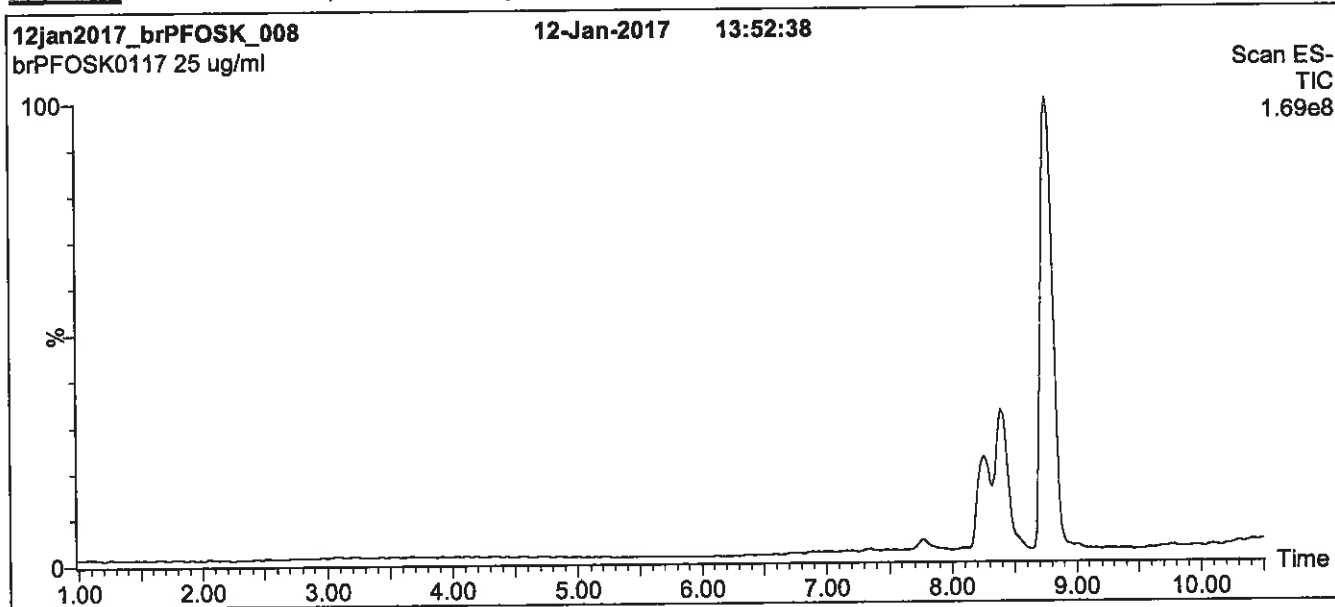
Isomer	Name	Structure	Percent Composition by <sup>19</sup> F-NMR
1	Potassium perfluoro-1-octanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>   CF <sub>3</sub>	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>   CF <sub>3</sub>	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>   CF <sub>3</sub>	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> SO <sub>3</sub> <sup>-</sup> K <sup>+</sup>   CF <sub>3</sub>   CF <sub>3</sub>	0.07

\* Percent of total perfluorooctanesulfonate isomers only. Isomers are labelled in Figure 2.  
 \*\* Systematic Name: Potassium perfluorooctane-2-sulfonate.

Certified By:   
 B.G. Chittim

Date: 01/20/2017  
 (mm/dd/yyyy)

**Figure 1: br-PFOSK; LC/MS Data (TIC and Mass Spectrum)**



**Conditions for Figure 1:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro *micro* API MS

**Chromatographic Conditions**

Column: Acquity UPLC BEH Shield RP<sub>18</sub>  
 1.7  $\mu$ m, 2.1 x 100 mm

Mobile phase: Gradient  
 Start: 45% (80:20 MeOH:ACN) / 55% H<sub>2</sub>O  
 (both with 10 mM NH<sub>4</sub>OAc buffer)  
 Ramp to 90% organic over 12 min and hold for 2 min.  
 Return to initial conditions over 0.5 min.  
 Time: 16 min

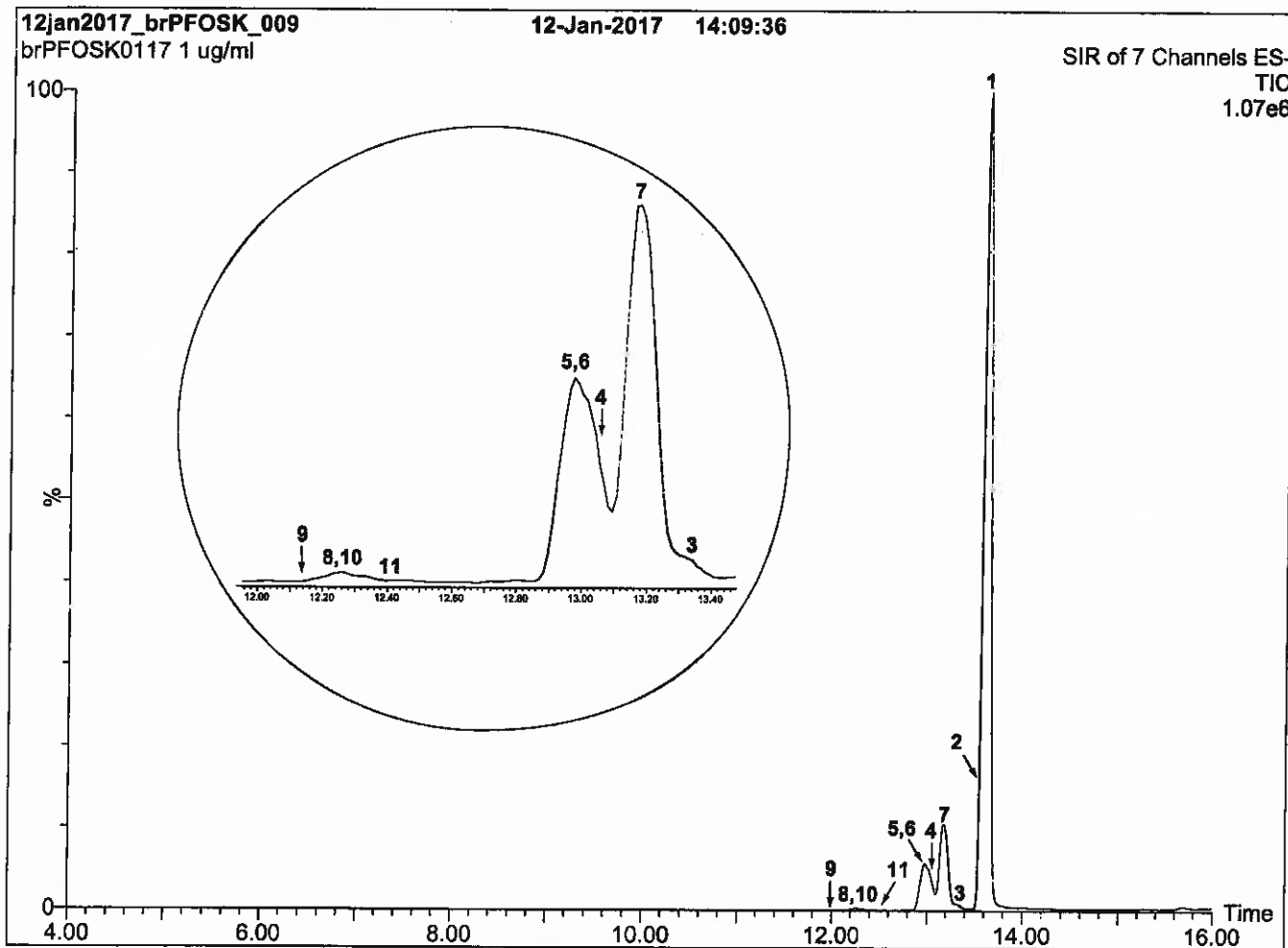
Flow: 300  $\mu$ l/min

**MS Parameters**

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)  
 Capillary Voltage (kV) = 3.00  
 Cone Voltage (V) = 60.00  
 Cone Gas Flow (l/hr) = 50  
 Desolvation Gas Flow (l/hr) = 750

**Figure 2: br-PFOSK; LC/MS Data (SIR)**



**Conditions for Figure 2:**

**LC:** Waters Acquity Ultra Performance LC  
**MS:** Micromass Quattro *micro* API MS

**Chromatographic Conditions:**

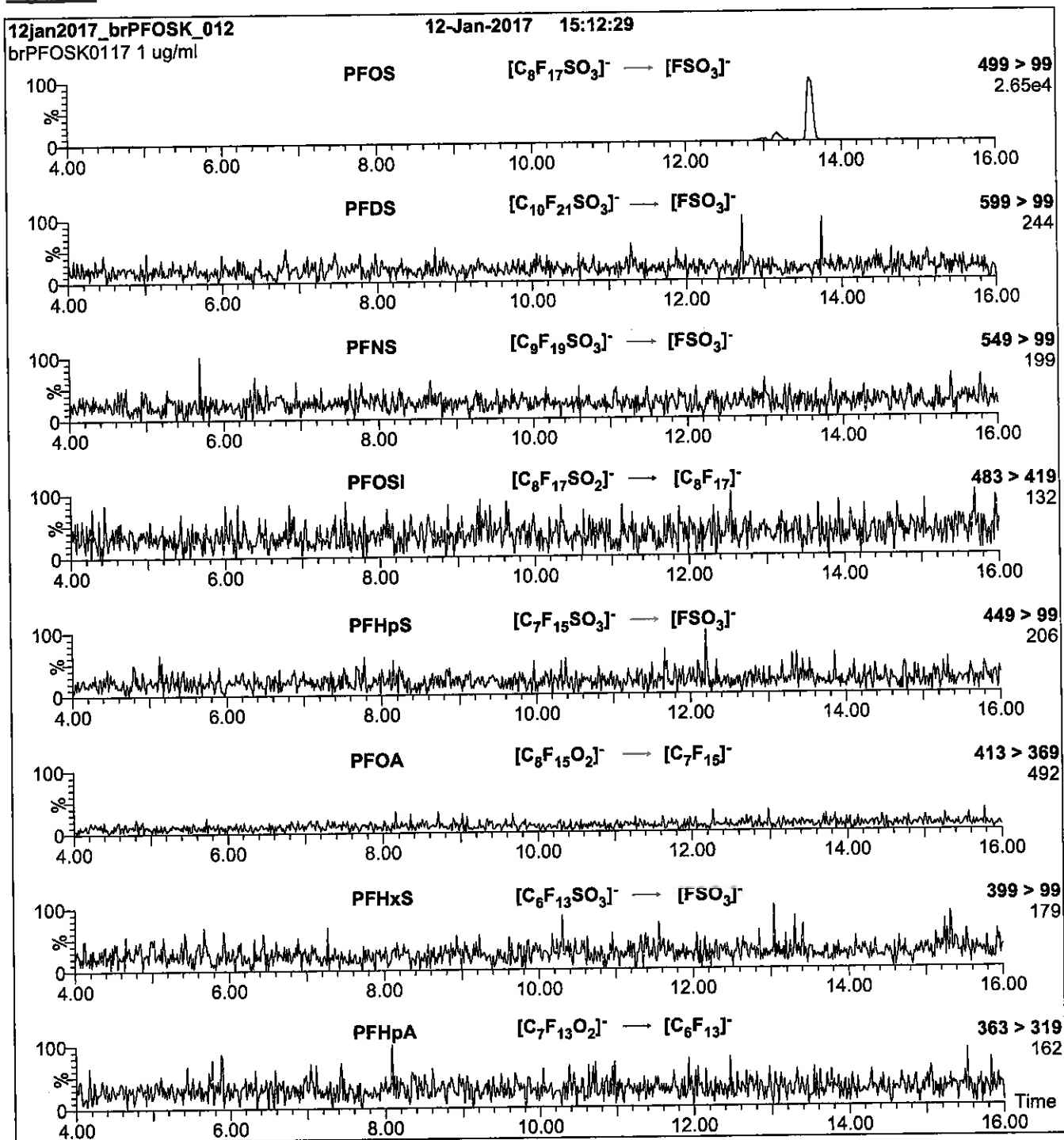
**Column:** Acquity UPLC BEH Shield RP<sub>18</sub> (1.7  $\mu$ m, 2.1 x 100 mm)  
**Injection:** 1.0  $\mu$ g/ml of br-PFOSK  
**Mobile Phase:** Gradient  
 45% (80:20 MeOH:ACN) / 55% H<sub>2</sub>O (both with 10 mM NH<sub>4</sub>OAc buffer)  
 Ramp to 90% organic over 15 min and hold for 3 min.  
 Return to Initial conditions over 1 min.  
 Time: 20 min  
**Flow:** 300  $\mu$ l/min

**MS Conditions:**

SIR (ES)  
 Source = 110 °C  
 Desolvation = 325 °C  
 Cone Voltage = 60V



**Figure 3: br-PFOSK; LC/MS/MS Data (Selected MRM Transitions)**



**Conditions for Figure 3:**

Injection: On-column

Mobile phase: Same as Figure 2

Flow: 300  $\mu$ l/min

**MS Parameters**

Collision Gas (mbar) = 3.31e-3  
Collision Energy (eV) = 11-50 (variable)

# Method 537 DOD

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Perfluorinated Alkyl Acids (LC/MS)  
by Method 537 DOD

FORM II  
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento

Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Matrix: Water

Level: Low

GC Column (1): GeminiC18 3 ID: 3 (mm)

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
NAWC-082118-RW-228	320-42363-1	91	97
NAWC-082118-FRB-228	320-42363-2	97	103
NAWC-082118-RW-175	320-42363-3	95	102
NAWC-082118-FRB-175	320-42363-4	96	102
NAWC-082118-RW-098	320-42363-5	93	103
NAWC-082118-RW-098 RA	320-42363-5 RA	88	89
NAWC-082118-FRB-098	320-42363-6	101	106
WGNA-082118-RW-048	320-42363-7	93	89
WGNA-082118-FRB-048	320-42363-8	89	101
NAWC-082118-RW-265	320-42363-9	98	104
NAWC-082118-FRB-265	320-42363-10	98	106
WGNA-082118-RW-355	320-42363-11	94	101
WGNA-082118-FRB-355	320-42363-12	97	107
	MB 320-242479/1-A	98	101
	LCS 320-242479/2-A	104	107
NAWC-082118-RW-228 MS	320-42363-1 MS	106	115
NAWC-082118-RW-228 MSD	320-42363-1 MSD	77	86

PFHxA = 13C2 PFHxA  
PFDA = 13C2 PFDA

QC LIMITS  
70-130  
70-130

# Column to be used to flag recovery values

FORM III  
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Matrix: Water Level: Low Lab File ID: 2018.08.29\_537B\_057.d  
 Lab ID: LCS 320-242479/2-A Client ID: \_\_\_\_\_

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	220	216	98	70-130	
Perfluorooctanoic acid (PFOA)	110	106	97	70-130	
Perfluorononanoic acid (PFNA)	110	100	91	70-130	
Perfluorohexanesulfonic acid (PFHxS)	168	172	102	70-130	
Perfluoroheptanoic acid (PFHpA)	54.0	56.1	104	70-130	
Perfluorobutanesulfonic acid (PFBS)	500	448	89	70-130	

# Column to be used to flag recovery and RPD values

FORM III  
LCMS MATRIX SPIKE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Matrix: Water Level: Low Lab File ID: 2018.08.29\_537B\_059.d  
 Lab ID: 320-42363-1 MS Client ID: NAWC-082118-RW-228 MS

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	199	11 J	257	124	70-130	
Perfluorooctanoic acid (PFOA)	99.5	12 J	125	113	70-130	M
Perfluorononanoic acid (PFNA)	99.5	18 U	106	106	70-130	
Perfluorohexanesulfonic acid (PFHxS)	152	11 U	191	126	70-130	
Perfluoroheptanoic acid (PFHpA)	48.9	4.1 J	58.8	112	70-130	
Perfluorobutanesulfonic acid (PFBS)	453	29 J	513	107	70-130	

# Column to be used to flag recovery and RPD values

FORM III  
LCMS MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Matrix: Water Level: Low Lab File ID: 2018.08.29\_537B\_060.d

Lab ID: 320-42363-1 MSD Client ID: NAWC-082118-RW-228 MSD

COMPOUND	SPIKE ADDED (ng/L)	MSD CONCENTRATION (ng/L)	MSD % REC	% RPD	QC LIMITS		#
					RPD	REC	
Perfluorooctanesulfonic acid (PFOS)	194	183	89	33	30	70-130	J1
Perfluorooctanoic acid (PFOA)	97.1	89.4	79	33	30	70-130	J1
Perfluorononanoic acid (PFNA)	97.1	78.0	80	30	30	70-130	
Perfluorohexanesulfonic acid (PFHxS)	148	137	92	33	30	70-130	J1
Perfluoroheptanoic acid (PFHpA)	47.7	44.7	85	27	30	70-130	
Perfluorobutanesulfonic acid (PFBS)	442	407	86	23	30	70-130	

# Column to be used to flag recovery and RPD values

FORM IV  
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Lab File ID: 2018.08.29\_537B\_056.d

Lab Sample ID: MB 320-242479/1-A

Matrix: Water

Date Extracted: 08/28/2018 06:42

Instrument ID: A8\_N

Date Analyzed: 08/30/2018 06:52

Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-242479/2-A	2018.08.29_537B_057.d	08/30/2018 06:56
NAWC-082118-RW-228	320-42363-1	2018.08.29_537B_058.d	08/30/2018 07:01
NAWC-082118-RW-228 MS	320-42363-1 MS	2018.08.29_537B_059.d	08/30/2018 07:06
NAWC-082118-RW-228 MSD	320-42363-1 MSD	2018.08.29_537B_060.d	08/30/2018 07:10
NAWC-082118-FRB-228	320-42363-2	2018.08.29_537B_061.d	08/30/2018 07:15
NAWC-082118-RW-175	320-42363-3	2018.08.29_537B_062.d	08/30/2018 07:20
NAWC-082118-FRB-175	320-42363-4	2018.08.29_537B_063.d	08/30/2018 07:24
NAWC-082118-RW-098	320-42363-5	2018.08.29_537B_064.d	08/30/2018 07:29
NAWC-082118-FRB-098	320-42363-6	2018.08.29_537B_065.d	08/30/2018 07:34
WGNA-082118-FRB-0488	320-42363-8	2018.08.29_537B_069.d	08/30/2018 07:52
NAWC-082118-RW-265	320-42363-9	2018.08.29_537B_070.d	08/30/2018 07:57
NAWC-082118-FRB-265	320-42363-10	2018.08.29_537B_071.d	08/30/2018 08:02
WGNA-082118-RW-3556	320-42363-11	2018.08.29_537B_072.d	08/30/2018 08:06
WGNA-082118-FRB-3556	320-42363-12	2018.08.29_537B_073.d	08/30/2018 08:11
NAWC-082118-RW-098 RA	320-42363-5 RA	2018.08.30_537AAA_069.d	08/31/2018 08:18
WGNA-082118-RW-0488	320-42363-7	2018.08.30_537AAA_070.d	08/31/2018 08:22

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Instrument ID: A8\_N Calibration Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 08/15/2018 18:44  
 Calibration ID: 40641

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
INITIAL CALIBRATION MEAN AREA AND MEAN RT	999840	1.85	2469394	2.11		
UPPER LIMIT	1499760	2.35	3704091	2.61		
LOWER LIMIT	499920	1.35	1234697	1.61		
LAB SAMPLE ID	CLIENT SAMPLE ID					
CCVL 320-240166/9		1006603	1.84	2388436	2.10	
ICV 320-240166/11		1022273	1.84	2551643	2.10	
CCVL 320-242979/1		1139590	1.84	2847783	2.09	
CCV 320-242992/18 CCVIS		880773	1.82	2347911	2.08	
MB 320-242479/1-A		1164023	1.81	2966015	2.06	
LCS 320-242479/2-A		1177090	1.81	3060823	2.06	
320-42363-1	NAWC-082118-RW-228	1268081	1.81	3071601	2.07	
320-42363-1 MS	NAWC-082118-RW-228 MS	1222421	1.81	2937520	2.07	
320-42363-1 MSD	NAWC-082118-RW-228 MSD	1115775	1.81	2722744	2.07	
320-42363-2	NAWC-082118-FRB-228	1133243	1.82	2796516	2.07	
320-42363-3	NAWC-082118-RW-175	1115542	1.81	2801077	2.07	
320-42363-4	NAWC-082118-FRB-175	1145851	1.82	2949105	2.07	
320-42363-5	NAWC-082118-RW-098	1309394Q	1.81	3251677	2.07	
320-42363-6	NAWC-082118-FRB-098	1154870	1.82	3011281	2.07	
CCV 320-242992/30 CCVIS		921093	1.81	2433863	2.07	
CCV 320-242994/30 CCVIS		921093	1.81	2433863	2.07	
320-42363-8	WGNA-082118-FRB-0488	1133293	1.81	2850914	2.06	
320-42363-9	NAWC-082118-RW-265	1111187	1.81	2790946	2.07	
320-42363-10	NAWC-082118-FRB-265	1090929	1.81	2797557	2.07	
320-42363-11	WGNA-082118-RW-3556	1215813	1.82	3053694	2.07	
320-42363-12	WGNA-082118-FRB-3556	1074215	1.81	2771310	2.07	
CCV 320-242994/38 CCVIS		907796	1.82	2371241	2.07	

13PFOA = 13C2-PFOA

PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area

RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits



FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Sample No.: CCV 320-242992/18 Date Analyzed: 08/30/2018 06:42  
 Instrument ID: A8\_N GC Column: GeminiC18 3x100 ID: 3 (mm)  
 Lab File ID (Standard): 2018.08.29\_537B\_054 Heated Purge: (Y/N) N  
 Calibration ID: 40641

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	880773	1.82	2347911	2.08		
UPPER LIMIT	1233082	2.32	3287075	2.58		
LOWER LIMIT	616541	1.32	1643538	1.58		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-242479/1-A		1164023	1.81	2966015	2.06	
LCS 320-242479/2-A		1177090	1.81	3060823	2.06	
320-42363-1	NAWC-082118-RW-228	1268081	1.81	3071601	2.07	
320-42363-1 MS	NAWC-082118-RW-228 MS	1222421	1.81	2937520	2.07	
320-42363-1 MSD	NAWC-082118-RW-228 MSD	1115775	1.81	2722744	2.07	
320-42363-2	NAWC-082118-FRB-228	1133243	1.82	2796516	2.07	
320-42363-3	NAWC-082118-RW-175	1115542	1.81	2801077	2.07	
320-42363-4	NAWC-082118-FRB-175	1145851	1.82	2949105	2.07	
320-42363-5	NAWC-082118-RW-098	1309394Q	1.81	3251677	2.07	
320-42363-6	NAWC-082118-FRB-098	1154870	1.82	3011281	2.07	

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Sample No.: CCV 320-242992/30 Date Analyzed: 08/30/2018 07:38  
 Instrument ID: A8\_N GC Column: GeminiC18 3x100 ID: 3 (mm)  
 Lab File ID (Standard): 2018.08.29\_537B\_066 Heated Purge: (Y/N) N  
 Calibration ID: 40641

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	921093	1.81	2433863	2.07		
UPPER LIMIT	1289530	2.31	3407408	2.57		
LOWER LIMIT	644765	1.31	1703704	1.57		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-242479/1-A		1164023	1.81	2966015	2.06	
LCS 320-242479/2-A		1177090	1.81	3060823	2.06	
320-42363-1	NAWC-082118-RW-228	1268081	1.81	3071601	2.07	
320-42363-1 MS	NAWC-082118-RW-228 MS	1222421	1.81	2937520	2.07	
320-42363-1 MSD	NAWC-082118-RW-228 MSD	1115775	1.81	2722744	2.07	
320-42363-2	NAWC-082118-FRB-228	1133243	1.82	2796516	2.07	
320-42363-3	NAWC-082118-RW-175	1115542	1.81	2801077	2.07	
320-42363-4	NAWC-082118-FRB-175	1145851	1.82	2949105	2.07	
320-42363-5	NAWC-082118-RW-098	1309394Q	1.81	3251677	2.07	
320-42363-6	NAWC-082118-FRB-098	1154870	1.82	3011281	2.07	

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Sample No.: CCV 320-242994/30 Date Analyzed: 08/30/2018 07:38  
 Instrument ID: A8\_N GC Column: GeminiC18 3x100 ID: 3 (mm)  
 Lab File ID (Standard): 2018.08.29\_537B\_066 Heated Purge: (Y/N) N  
 Calibration ID: 40641

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	921093	1.81	2433863	2.07		
UPPER LIMIT	1289530	2.31	3407408	2.57		
LOWER LIMIT	644765	1.31	1703704	1.57		
LAB SAMPLE ID	CLIENT SAMPLE ID					
320-42363-8	WGNA-082118-FRB-0488	1133293	1.81	2850914	2.06	
320-42363-9	NAWC-082118-RW-265	1111187	1.81	2790946	2.07	
320-42363-10	NAWC-082118-FRB-265	1090929	1.81	2797557	2.07	
320-42363-11	WGNA-082118-RW-3556	1215813	1.82	3053694	2.07	
320-42363-12	WGNA-082118-FRB-3556	1074215	1.81	2771310	2.07	

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Sample No.: CCV 320-242994/38 Date Analyzed: 08/30/2018 08:16  
 Instrument ID: A8\_N GC Column: GeminiC18 3x100 ID: 3 (mm)  
 Lab File ID (Standard): 2018.08.29\_537B\_074 Heated Purge: (Y/N) N  
 Calibration ID: 40641

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	907796	1.82	2371241	2.07		
UPPER LIMIT	1270914	2.32	3319737	2.57		
LOWER LIMIT	635457	1.32	1659869	1.57		
LAB SAMPLE ID	CLIENT SAMPLE ID					
320-42363-8	WGNA-082118-FRB-0488	1133293	1.81	2850914	2.06	
320-42363-9	NAWC-082118-RW-265	1111187	1.81	2790946	2.07	
320-42363-10	NAWC-082118-FRB-265	1090929	1.81	2797557	2.07	
320-42363-11	WGNA-082118-RW-3556	1215813	1.82	3053694	2.07	
320-42363-12	WGNA-082118-FRB-3556	1074215	1.81	2771310	2.07	

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Instrument ID: A8\_N Calibration Start Date: 08/30/2018 16:19  
 GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 08/30/2018 16:42  
 Calibration ID: 40933

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
INITIAL CALIBRATION MEAN AREA AND MEAN RT	899367	1.83	2339667	2.08		
UPPER LIMIT	1349051	2.33	3509501	2.58		
LOWER LIMIT	449684	1.33	1169834	1.58		
LAB SAMPLE ID	CLIENT SAMPLE ID					
CCVL 320-243207/9		960926	1.83	2460442	2.08	
ICV 320-243207/11		788747	1.83	2000251	2.08	
CCV 320-243340/59 CCVIS		727647	1.81	1908647	2.06	
320-42363-5 RA	NAWC-082118-RW-098 RA	1113652Q	1.83	2746523Q	2.08	
320-42363-7	WGNA-082118-RW-0488	760091	1.83	1941807	2.08	
CCV 320-243340/64 CCVIS		813997	1.82	2128142	2.08	

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Sample No.: CCV 320-243340/59 Date Analyzed: 08/31/2018 07:18  
 Instrument ID: A8\_N GC Column: GeminiC18 3x100 ID: 3 (mm)  
 Lab File ID (Standard): 2018.08.30\_537AA\_06 Heated Purge: (Y/N) N  
 Calibration ID: 40933

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	727647	1.81	1908647	2.06		
UPPER LIMIT	1018706	2.31	2672106	2.56		
LOWER LIMIT	509353	1.31	1336053	1.56		
LAB SAMPLE ID	CLIENT SAMPLE ID					
320-42363-5 RA	NAWC-082118-RW-098 RA		1113652Q	1.83	2746523Q	2.08
320-42363-7	WGNA-082118-RW-0488		760091	1.83	1941807	2.08

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Sample No.: CCV 320-243340/64 Date Analyzed: 08/31/2018 08:27  
 Instrument ID: A8\_N GC Column: GeminiC18 3x100 ID: 3 (mm)  
 Lab File ID (Standard): 2018.08.30\_537AAA\_0 Heated Purge: (Y/N) N  
 Calibration ID: 40933

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	813997	1.82	2128142	2.08		
UPPER LIMIT	1139596	2.32	2979399	2.58		
LOWER LIMIT	569798	1.32	1489699	1.58		
LAB SAMPLE ID	CLIENT SAMPLE ID					
320-42363-5 RA	NAWC-082118-RW-098 RA		1113652Q	1.83	2746523Q	2.08
320-42363-7	WGNA-082118-RW-0488		760091	1.83	1941807	2.08

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-228 Lab Sample ID: 320-42363-1  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_058.d  
 Analysis Method: 537 Date Collected: 08/21/2018 09:10  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 277.7(mL) Date Analyzed: 08/30/2018 07:01  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	11	J J1	36	14	6.1
335-67-1	Perfluorooctanoic acid (PFOA)	12	J J1	18	7.2	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.2
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U J1	27	11	5.0
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.0	J	9.0	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	31	J	81	32	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	91		70-130
STL00996	13C2 PFDA	97		70-130



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_058.d  
 Lims ID: 320-42363-A-1-A  
 Client ID: NAWC-082118-RW-228  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:01:31 ALS Bottle#: 39 Worklist Smp#: 22  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-1-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:46:23

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.366	0.0	1.000	1057838	8.63		1231	
298.90 > 99.00	1.358	1.366	-0.008	0.994	695562		1.52(0.00-0.00)	1412	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.479	1.487	-0.008	1.000	1198296	9.09		11963	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.631	1.631	0.0	1.000	145943	0.8228		56.8	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.624	1.631	-0.007	1.000	147659	1.10		22.3	
* 6 13C2-PFOA									
415.00 > 370.00	1.813	1.821	-0.008		1268081	10.0		9090	S
5 Perfluorooctanoic acid									
413.00 > 369.00	1.813	1.821	-0.008	1.000	477256	3.45		54.1	
413.00 > 169.00	1.813	1.821	-0.008	1.000	263655		1.81(0.00-0.00)	661	
* 7 13C4 PFOS									
503.00 > 80.00	2.071	2.079	-0.008		3071601	28.7		3151	
9 Perfluorononanoic acid									
463.00 > 419.00	2.079	2.086	-0.007	1.000	50109	0.4794		4.5	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.071	2.109	-0.038	1.000	347568	3.00		156	
499.00 > 99.00	2.071	2.109	-0.038	1.000	65347		5.32(0.00-0.00)	102	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.238	2.246	-0.008	1.000	979264	9.75		6012	

[QC Flag Legend](#)

Processing Flags

s - Failed ISTD Recovery Test

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_058.d

Injection Date: 30-Aug-2018 07:01:31

Instrument ID: A8\_N

Lims ID: 320-42363-A-1-A

Lab Sample ID: 320-42363-1

Client ID: NAWC-082118-RW-228

Operator ID: SACINSTLCMS01

ALS Bottle#: 39

Worklist Smp#: 22

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

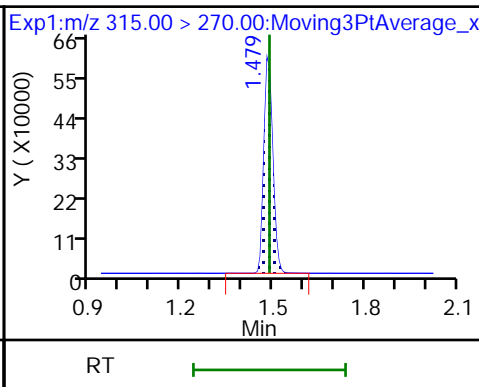
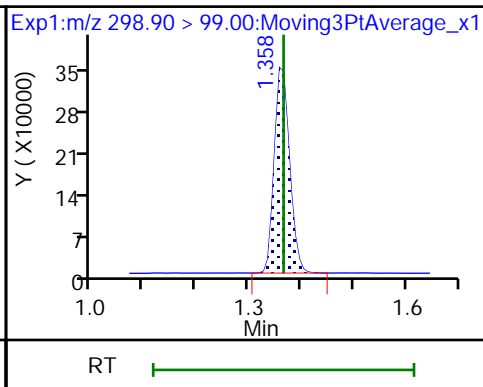
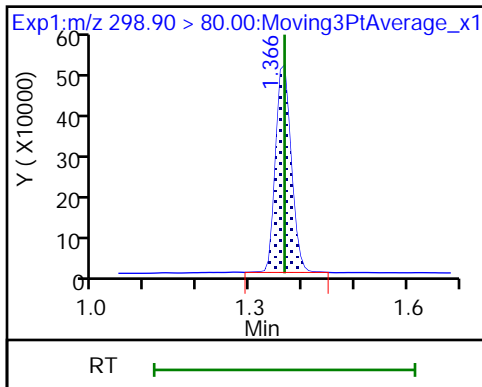
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

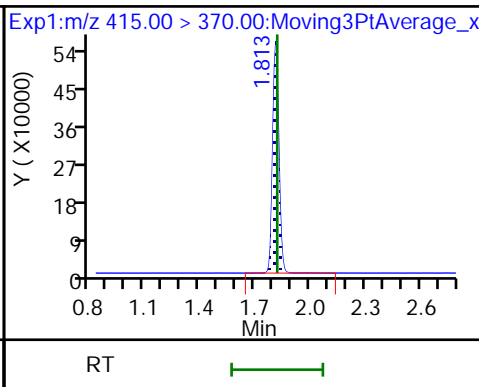
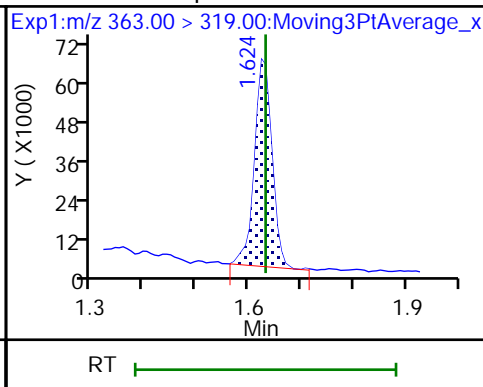
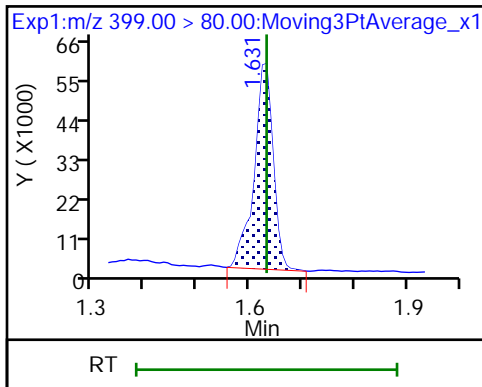
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

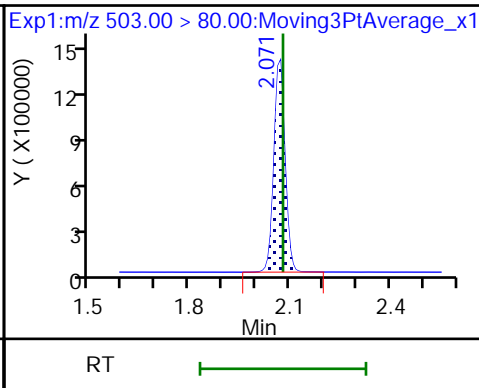
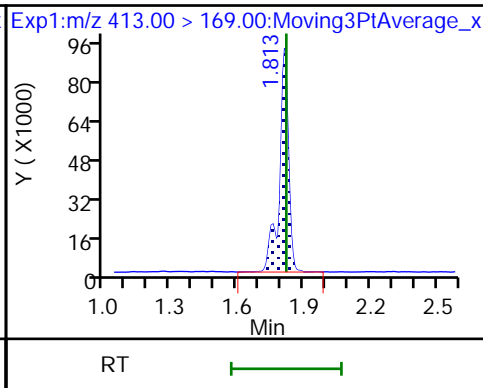
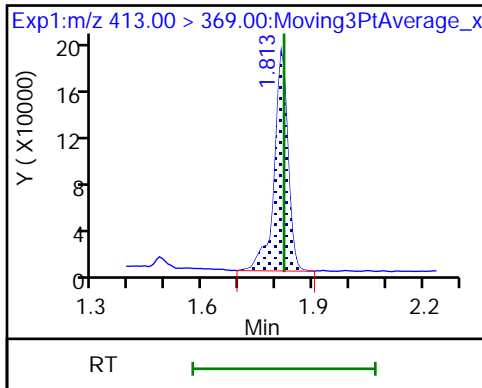
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

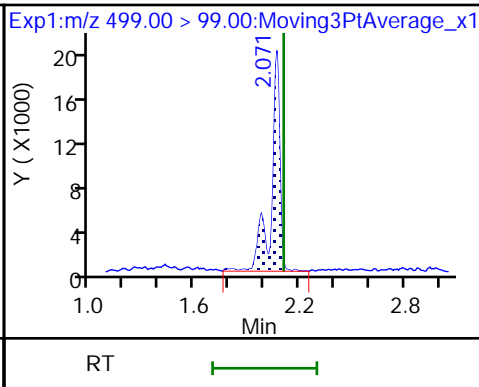
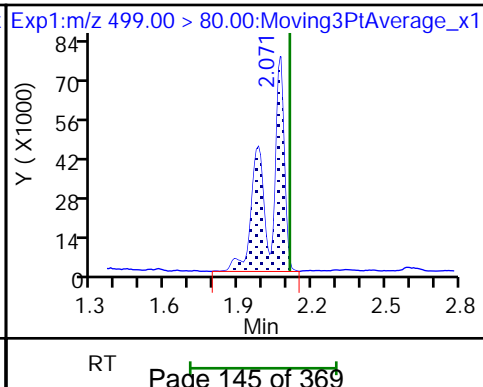
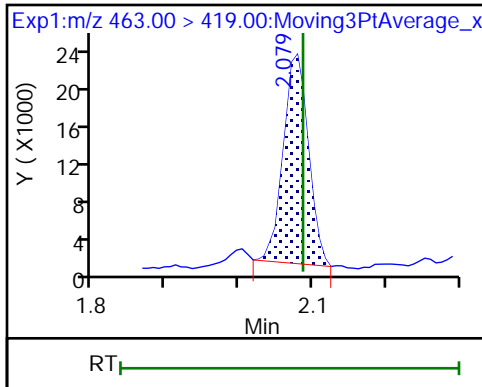
\* 7 13C4 PFOS



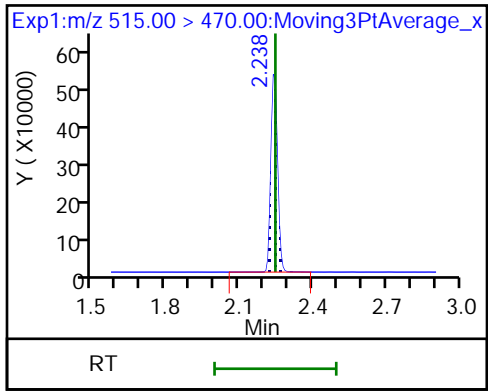
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_058.d  
 Lims ID: 320-42363-A-1-A  
 Client ID: NAWC-082118-RW-228  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:01:31 ALS Bottle#: 39 Worklist Smp#: 22  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-1-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:46:23

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.09	90.91
\$ 10 13C2 PFDA	10.0	9.75	97.49

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-FRB-228 Lab Sample ID: 320-42363-2  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_061.d  
 Analysis Method: 537 Date Collected: 08/21/2018 09:05  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 268.2 (mL) Date Analyzed: 08/30/2018 07:15  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	37	15	6.3
335-67-1	Perfluorooctanoic acid (PFOA)	7.5	U	19	7.5	2.6
375-95-1	Perfluorononanoic acid (PFNA)	19	U	22	19	7.5
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	28	11	5.1
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.7	U	9.3	3.7	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	34	U	84	34	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	97		70-130
STL00996	13C2 PFDA	103		70-130

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_061.d  
 Lims ID: 320-42363-A-2-A  
 Client ID: NAWC-082118-FRB-228  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:15:32 ALS Bottle#: 42 Worklist Smp#: 25  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-2-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
\$ 2 13C2 PFHxA	315.00 > 270.00	1.487	1.487	0.0	1.000	1140510	9.68	11306	
* 6 13C2-PFOA	415.00 > 370.00	1.821	1.821	0.0		1133243	10.0	7971	
* 7 13C4 PFOS	503.00 > 80.00	2.071	2.079	-0.008		2796516	28.7	6447	
\$ 10 13C2 PFDA	515.00 > 470.00	2.246	2.246	0.0	1.000	925421	10.3	5458	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_061.d

Injection Date: 30-Aug-2018 07:15:32

Instrument ID: A8\_N

Lims ID: 320-42363-A-2-A

Lab Sample ID: 320-42363-2

Client ID: NAWC-082118-FRB-228

Operator ID: SACINSTLCMS01

ALS Bottle#: 42

Worklist Smp#: 25

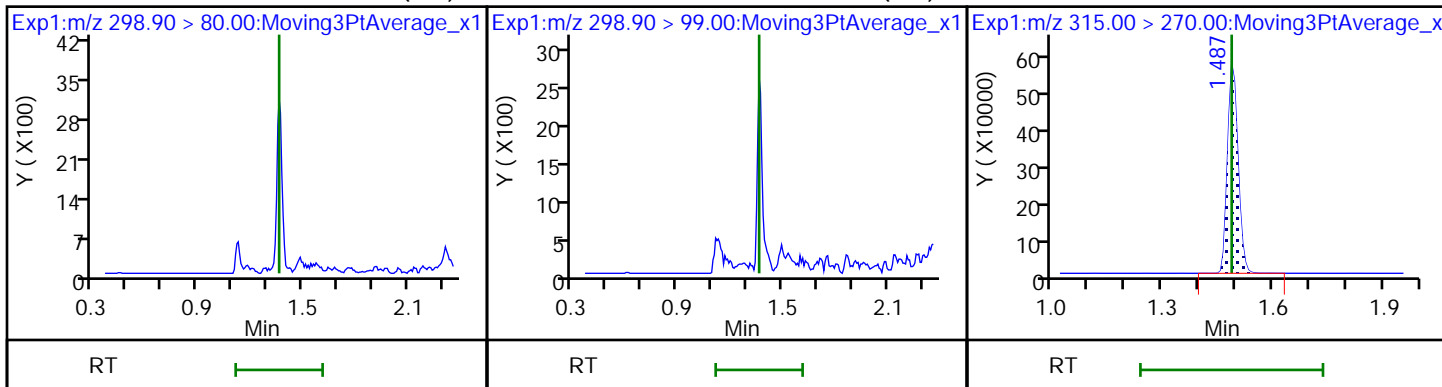
Injection Vol: 2.0 ul

Dil. Factor: 1.0000

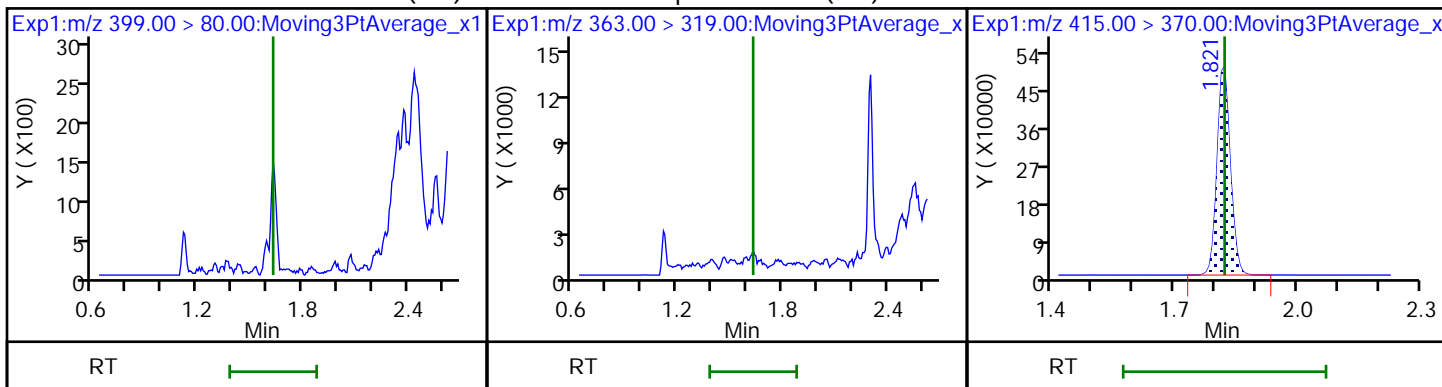
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

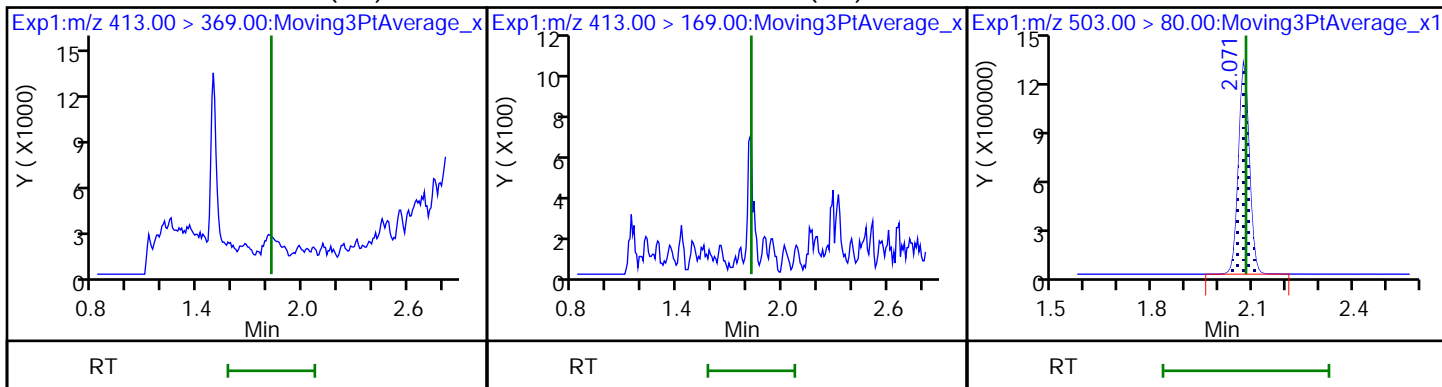
1 Perfluorobutanesulfonic acid (ND) 1 Perfluorobutanesulfonic acid (ND) \$ 2 13C2 PFHxA



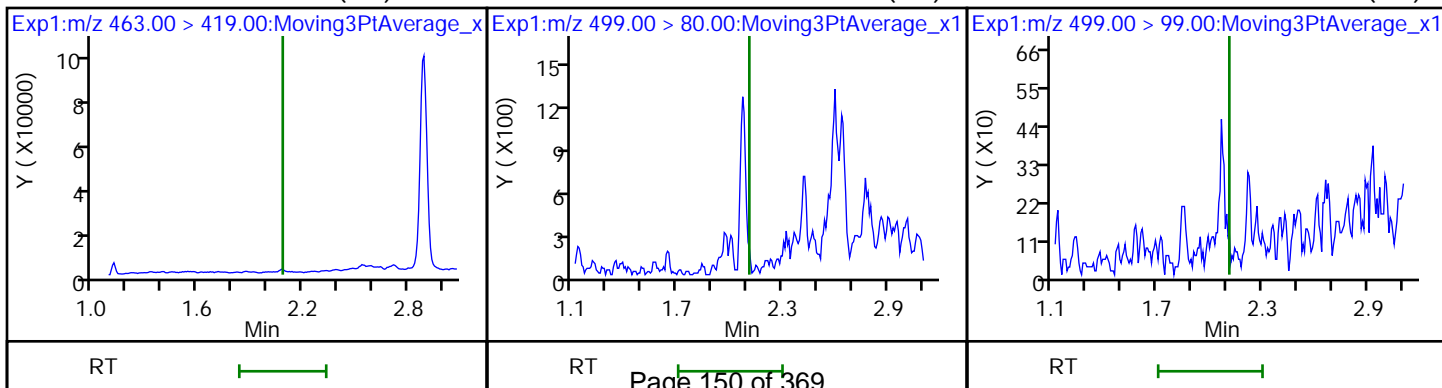
3 Perfluorohexanesulfonic acid (ND) 4 Perfluoroheptanoic acid (ND) \* 6 13C2-PFOA



5 Perfluorooctanoic acid (ND) 5 Perfluorooctanoic acid (ND) \* 7 13C4 PFOS

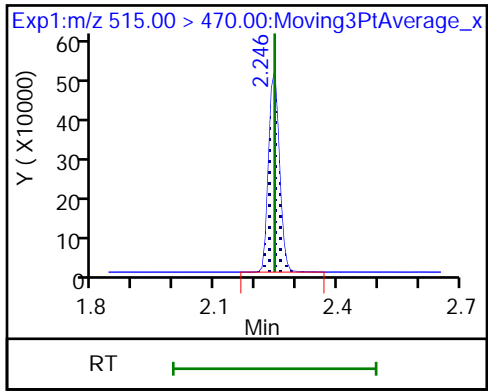


9 Perfluorononanoic acid (ND) 8 Perfluorooctane sulfonic acid (ND) 8 Perfluorooctane sulfonic acid (ND)





\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_061.d  
 Lims ID: 320-42363-A-2-A  
 Client ID: NAWC-082118-FRB-228  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:15:32 ALS Bottle#: 42 Worklist Smp#: 25  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-2-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.68	96.83
\$ 10 13C2 PFDA	10.0	10.3	103.09

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-175 Lab Sample ID: 320-42363-3  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_062.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:10  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 280.3(mL) Date Analyzed: 08/30/2018 07:20  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	65		36	14	6.1
335-67-1	Perfluorooctanoic acid (PFOA)	12	J	18	7.1	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	21	18	7.1
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	40		27	11	4.9
375-85-9	Perfluoroheptanoic acid (PFHpA)	5.1	J	8.9	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	32	U	80	32	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	95		70-130
STL00996	13C2 PFDA	102		70-130

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_062.d  
 Lims ID: 320-42363-A-3-A  
 Client ID: NAWC-082118-RW-175  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:20:14 ALS Bottle#: 43 Worklist Smp#: 26  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-3-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:47:56

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.358	1.366	-0.008	1.000	175567	1.57		203	
298.90 > 99.00	1.358	1.366	-0.008	1.000	118838		1.48(0.00-0.00)	289	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.479	1.487	-0.008	1.000	1103049	9.51		12377	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.624	1.631	-0.007	1.000	1819025	11.2		827	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.624	1.631	-0.007	1.000	169899	1.44		30.4	
* 6 13C2-PFOA									
415.00 > 370.00	1.813	1.821	-0.008		1115542	10.0		8426	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.813	1.821	-0.008	1.000	394631	3.25		44.7	
413.00 > 169.00	1.813	1.821	-0.008	1.000	225858		1.75(0.00-0.00)	532	
* 7 13C4 PFOS									
503.00 > 80.00	2.071	2.079	-0.008		2801077	28.7		3076	
9 Perfluorononanoic acid									
463.00 > 419.00	2.079	2.086	-0.007	1.000	41987	0.4566		4.1	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.071	2.109	-0.038	1.000	1928685	18.3		1028	
499.00 > 99.00	2.071	2.109	-0.038	1.000	420866		4.58(0.00-0.00)	895	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.238	2.246	-0.008	1.000	902276	10.2		5275	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_062.d

Injection Date: 30-Aug-2018 07:20:14

Instrument ID: A8\_N

Lims ID: 320-42363-A-3-A

Lab Sample ID: 320-42363-3

Client ID: NAWC-082118-RW-175

Operator ID: SACINSTLCMS01

ALS Bottle#: 43

Worklist Smp#: 26

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

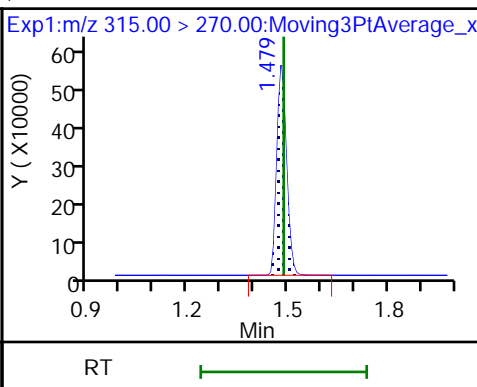
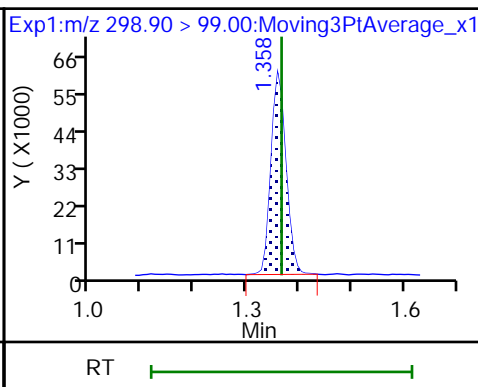
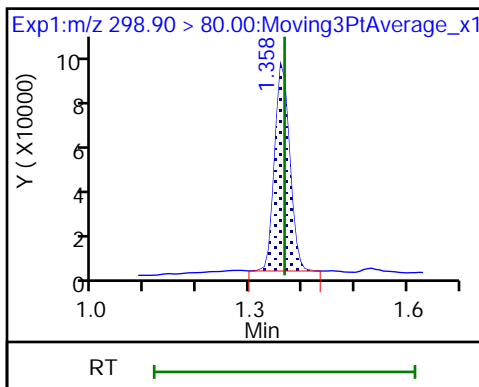
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

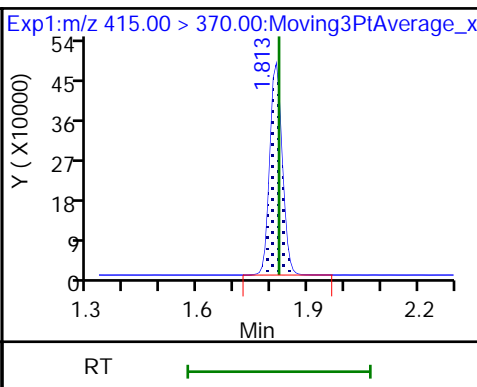
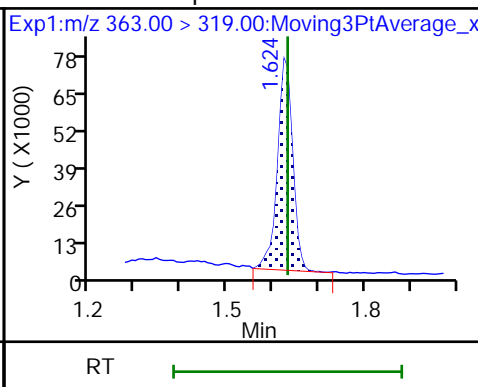
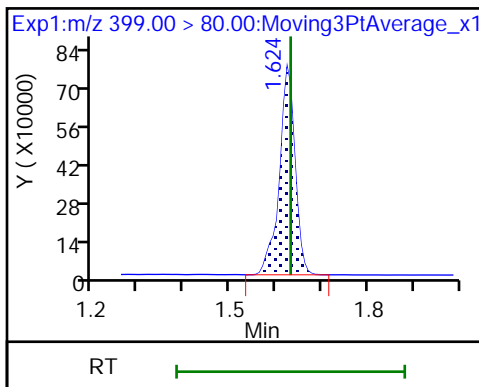
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

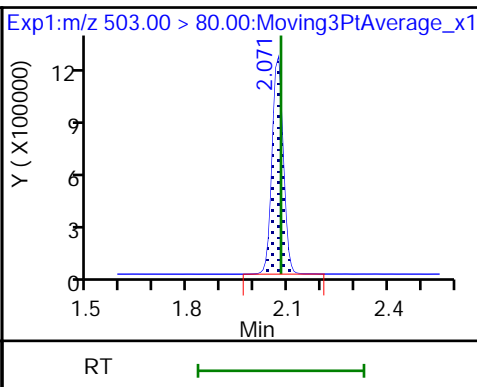
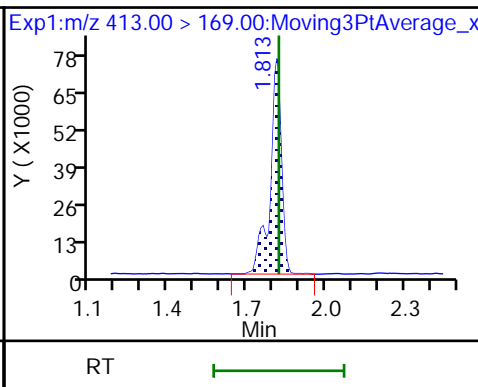
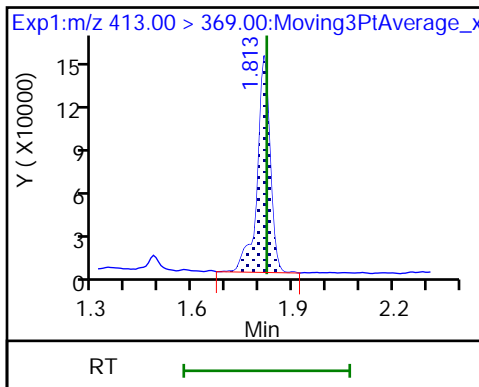
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

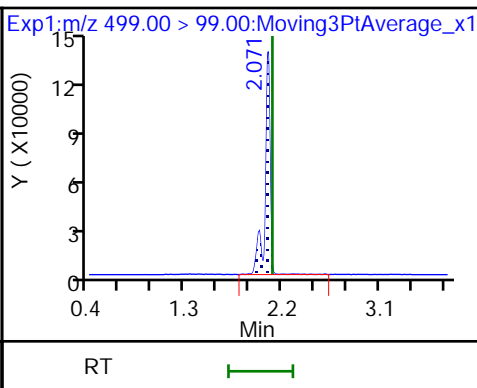
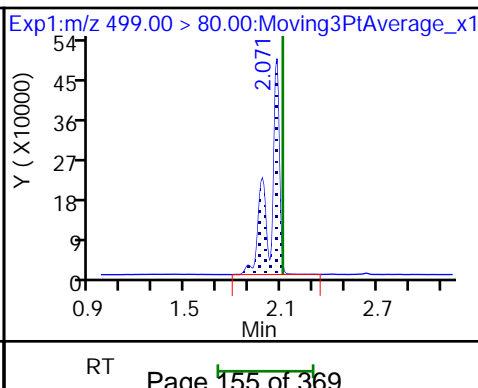
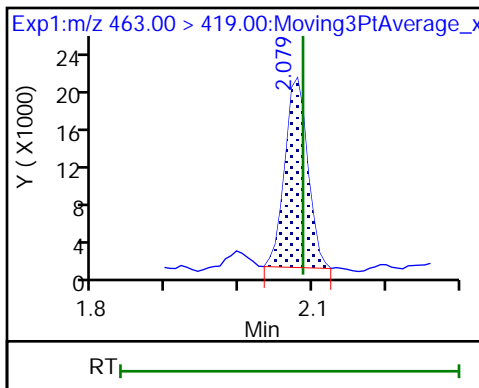
\* 7 13C4 PFOS



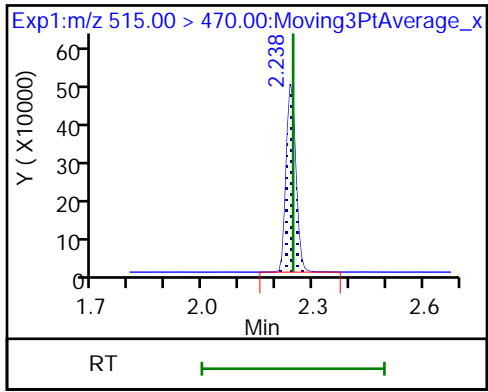
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_062.d  
 Lims ID: 320-42363-A-3-A  
 Client ID: NAWC-082118-RW-175  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:20:14 ALS Bottle#: 43 Worklist Smp#: 26  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-3-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:47:56

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.51	95.13
\$ 10 13C2 PFDA	10.0	10.2	102.11

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-FRB-175 Lab Sample ID: 320-42363-4  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_063.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:05  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 274.2 (mL) Date Analyzed: 08/30/2018 07:24  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	36	15	6.2
335-67-1	Perfluorooctanoic acid (PFOA)	7.3	U	18	7.3	2.6
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.3
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	27	11	5.0
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.6	U	9.1	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	33	U	82	33	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	96		70-130
STL00996	13C2 PFDA	102		70-130



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_063.d  
 Lims ID: 320-42363-A-4-A  
 Client ID: NAWC-082118-FRB-175  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:24:54 ALS Bottle#: 44 Worklist Smp#: 27  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-4-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
\$ 2 13C2 PFHxA	315.00 > 270.00	1.487	1.487	0.0	1.000	1138365	9.56	11647	
* 6 13C2-PFOA	415.00 > 370.00	1.821	1.821	0.0		1145851	10.0	8856	
* 7 13C4 PFOS	503.00 > 80.00	2.071	2.079	-0.008		2949105	28.7	5907	
\$ 10 13C2 PFDA	515.00 > 470.00	2.246	2.246	0.0	1.000	922160	10.2	5519	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_063.d

Injection Date: 30-Aug-2018 07:24:54

Instrument ID: A8\_N

Lims ID: 320-42363-A-4-A

Lab Sample ID: 320-42363-4

Client ID: NAWC-082118-FRB-175

Operator ID: SACINSTLCMS01

ALS Bottle#: 44

Worklist Smp#: 27

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

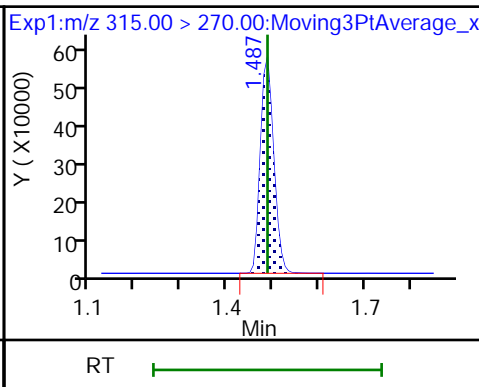
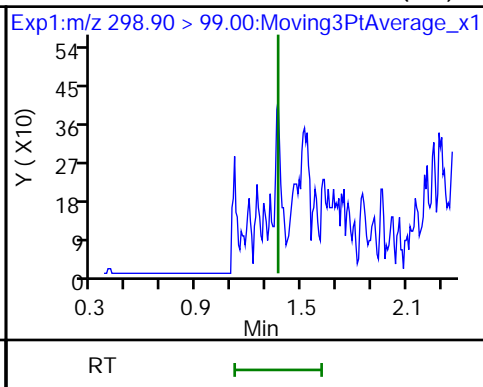
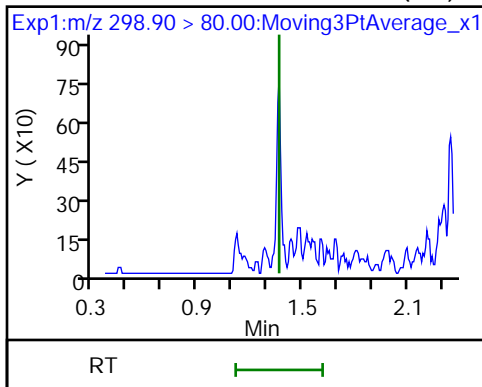
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid (ND)

1 Perfluorobutanesulfonic acid (ND)

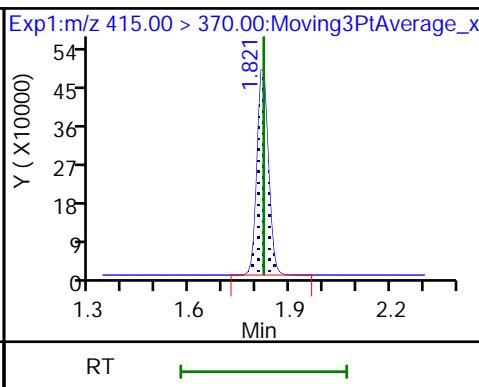
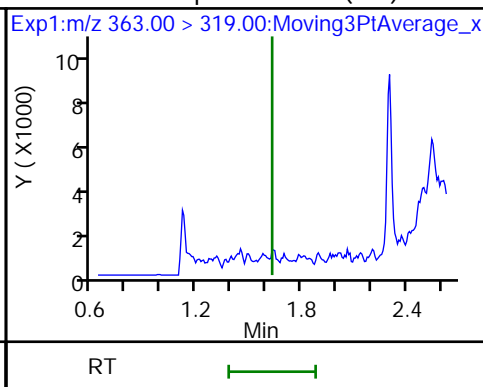
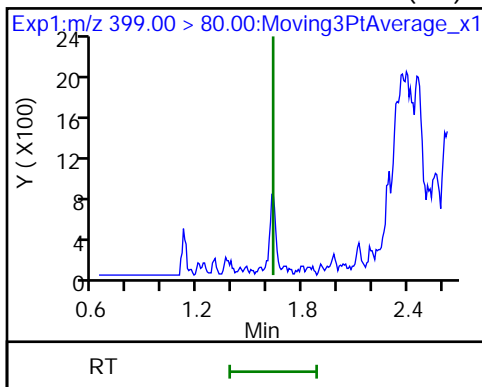
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid (ND)

4 Perfluoroheptanoic acid (ND)

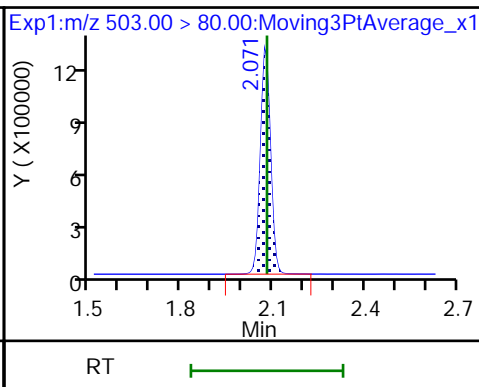
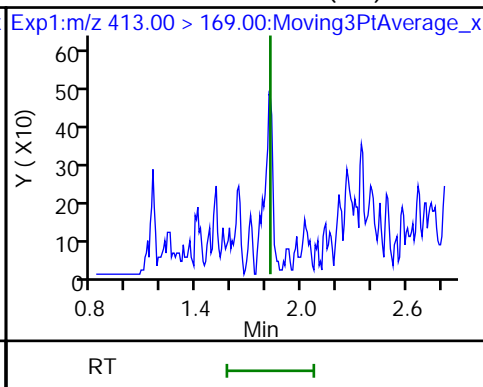
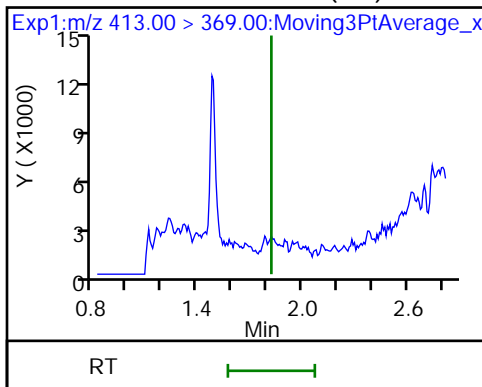
\* 6 13C2-PFOA



5 Perfluorooctanoic acid (ND)

5 Perfluorooctanoic acid (ND)

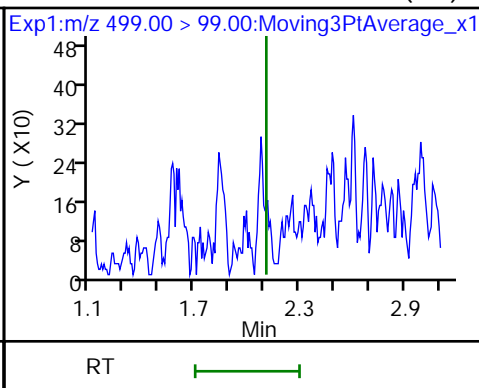
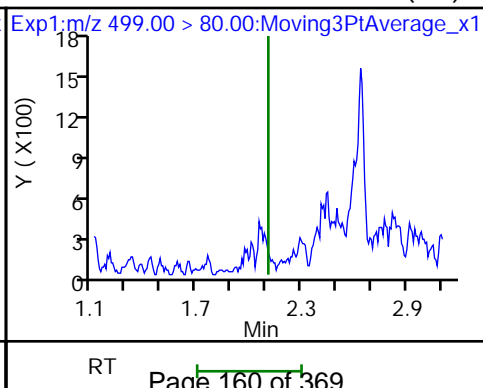
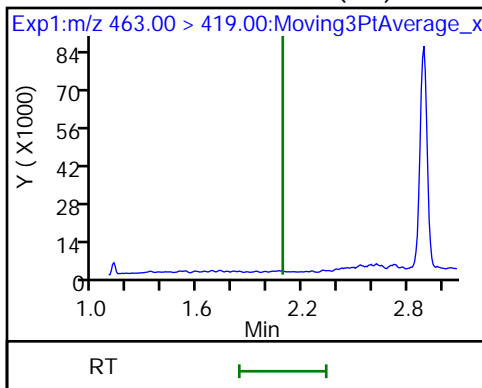
\* 7 13C4 PFOS



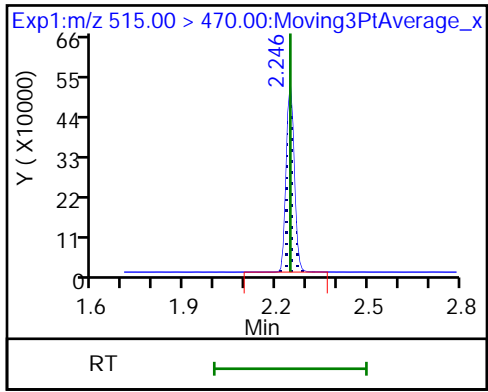
9 Perfluorononanoic acid (ND)

8 Perfluorooctane sulfonic acid (ND)

8 Perfluorooctane sulfonic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_063.d  
 Lims ID: 320-42363-A-4-A  
 Client ID: NAWC-082118-FRB-175  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:24:54 ALS Bottle#: 44 Worklist Smp#: 27  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-4-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.56	95.58
\$ 10 13C2 PFDA	10.0	10.2	101.60

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-098 Lab Sample ID: 320-42363-5  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_064.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:40  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 290.6(mL) Date Analyzed: 08/30/2018 07:29  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	11	J	34	14	5.8
335-67-1	Perfluorooctanoic acid (PFOA)	11	J	17	6.9	2.4
375-95-1	Perfluorononanoic acid (PFNA)	17	U	21	17	6.9
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	10	U	26	10	4.7
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.5	J	8.6	3.4	1.6
375-73-5	Perfluorobutanesulfonic acid (PFBS)	31	U	77	31	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	93		70-130
STL00996	13C2 PFDA	103		70-130

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_064.d  
 Lims ID: 320-42363-A-5-A  
 Client ID: NAWC-082118-RW-098  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:29:35 ALS Bottle#: 45 Worklist Smp#: 28  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-5-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:48:34

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.366	0.0	1.000	203039	1.56		379	
298.90 > 99.00	1.366	1.366	0.0	1.000	143063		1.42(0.00-0.00)	266	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.487	1.487	0.0	1.000	1267640	9.31		12332	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.631	1.631	0.0	1.000	240082	1.28		119	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.631	1.631	0.0	1.000	142320	1.03		20.4	
* 6 13C2-PFOA									
415.00 > 370.00	1.813	1.821	-0.008		1309394	10.0		9003	S
5 Perfluorooctanoic acid									
413.00 > 369.00	1.813	1.821	-0.008	1.000	465755	3.26		53.2	
413.00 > 169.00	1.813	1.821	-0.008	1.000	264327		1.76(0.00-0.00)	610	
* 7 13C4 PFOS									
503.00 > 80.00	2.071	2.079	-0.008		3251677	28.7		4142	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.071	2.109	-0.038	1.000	395371	3.23		163	
499.00 > 99.00	2.071	2.109	-0.038	1.000	68014		5.81(0.00-0.00)	86.7	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.246	0.0	1.000	1069503	10.3		7110	

[QC Flag Legend](#)

Processing Flags

s - Failed ISTD Recovery Test

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_064.d

Injection Date: 30-Aug-2018 07:29:35

Instrument ID: A8\_N

Lims ID: 320-42363-A-5-A

Lab Sample ID: 320-42363-5

Client ID: NAWC-082118-RW-098

Operator ID: SACINSTLCMS01

ALS Bottle#: 45

Worklist Smp#: 28

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

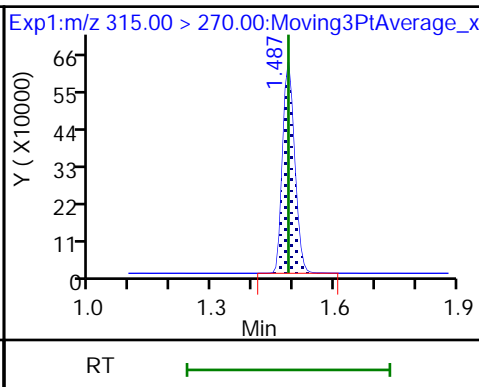
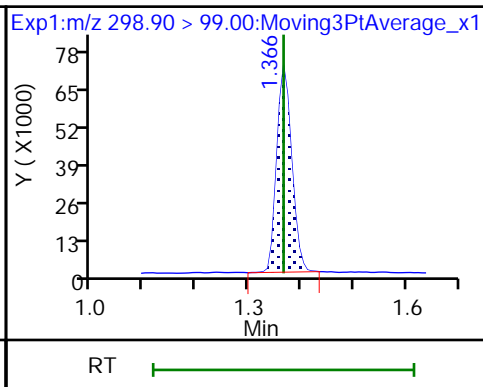
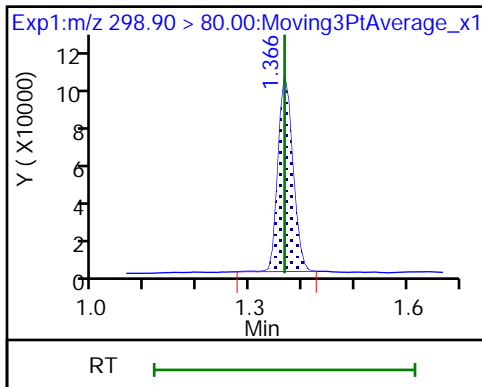
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

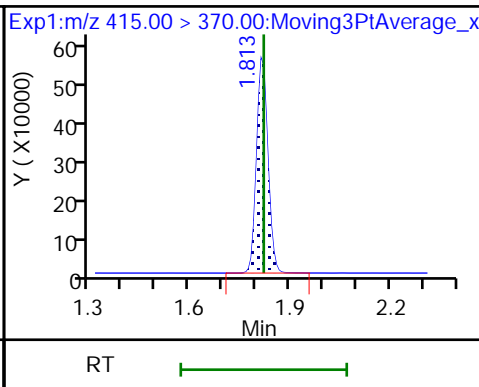
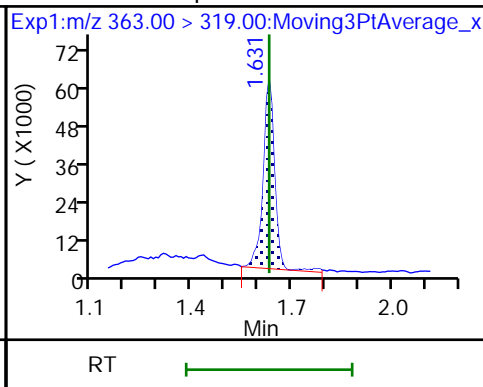
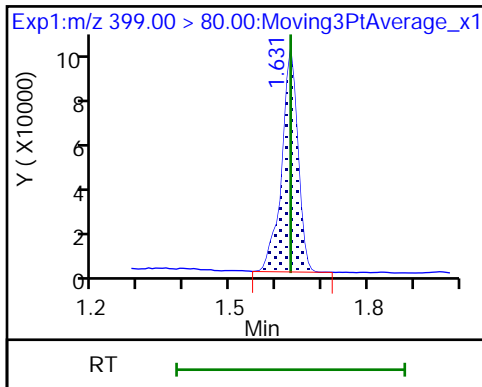
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

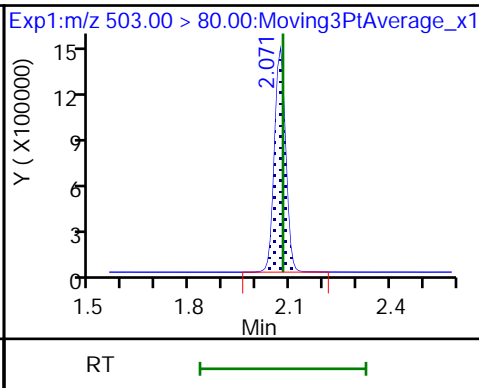
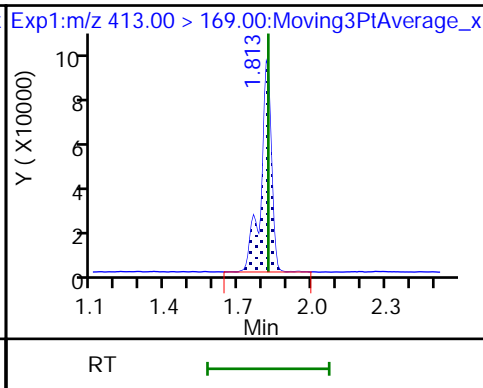
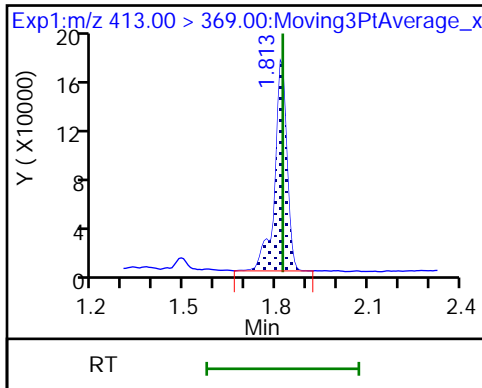
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

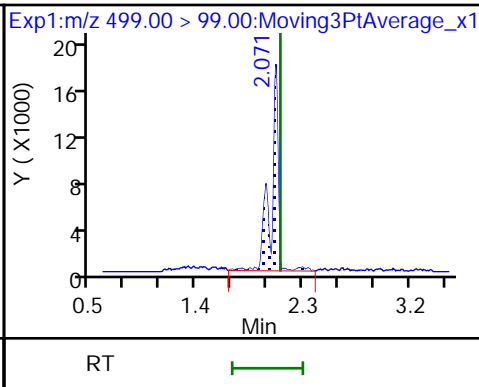
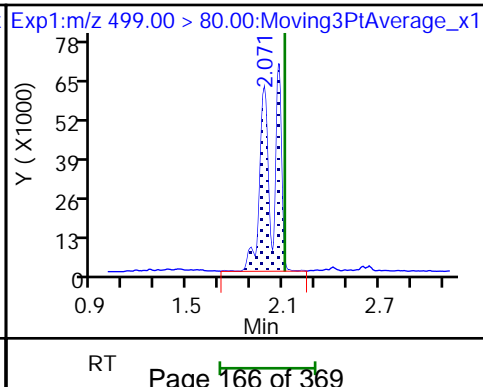
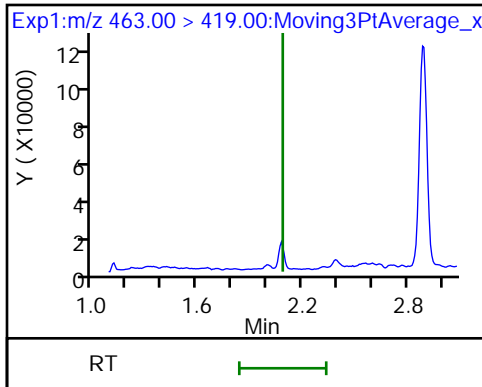
\* 7 13C4 PFOS



9 Perfluorononanoic acid (ND)

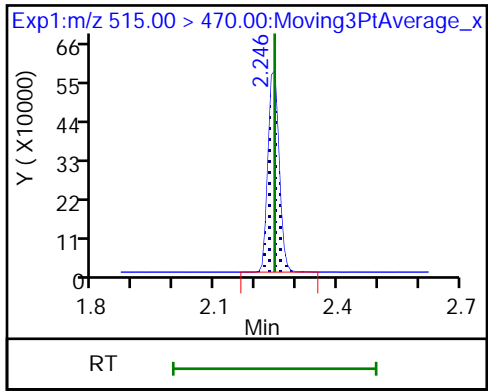
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid





\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_064.d  
 Lims ID: 320-42363-A-5-A  
 Client ID: NAWC-082118-RW-098  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:29:35 ALS Bottle#: 45 Worklist Smp#: 28  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-5-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:48:34

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.31	93.14
\$ 10 13C2 PFDA	10.0	10.3	103.11

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-098 RA Lab Sample ID: 320-42363-5 RA  
 Matrix: Water Lab File ID: 2018.08.30\_537AAA\_069.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:40  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 290.6(mL) Date Analyzed: 08/31/2018 08:18  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 243340 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	11	J	34	14	5.8
335-67-1	Perfluorooctanoic acid (PFOA)	11	J	17	6.9	2.4
375-95-1	Perfluorononanoic acid (PFNA)	17	U	21	17	6.9
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	10	U	26	10	4.7
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.4	J	8.6	3.4	1.6
375-73-5	Perfluorobutanesulfonic acid (PFBS)	31	U	77	31	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	88		70-130
STL00996	13C2 PFDA	89		70-130

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\2018.08.30\_537AAA\_069.d  
 Lims ID: 320-42363-A-5-A  
 Client ID: NAWC-082118-RW-098  
 Sample Type: Client  
 Inject. Date: 31-Aug-2018 08:18:05 ALS Bottle#: 48 Worklist Smp#: 62  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-5-a  
 Misc. Info.: Plate: 1 Rack: 4  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 31-Aug-2018 10:13:48 Calib Date: 30-Aug-2018 16:42:48  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK008

First Level Reviewer: barnettj Date: 31-Aug-2018 10:12:14

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.358	0.008	1.000	180973	1.66		392	
298.90 > 99.00	1.366	1.358	0.008	1.000	120047		1.51(0.00-0.00)	285	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.487	1.479	0.008	1.000	1115843	8.81		11773	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.639	1.624	0.015	1.000	118927	0.9796		19.1	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.639	1.624	0.015	1.000	206945	1.27		112	
* 6 13C2-PFOA									
415.00 > 370.00	1.828	1.813	0.015		1113652	10.0		8873	S
5 Perfluorooctanoic acid									
413.00 > 369.00	1.828	1.813	0.015	1.000	391536	3.26		49.8	
413.00 > 169.00	1.828	1.813	0.015	1.000	231011		1.69(0.00-0.00)	586	
* 7 13C4 PFOS									
503.00 > 80.00	2.079	2.064	0.015		2746523	28.7		4058	S
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.086	2.109	-0.023	1.000	333440	3.25		146	
499.00 > 99.00	2.079	2.109	-0.030	0.996	55099		6.05(0.00-0.00)	87.5	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.238	0.008	1.000	893020	8.89		5655	

[QC Flag Legend](#)

Processing Flags

s - Failed ISTD Recovery Test

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\2018.08.30\_537AAA\_069.d

Injection Date: 31-Aug-2018 08:18:05

Instrument ID: A8\_N

Lims ID: 320-42363-A-5-A

Lab Sample ID: 320-42363-5

Client ID: NAWC-082118-RW-098

Operator ID: SACINSTLCMS01

ALS Bottle#: 48

Worklist Smp#: 62

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

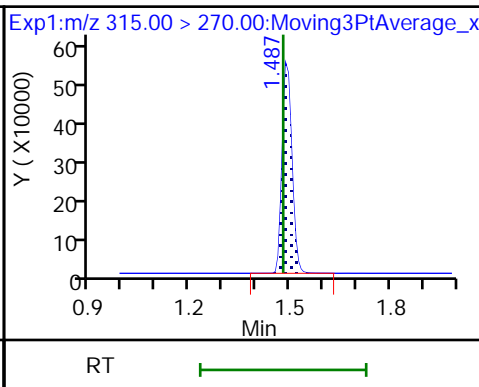
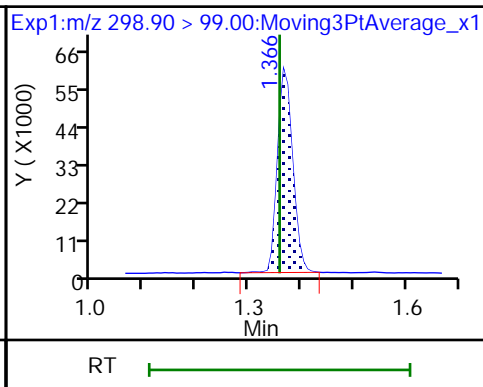
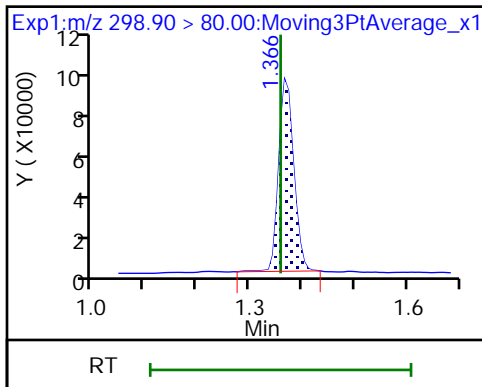
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

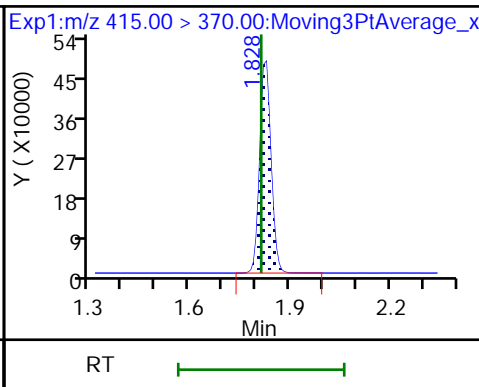
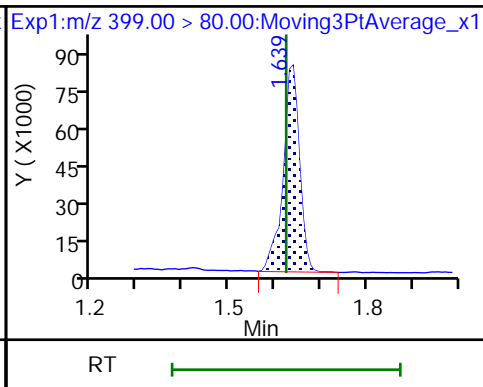
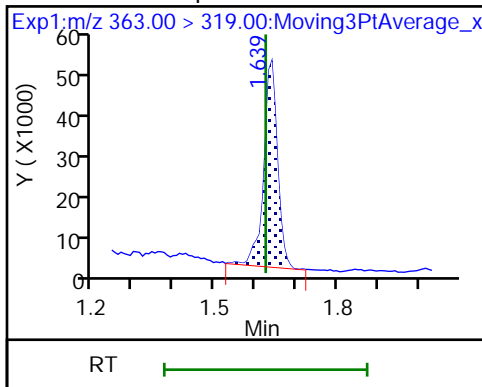
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

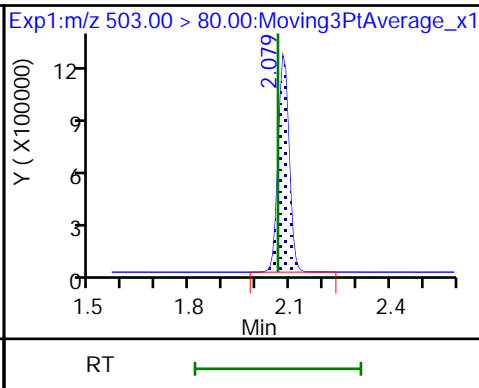
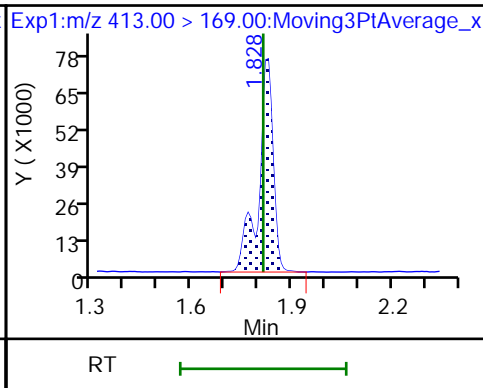
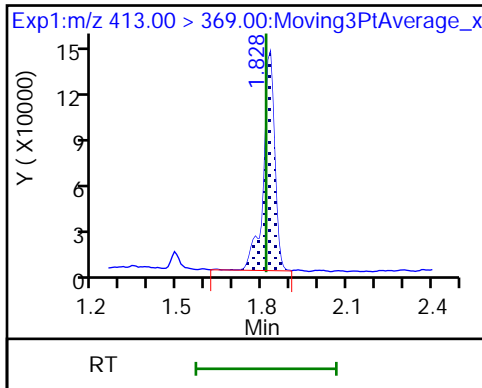
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

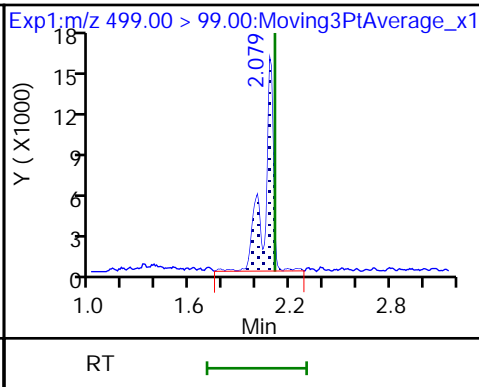
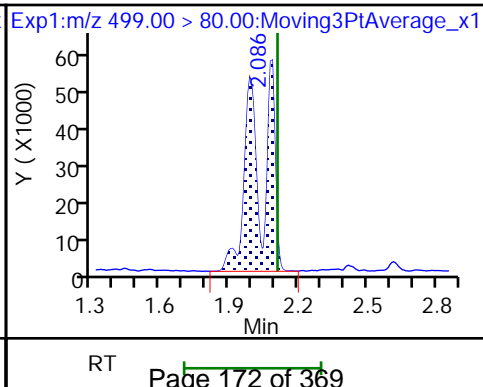
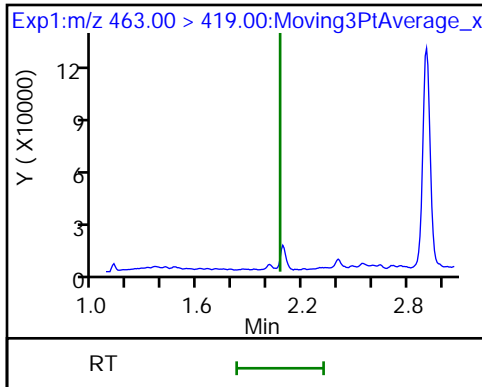
\* 7 13C4 PFOS



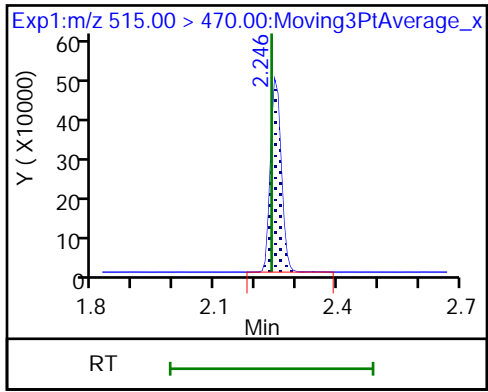
9 Perfluorononanoic acid (ND)

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\2018.08.30\_537AAA\_069.d  
 Lims ID: 320-42363-A-5-A  
 Client ID: NAWC-082118-RW-098  
 Sample Type: Client  
 Inject. Date: 31-Aug-2018 08:18:05 ALS Bottle#: 48 Worklist Smp#: 62  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-5-a  
 Misc. Info.: Plate: 1 Rack: 4  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 31-Aug-2018 10:13:48 Calib Date: 30-Aug-2018 16:42:48  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK008

First Level Reviewer: barnettj Date: 31-Aug-2018 10:12:14

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	8.81	88.10
\$ 10 13C2 PFDA	10.0	8.89	88.87



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-FRB-098 Lab Sample ID: 320-42363-6  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_065.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:35  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 256.9(mL) Date Analyzed: 08/30/2018 07:34  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	16	U	39	16	6.6
335-67-1	Perfluorooctanoic acid (PFOA)	7.8	U	19	7.8	2.7
375-95-1	Perfluorononanoic acid (PFNA)	19	U	23	19	7.8
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	29	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.9	U	9.7	3.9	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	88	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	101		70-130
STL00996	13C2 PFDA	106		70-130

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_065.d  
 Lims ID: 320-42363-A-6-A  
 Client ID: NAWC-082118-FRB-098  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:34:14 ALS Bottle#: 46 Worklist Smp#: 29  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-6-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
\$ 2 13C2 PFHxA	315.00 > 270.00	1.487	1.487	0.0	1.000	1211219	10.1	11833	
* 6 13C2-PFOA	415.00 > 370.00	1.821	1.821	0.0		1154870	10.0	7441	
* 7 13C4 PFOS	503.00 > 80.00	2.071	2.079	-0.008		3011281	28.7	6688	
\$ 10 13C2 PFDA	515.00 > 470.00	2.246	2.246	0.0	1.000	972197	10.6	6157	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_065.d

Injection Date: 30-Aug-2018 07:34:14

Instrument ID: A8\_N

Lims ID: 320-42363-A-6-A

Lab Sample ID: 320-42363-6

Client ID: NAWC-082118-FRB-098

Operator ID: SACINSTLCMS01

ALS Bottle#: 46

Worklist Smp#: 29

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

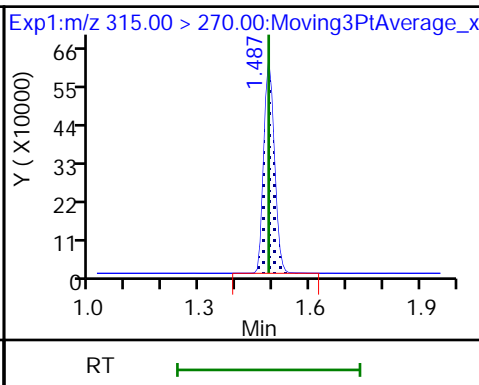
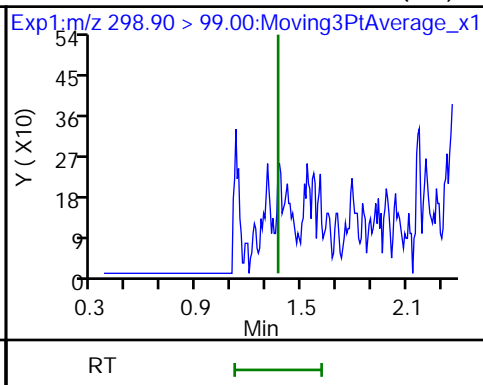
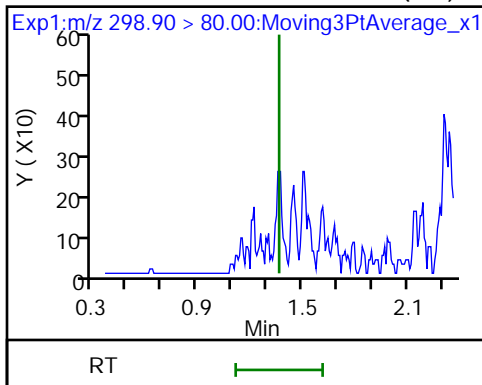
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid (ND)

1 Perfluorobutanesulfonic acid (ND)

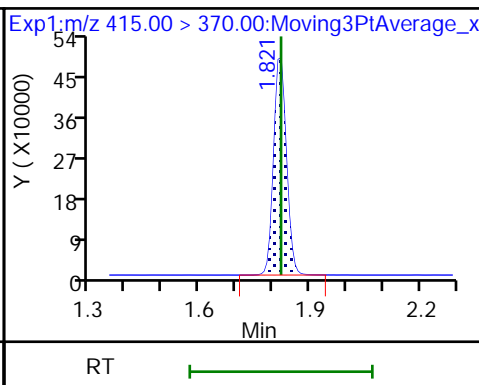
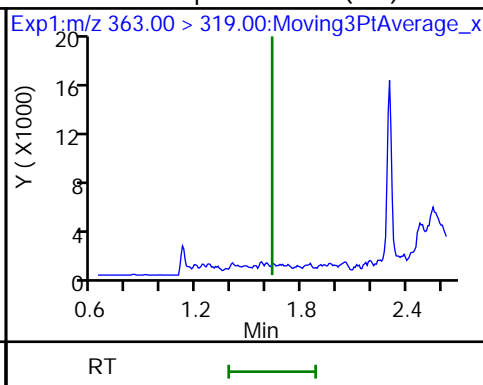
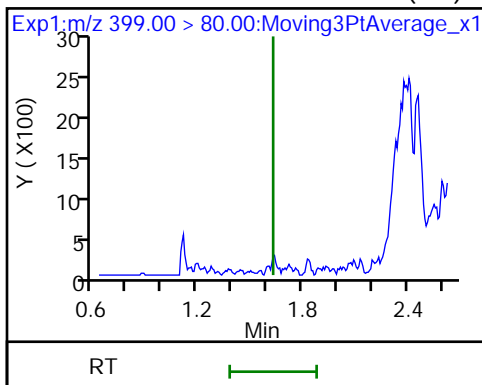
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid (ND)

4 Perfluoroheptanoic acid (ND)

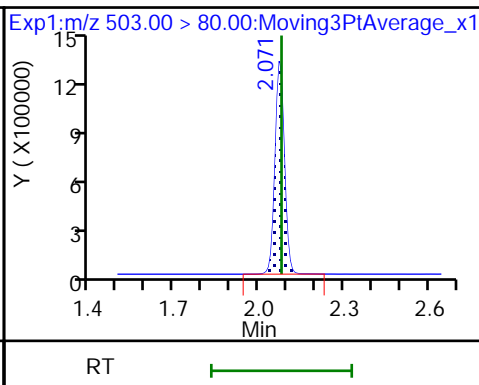
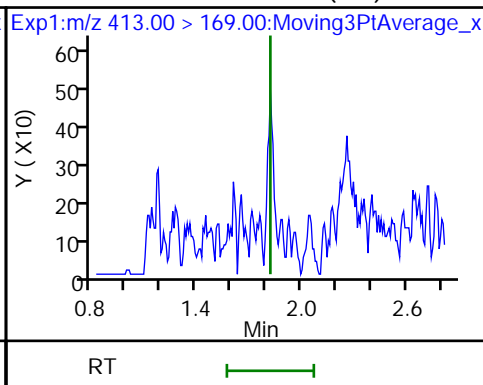
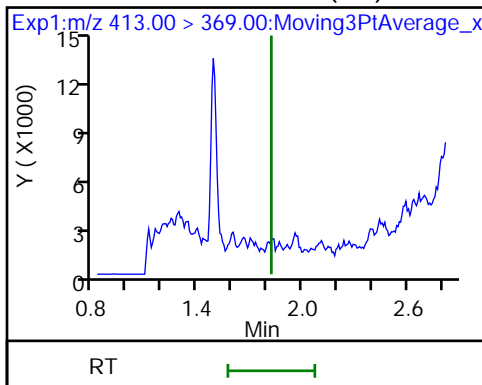
\* 6 13C2-PFOA



5 Perfluorooctanoic acid (ND)

5 Perfluorooctanoic acid (ND)

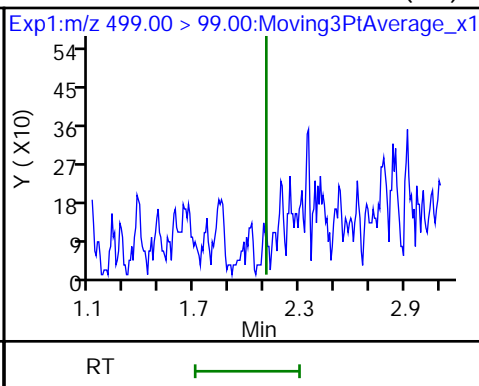
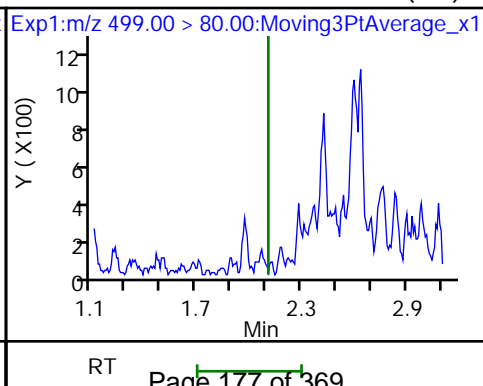
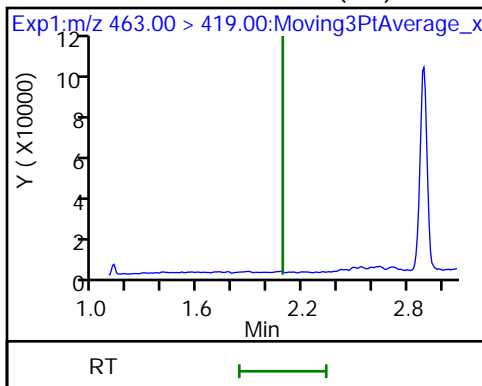
\* 7 13C4 PFOS



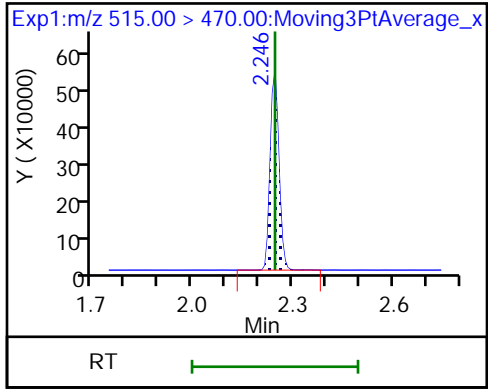
9 Perfluorononanoic acid (ND)

8 Perfluorooctane sulfonic acid (ND)

8 Perfluorooctane sulfonic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_065.d  
 Lims ID: 320-42363-A-6-A  
 Client ID: NAWC-082118-FRB-098  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:34:14 ALS Bottle#: 46 Worklist Smp#: 29  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-6-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	10.1	100.90
\$ 10 13C2 PFDA	10.0	10.6	106.27

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: WGNA-082118-RW-0488 Lab Sample ID: 320-42363-7  
 Matrix: Water Lab File ID: 2018.08.30\_537AAA\_070.d  
 Analysis Method: 537 Date Collected: 08/21/2018 11:40  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 282 (mL) Date Analyzed: 08/31/2018 08:22  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 243340 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	19	J	35	14	6.0
335-67-1	Perfluorooctanoic acid (PFOA)	30		18	7.1	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	21	18	7.1
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	20	J	27	11	4.9
375-85-9	Perfluoroheptanoic acid (PFHpA)	11		8.9	3.5	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	32	U	80	32	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	93		70-130
STL00996	13C2 PFDA	89		70-130

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\2018.08.30\_537AAA\_070.d  
 Lims ID: 320-42363-A-7-A  
 Client ID: WGNA-082118-RW-0488  
 Sample Type: Client  
 Inject. Date: 31-Aug-2018 08:22:46 ALS Bottle#: 49 Worklist Smp#: 63  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-7-a  
 Misc. Info.: Plate: 1 Rack: 4  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 31-Aug-2018 10:13:48 Calib Date: 30-Aug-2018 16:42:48  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK008

First Level Reviewer: barnettj Date: 31-Aug-2018 10:12:32

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.373	1.358	0.015	1.000	235822	3.06		606	
298.90 > 99.00	1.373	1.358	0.015	1.000	154603		1.53(0.00-0.00)	484	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.495	1.479	0.016	1.000	801468	9.27		8254	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.639	1.624	0.015	1.000	257011	3.10		49.5	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.639	1.624	0.015	1.000	665861	5.76		375	
* 6 13C2-PFOA									
415.00 > 370.00	1.828	1.813	0.015		760091	10.0		6374	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.828	1.813	0.015	1.000	700182	8.53		85.0	
413.00 > 169.00	1.828	1.813	0.015	1.000	429153		1.63(0.00-0.00)	1038	
* 7 13C4 PFOS									
503.00 > 80.00	2.079	2.064	0.015		1941807	28.7		2885	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.086	2.109	-0.023	1.000	383765	5.29		287	
499.00 > 99.00	2.086	2.109	-0.023	1.000	65521		5.86(0.00-0.00)	132	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.253	2.238	0.015	1.000	607299	8.85		3731	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\2018.08.30\_537AAA\_070.d

Injection Date: 31-Aug-2018 08:22:46

Instrument ID: A8\_N

Lims ID: 320-42363-A-7-A

Lab Sample ID: 320-42363-7

Client ID: WGNA-082118-RW-0488

Operator ID: SACINSTLCMS01

ALS Bottle#: 49

Worklist Smp#: 63

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

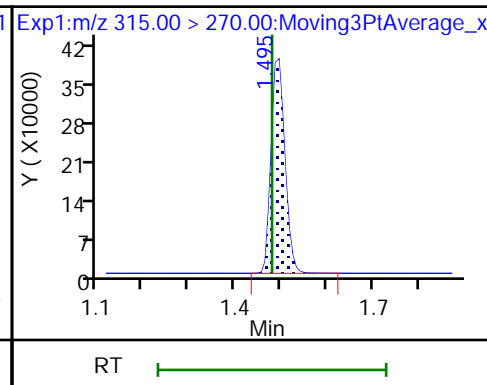
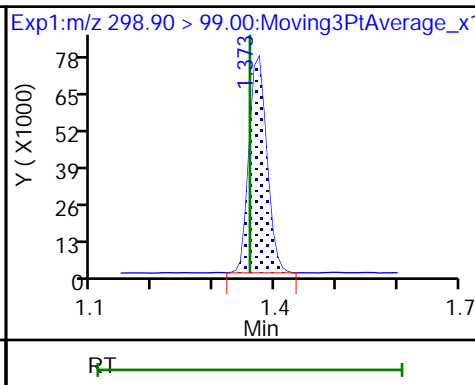
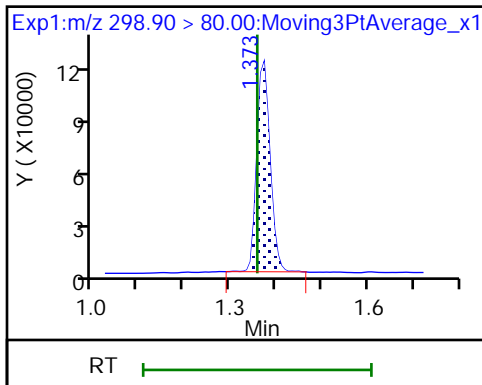
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

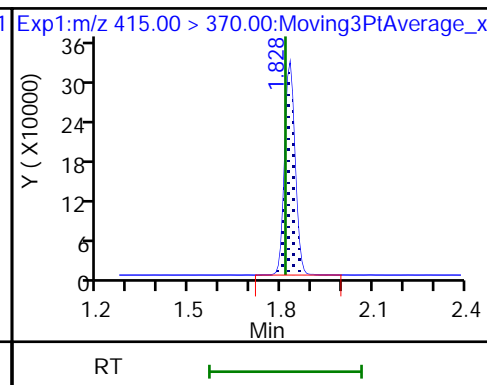
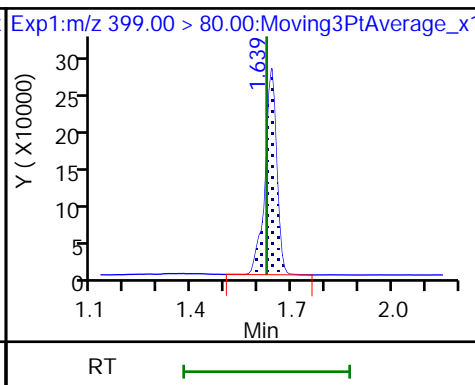
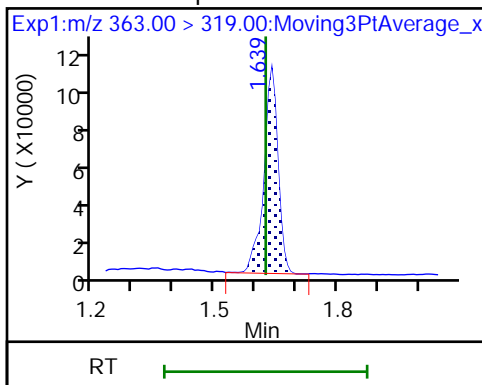
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

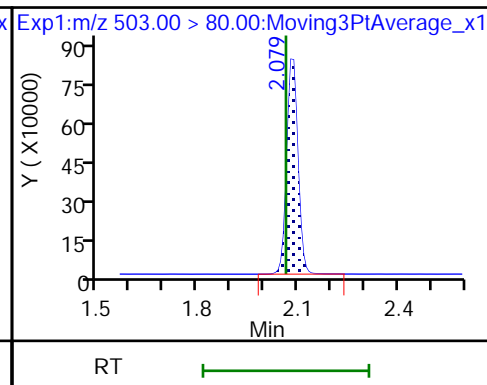
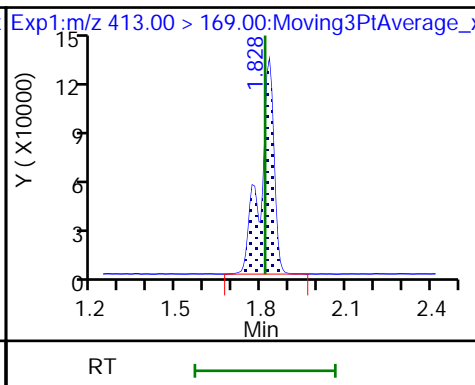
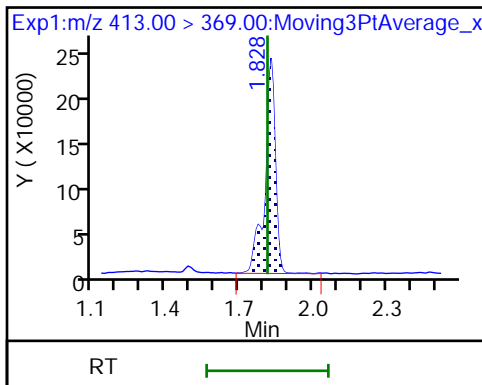
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

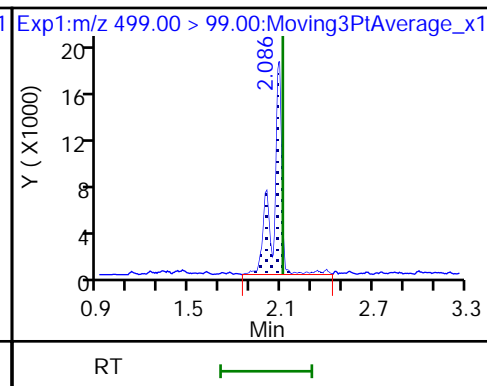
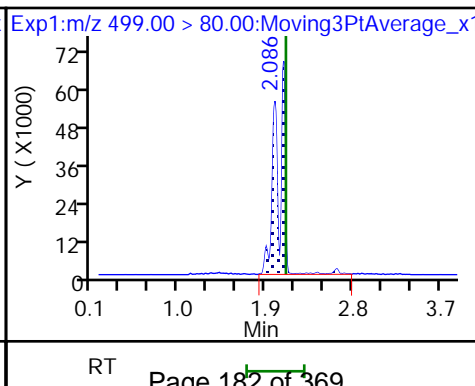
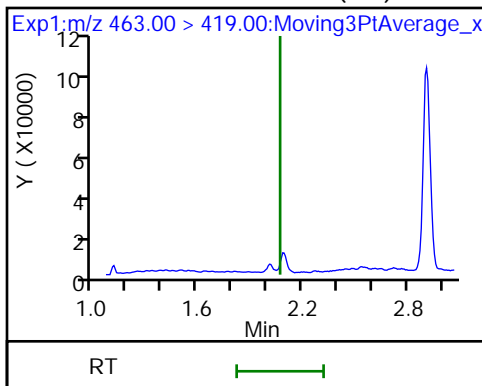
\* 7 13C4 PFOS



9 Perfluorononanoic acid (ND)

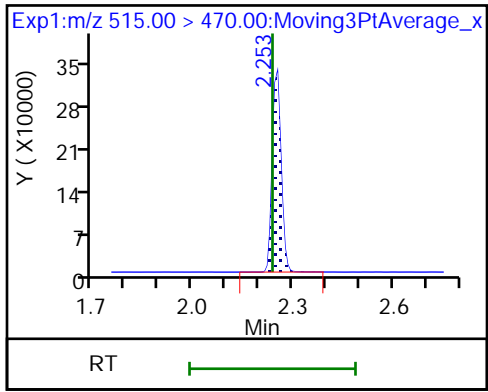
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid





\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\2018.08.30\_537AAA\_070.d  
 Lims ID: 320-42363-A-7-A  
 Client ID: WGNA-082118-RW-0488  
 Sample Type: Client  
 Inject. Date: 31-Aug-2018 08:22:46 ALS Bottle#: 49 Worklist Smp#: 63  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-7-a  
 Misc. Info.: Plate: 1 Rack: 4  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 31-Aug-2018 10:13:48 Calib Date: 30-Aug-2018 16:42:48  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK008

First Level Reviewer: barnettj Date: 31-Aug-2018 10:12:32

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.27	92.71
\$ 10 13C2 PFDA	10.0	8.85	88.55

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: WGNA-082118-FRB-0488 Lab Sample ID: 320-42363-8  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_069.d  
 Analysis Method: 537 Date Collected: 08/21/2018 11:35  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 271.8(mL) Date Analyzed: 08/30/2018 07:52  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	37	15	6.3
335-67-1	Perfluorooctanoic acid (PFOA)	7.4	U	18	7.4	2.6
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.4
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	28	11	5.1
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.7	U	9.2	3.7	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	33	U	83	33	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	89		70-130
STL00996	13C2 PFDA	101		70-130

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_069.d  
 Lims ID: 320-42363-A-8-A  
 Client ID: WGNA-082118-FRB-0488  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:52:56 ALS Bottle#: 48 Worklist Smp#: 33  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-8-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:50:47 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
\$ 2 13C2 PFHxA	315.00 > 270.00	1.479	1.487	-0.008	1.000	1053808	8.95	10645	
* 6 13C2-PFOA	415.00 > 370.00	1.813	1.813	0.0		1133293	10.0	8392	
* 7 13C4 PFOS	503.00 > 80.00	2.064	2.071	-0.007		2850914	28.7	6112	
\$ 10 13C2 PFDA	515.00 > 470.00	2.238	2.246	-0.008	1.000	909433	10.1	5492	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_069.d

Injection Date: 30-Aug-2018 07:52:56

Instrument ID: A8\_N

Lims ID: 320-42363-A-8-A

Lab Sample ID: 320-42363-8

Client ID: WGNA-082118-FRB-0488

Operator ID: SACINSTLCMS01

ALS Bottle#: 48

Worklist Smp#: 33

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

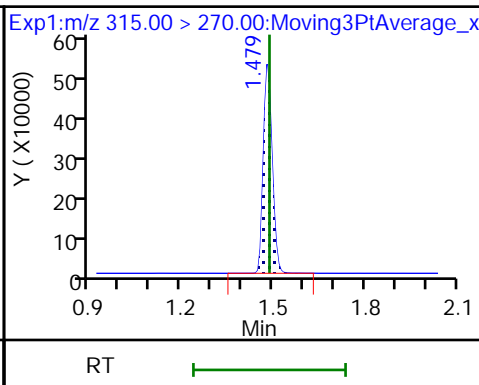
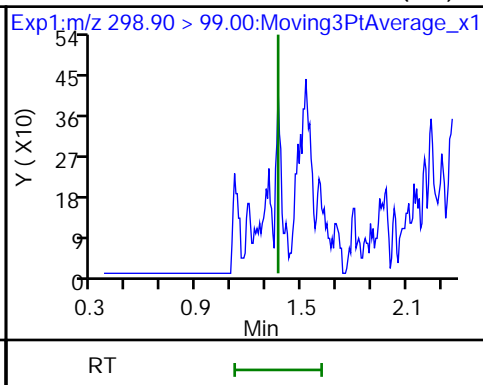
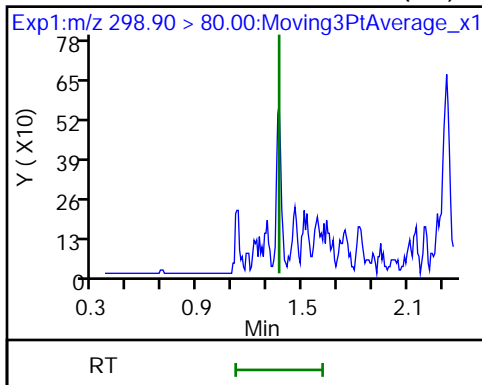
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid (ND)

1 Perfluorobutanesulfonic acid (ND)

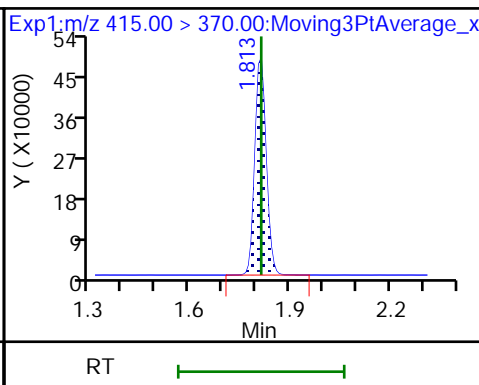
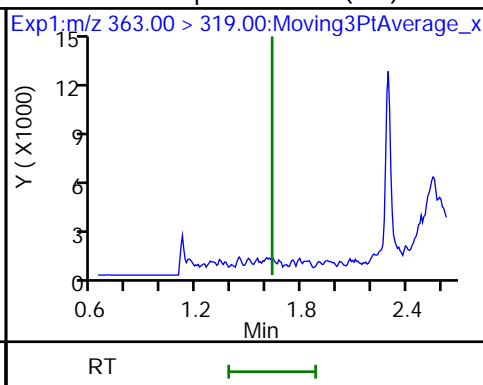
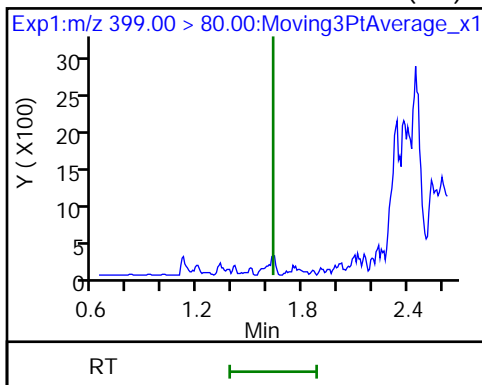
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid (ND)

4 Perfluoroheptanoic acid (ND)

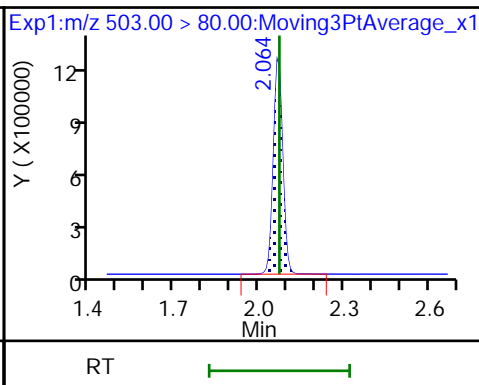
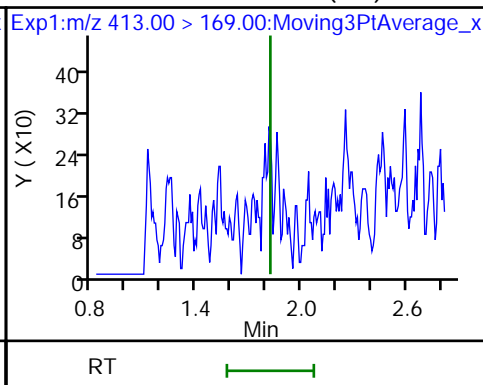
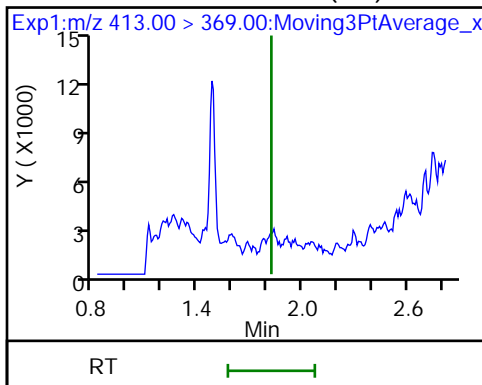
\* 6 13C2-PFOA



5 Perfluorooctanoic acid (ND)

5 Perfluorooctanoic acid (ND)

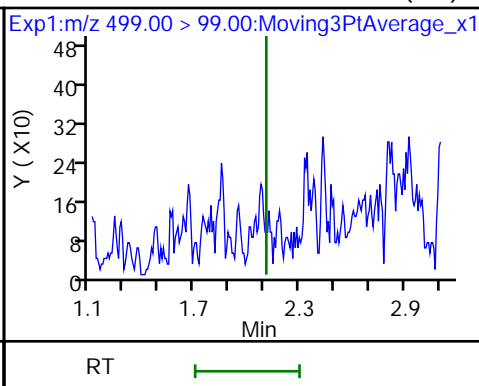
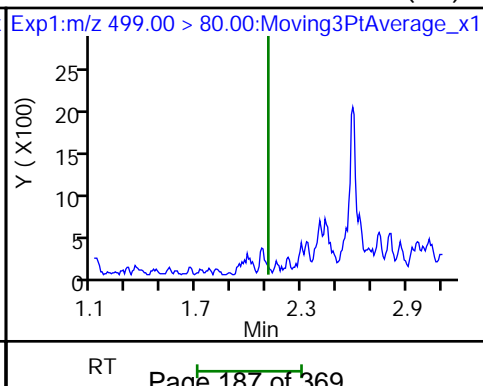
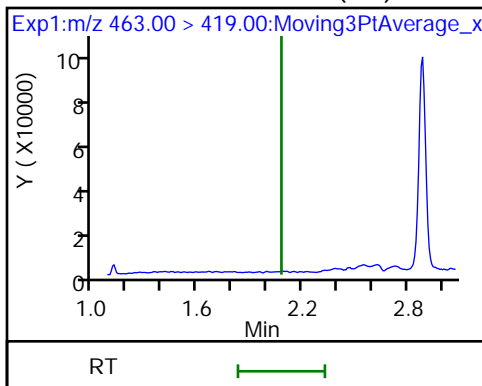
\* 7 13C4 PFOS



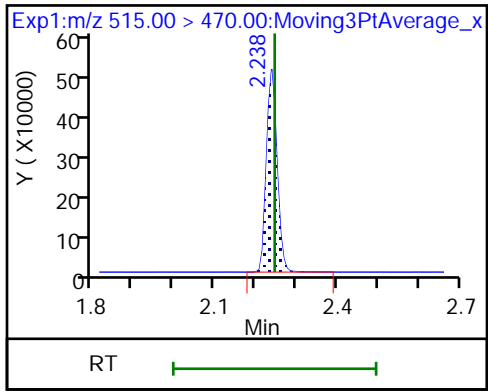
9 Perfluorononanoic acid (ND)

8 Perfluorooctane sulfonic acid (ND)

8 Perfluorooctane sulfonic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_069.d  
 Lims ID: 320-42363-A-8-A  
 Client ID: WGNA-082118-FRB-0488  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:52:56 ALS Bottle#: 48 Worklist Smp#: 33  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-8-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:50:47 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	8.95	89.46
\$ 10 13C2 PFDA	10.0	10.1	101.31

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-265 Lab Sample ID: 320-42363-9  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_070.d  
 Analysis Method: 537 Date Collected: 08/21/2018 12:10  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 280.3(mL) Date Analyzed: 08/30/2018 07:57  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	23	J	36	14	6.1
335-67-1	Perfluorooctanoic acid (PFOA)	15	J	18	7.1	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	21	18	7.1
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	J	27	11	4.9
375-85-9	Perfluoroheptanoic acid (PFHpA)	9.1		8.9	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	32	U	80	32	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	98		70-130
STL00996	13C2 PFDA	104		70-130



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_070.d  
 Lims ID: 320-42363-A-9-A  
 Client ID: NAWC-082118-RW-265  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:57:37 ALS Bottle#: 49 Worklist Smp#: 34  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-9-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:50:47 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:49:45

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.366	0.0	1.000	156076	1.40		301	
298.90 > 99.00	1.358	1.366	-0.008	0.994	103615		1.51(0.00-0.00)	272	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.487	1.487	0.0	1.000	1136856	9.84		11902	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.624	1.631	-0.007	1.000	539662	3.35		299	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.631	1.631	0.0	1.000	299371	2.55		57.7	
* 6 13C2-PFOA									
415.00 > 370.00	1.813	1.813	0.0		1111187	10.0		7511	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.813	1.821	-0.008	1.000	496804	4.10		64.6	
413.00 > 169.00	1.813	1.821	-0.008	1.000	299848		1.66(0.00-0.00)	890	
* 7 13C4 PFOS									
503.00 > 80.00	2.071	2.071	0.0		2790946	28.7		3718	
9 Perfluorononanoic acid									
463.00 > 419.00	2.079	2.079	0.0	1.000	51824	0.5658		4.6	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.071	2.109	-0.038	1.000	673415	6.41		498	
499.00 > 99.00	2.064	2.109	-0.045	0.996	135375		4.97(0.00-0.00)	297	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.238	2.246	-0.008	1.000	912806	10.4		5433	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_070.d

Injection Date: 30-Aug-2018 07:57:37

Instrument ID: A8\_N

Lims ID: 320-42363-A-9-A

Lab Sample ID: 320-42363-9

Client ID: NAWC-082118-RW-265

Operator ID: SACINSTLCMS01

ALS Bottle#: 49

Worklist Smp#: 34

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

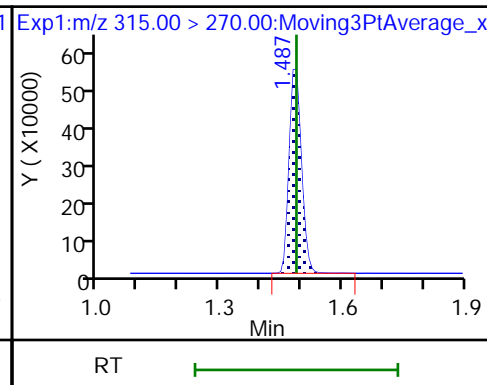
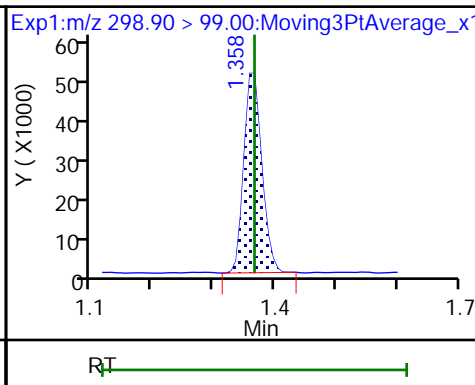
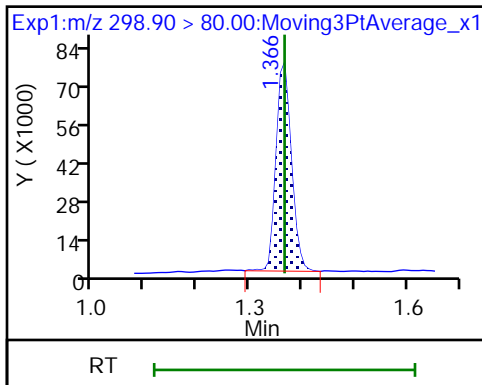
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

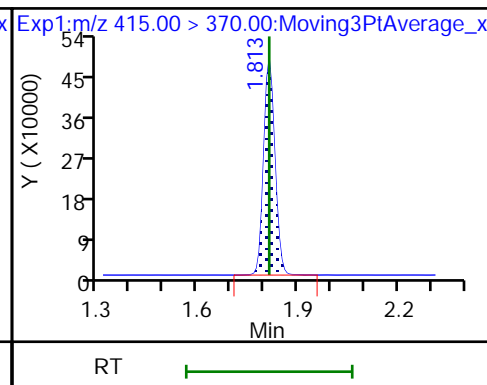
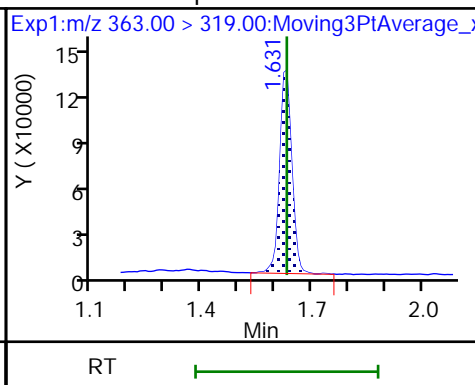
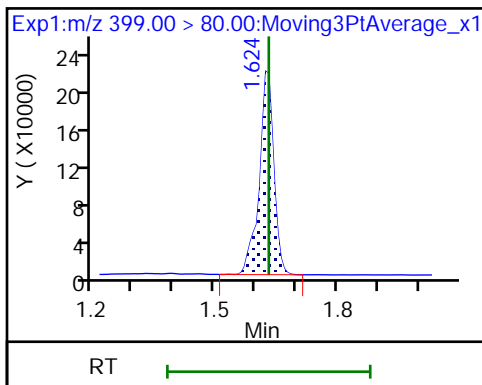
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

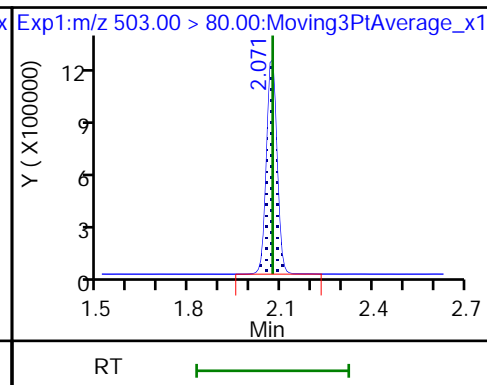
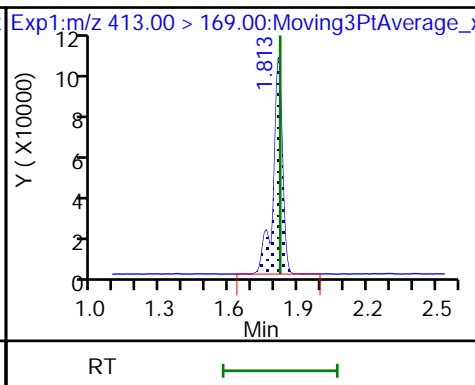
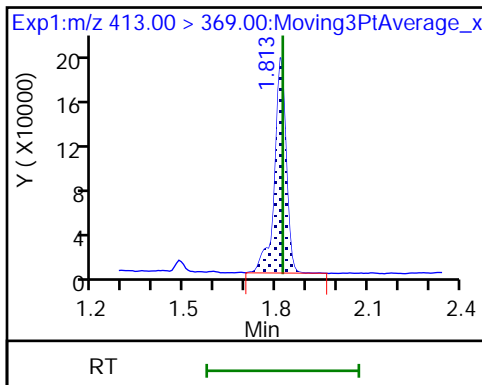
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

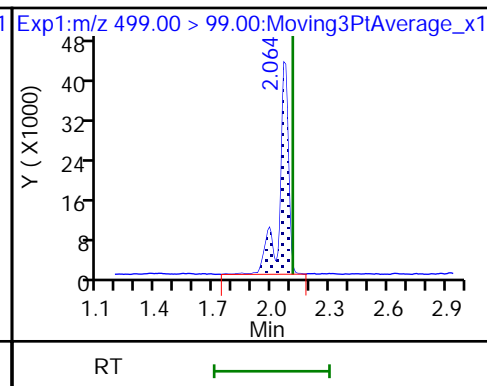
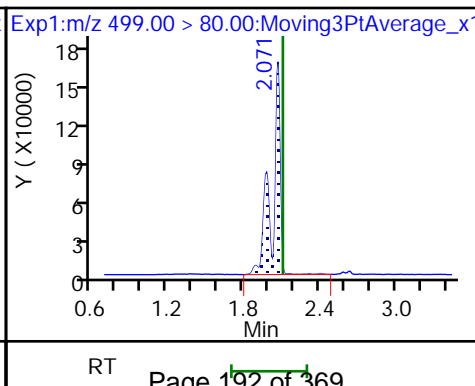
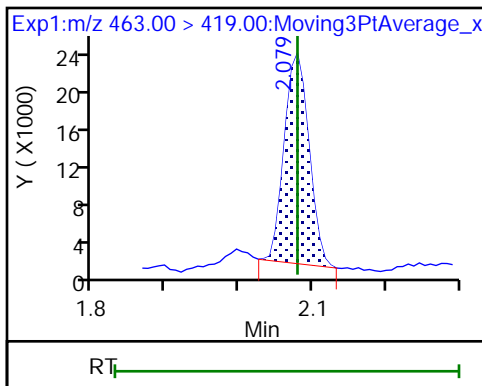
\* 7 13C4 PFOS



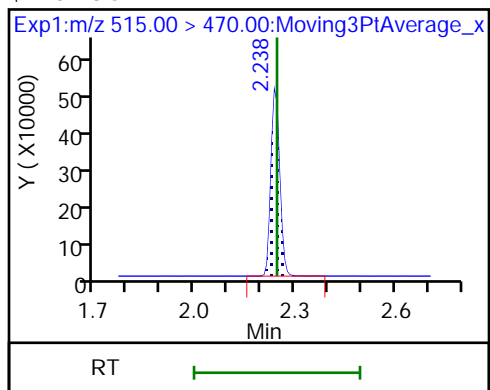
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_070.d  
 Lims ID: 320-42363-A-9-A  
 Client ID: NAWC-082118-RW-265  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:57:37 ALS Bottle#: 49 Worklist Smp#: 34  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-9-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:50:47 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:49:45

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.84	98.43
\$ 10 13C2 PFDA	10.0	10.4	103.71

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-FRB-265 Lab Sample ID: 320-42363-10  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_071.d  
 Analysis Method: 537 Date Collected: 08/21/2018 12:05  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 276.7(mL) Date Analyzed: 08/30/2018 08:02  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	14	U	36	14	6.1
335-67-1	Perfluorooctanoic acid (PFOA)	7.2	U	18	7.2	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.2
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	27	11	5.0
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.6	U	9.0	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	33	U	81	33	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	98		70-130
STL00996	13C2 PFDA	106		70-130

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_071.d  
 Lims ID: 320-42363-A-10-A  
 Client ID: NAWC-082118-FRB-265  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 08:02:18 ALS Bottle#: 50 Worklist Smp#: 35  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-10-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:50:47 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
\$ 2 13C2 PFHxA	315.00 > 270.00	1.487	1.487	0.0	1.000	1112850	9.81	11468	
* 6 13C2-PFOA	415.00 > 370.00	1.813	1.813	0.0		1090929	10.0	8584	
* 7 13C4 PFOS	503.00 > 80.00	2.071	2.071	0.0		2797557	28.7	6798	
\$ 10 13C2 PFDA	515.00 > 470.00	2.246	2.246	0.0	1.000	913009	10.6	5391	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_071.d

Injection Date: 30-Aug-2018 08:02:18

Instrument ID: A8\_N

Lims ID: 320-42363-A-10-A

Lab Sample ID: 320-42363-10

Client ID: NAWC-082118-FRB-265

Operator ID: SACINSTLCMS01

ALS Bottle#: 50

Worklist Smp#: 35

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

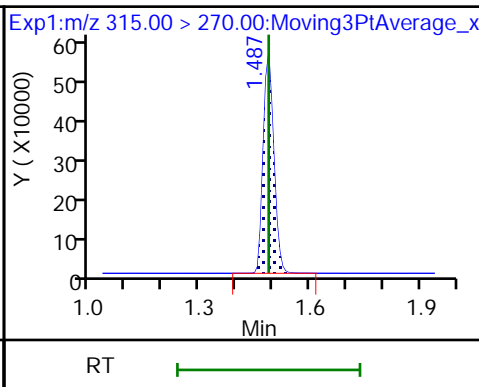
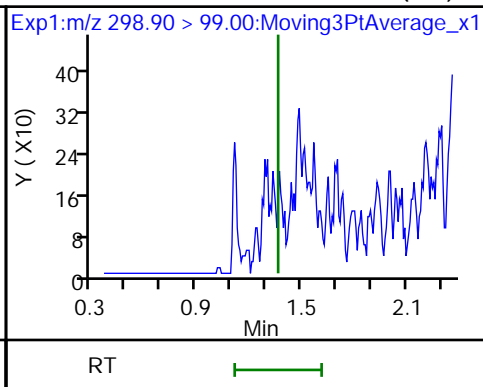
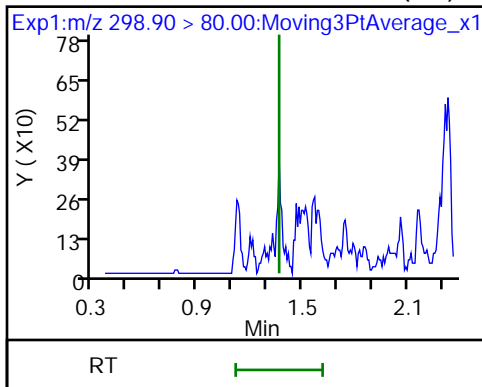
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid (ND)

1 Perfluorobutanesulfonic acid (ND)

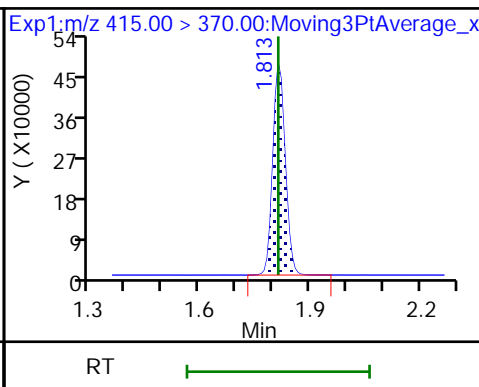
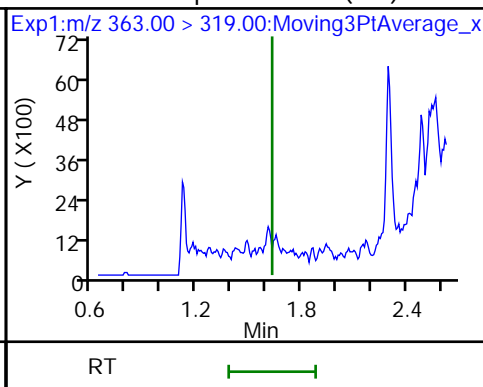
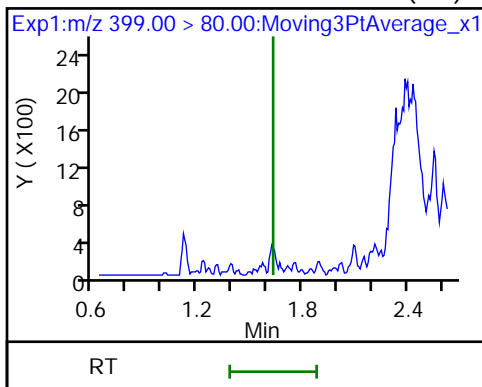
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid (ND)

4 Perfluoroheptanoic acid (ND)

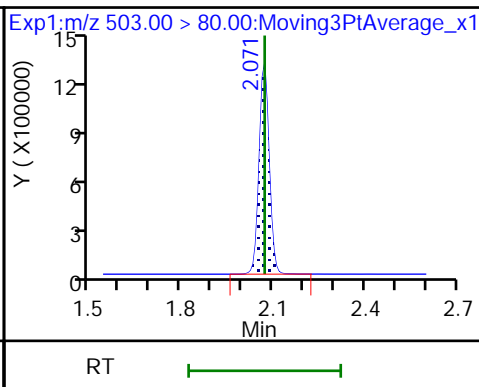
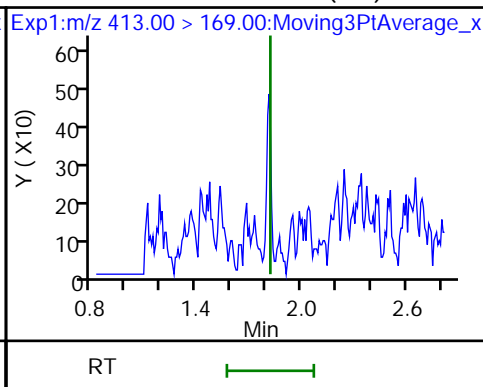
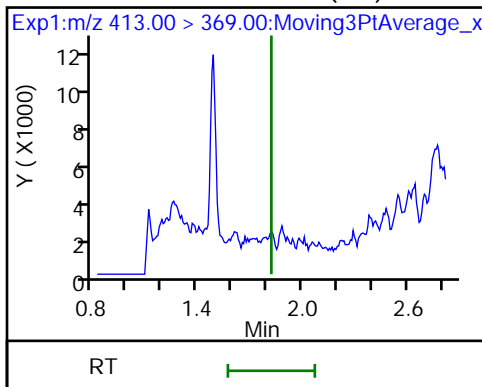
\* 6 13C2-PFOA



5 Perfluorooctanoic acid (ND)

5 Perfluorooctanoic acid (ND)

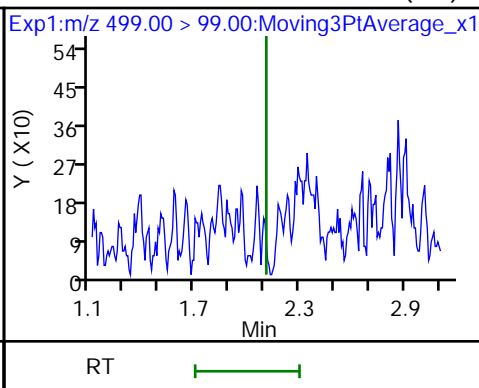
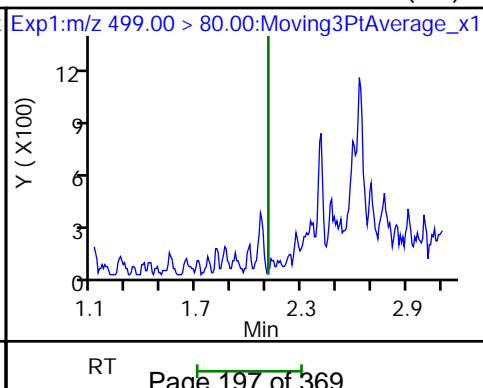
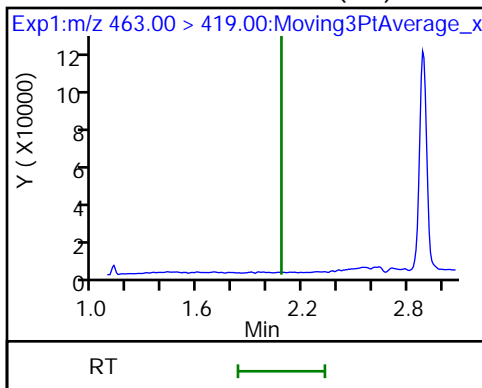
\* 7 13C4 PFOS



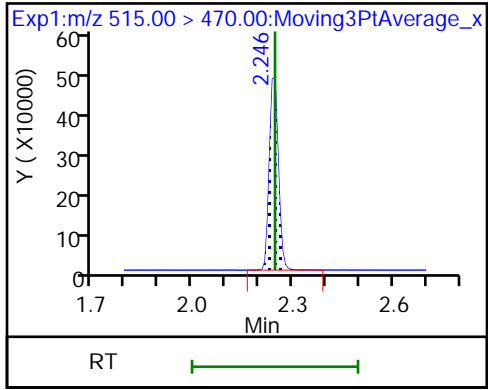
9 Perfluorononanoic acid (ND)

8 Perfluorooctane sulfonic acid (ND)

8 Perfluorooctane sulfonic acid (ND)



\$ 10 13C2 PFDA





TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_071.d  
 Lims ID: 320-42363-A-10-A  
 Client ID: NAWC-082118-FRB-265  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 08:02:18 ALS Bottle#: 50 Worklist Smp#: 35  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-10-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:50:47 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.81	98.14
\$ 10 13C2 PFDA	10.0	10.6	105.65

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: WGNA-082118-RW-3556 Lab Sample ID: 320-42363-11  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_072.d  
 Analysis Method: 537 Date Collected: 08/21/2018 12:40  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 263.8(mL) Date Analyzed: 08/30/2018 08:06  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	13	J	38	15	6.4
335-67-1	Perfluorooctanoic acid (PFOA)	14	J	19	7.6	2.7
375-95-1	Perfluorononanoic acid (PFNA)	19	U	23	19	7.6
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	28	11	5.2
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.6	J	9.5	3.8	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	34	U	85	34	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	94		70-130
STL00996	13C2 PFDA	101		70-130

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_072.d  
 Lims ID: 320-42363-A-11-A  
 Client ID: WGNA-082118-RW-3556  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 08:06:58 ALS Bottle#: 51 Worklist Smp#: 36  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-11-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:50:47 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:50:07

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.366	0.0	1.000	242861	1.99		379	
298.90 > 99.00	1.366	1.366	0.0	1.000	159183		1.53(0.00-0.00)	405	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.487	1.487	0.0	1.000	1184135	9.37		10822	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.631	1.631	0.0	1.000	145740	0.8264		60.4	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.631	1.631	0.0	1.000	155016	1.21		23.8	
* 6 13C2-PFOA									
415.00 > 370.00	1.821	1.813	0.008		1215813	10.0		8486	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.821	1.821	0.0	1.000	483574	3.65		53.2	
413.00 > 169.00	1.821	1.821	0.0	1.000	280453		1.72(0.00-0.00)	702	
* 7 13C4 PFOS									
503.00 > 80.00	2.071	2.071	0.0		3053694	28.7		3402	
9 Perfluorononanoic acid									
463.00 > 419.00	2.079	2.079	0.0	1.000	45271	0.4517		3.9	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.071	2.109	-0.038	1.000	402214	3.50		181	
499.00 > 99.00	2.071	2.109	-0.038	1.000	72115		5.58(0.00-0.00)	96.8	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.246	0.0	1.000	971498	10.1		5531	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_072.d

Injection Date: 30-Aug-2018 08:06:58

Instrument ID: A8\_N

Lims ID: 320-42363-A-11-A

Lab Sample ID: 320-42363-11

Client ID: WGNA-082118-RW-3556

Operator ID: SACINSTLCMS01

ALS Bottle#: 51

Worklist Smp#: 36

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

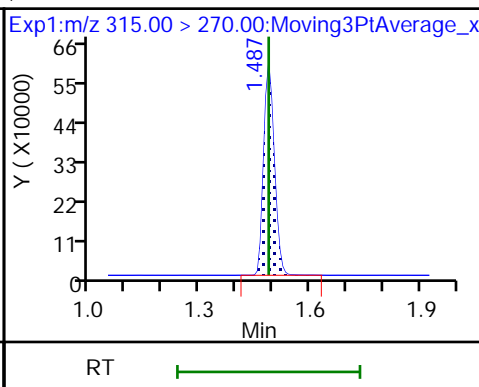
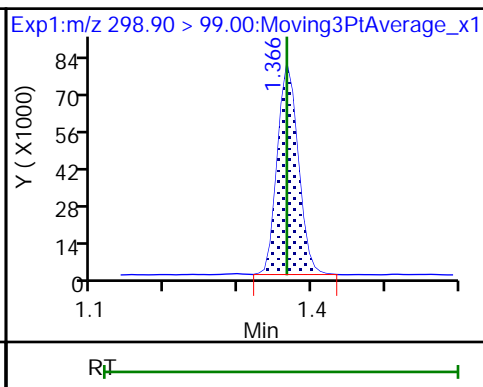
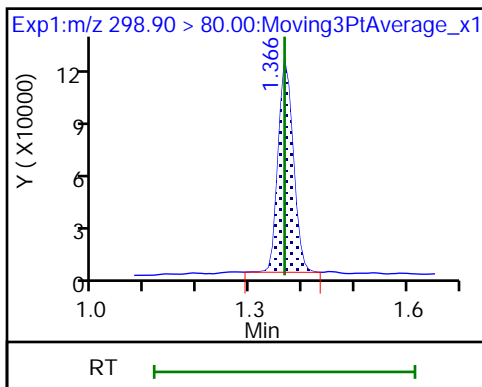
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

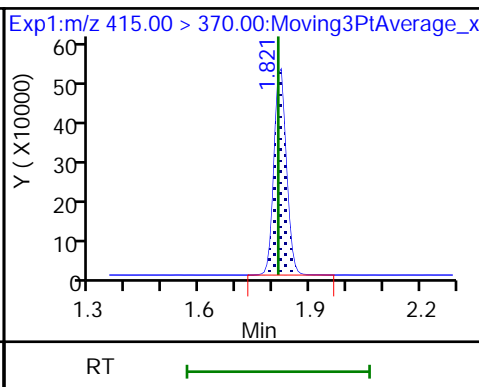
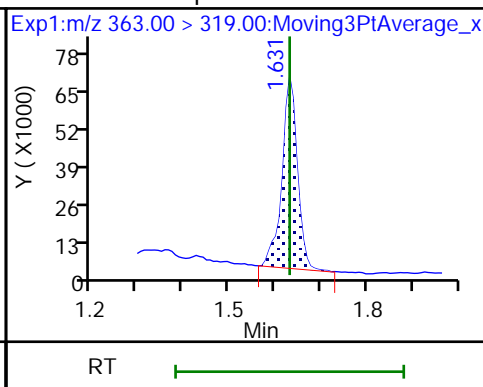
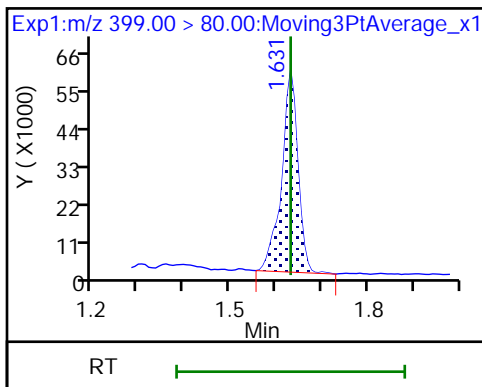
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

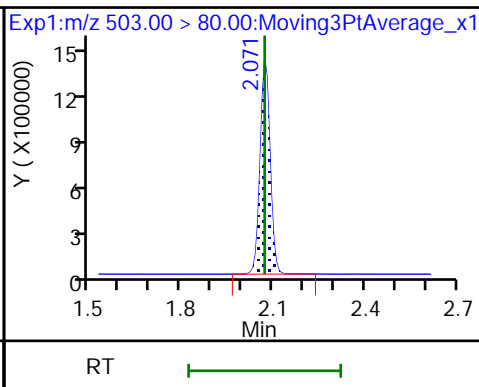
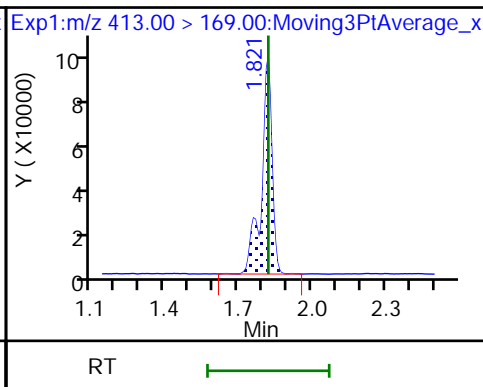
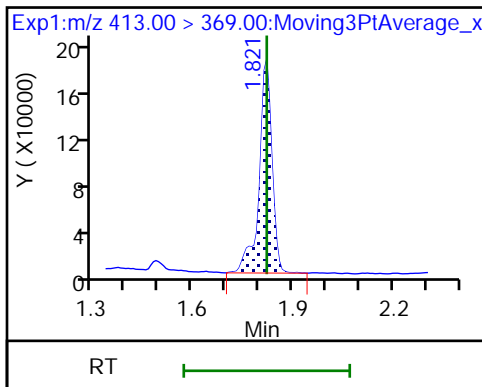
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

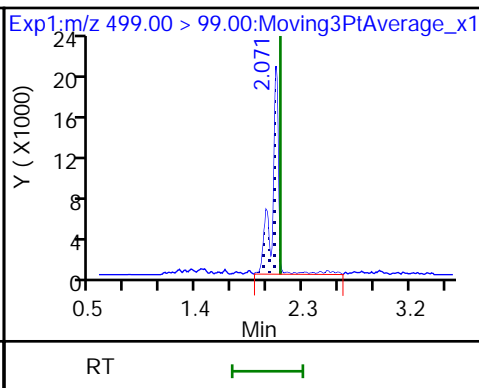
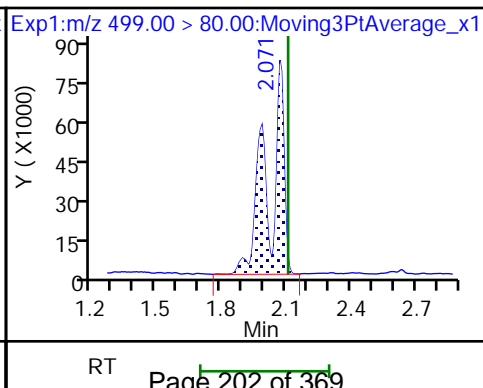
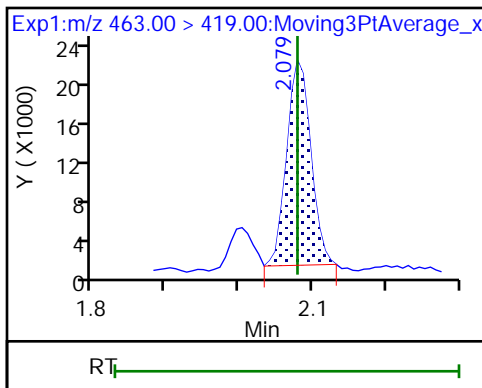
\* 7 13C4 PFOS



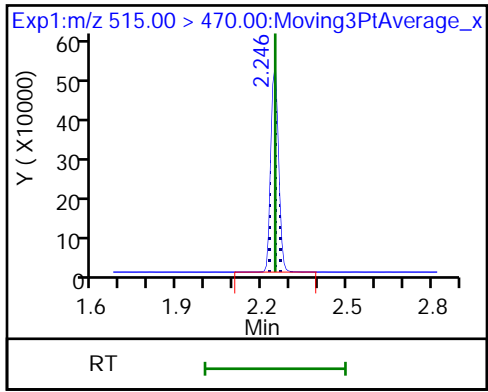
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_072.d  
 Lims ID: 320-42363-A-11-A  
 Client ID: WGNA-082118-RW-3556  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 08:06:58 ALS Bottle#: 51 Worklist Smp#: 36  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-11-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:50:47 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:50:07

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.37	93.70
\$ 10 13C2 PFDA	10.0	10.1	100.87

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: WGNA-082118-FRB-3556 Lab Sample ID: 320-42363-12  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_073.d  
 Analysis Method: 537 Date Collected: 08/21/2018 12:35  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 274.9(mL) Date Analyzed: 08/30/2018 08:11  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	36	15	6.2
335-67-1	Perfluorooctanoic acid (PFOA)	7.3	U	18	7.3	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.3
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	27	11	5.0
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.6	U	9.1	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	33	U	82	33	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	97		70-130
STL00996	13C2 PFDA	107		70-130

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_073.d  
 Lims ID: 320-42363-A-12-A  
 Client ID: WGNA-082118-FRB-3556  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 08:11:39 ALS Bottle#: 52 Worklist Smp#: 37  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-12-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:50:47 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
\$ 2 13C2 PFHxA	315.00 > 270.00	1.487	1.487	0.0	1.000	1085764	9.72	9538	
* 6 13C2-PFOA	415.00 > 370.00	1.813	1.813	0.0		1074215	10.0	7317	
* 7 13C4 PFOS	503.00 > 80.00	2.071	2.071	0.0		2771310	28.7	6129	
\$ 10 13C2 PFDA	515.00 > 470.00	2.246	2.246	0.0	1.000	906738	10.7	4946	



TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_073.d

Injection Date: 30-Aug-2018 08:11:39

Instrument ID: A8\_N

Lims ID: 320-42363-A-12-A

Lab Sample ID: 320-42363-12

Client ID: WGNA-082118-FRB-3556

Operator ID: SACINSTLCMS01

ALS Bottle#: 52

Worklist Smp#: 37

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

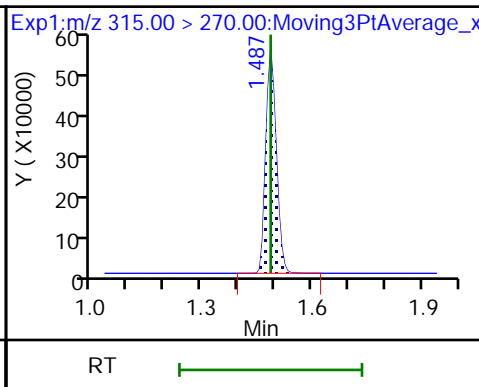
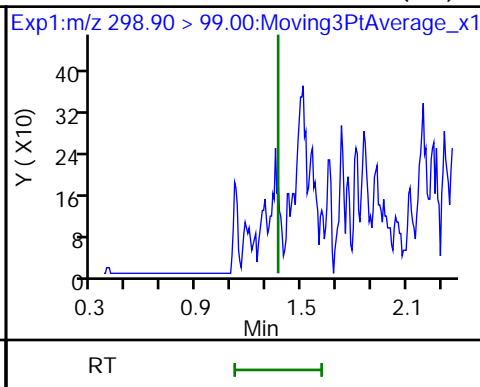
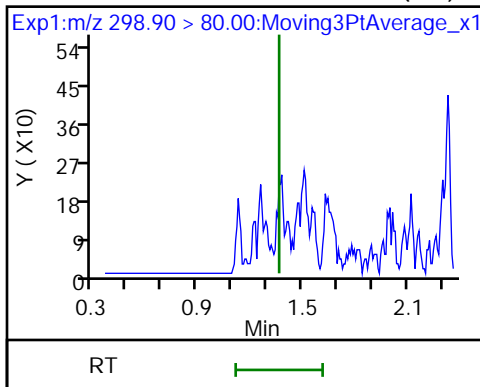
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid (ND)

1 Perfluorobutanesulfonic acid (ND)

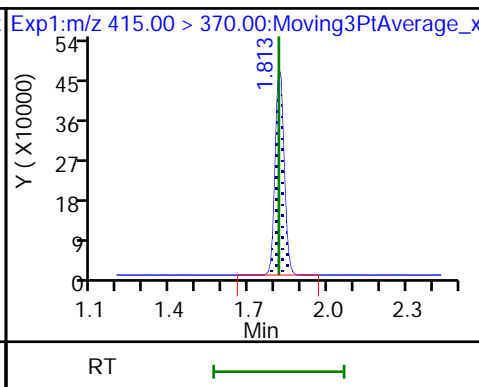
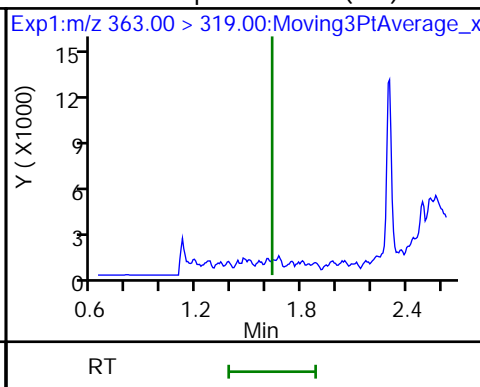
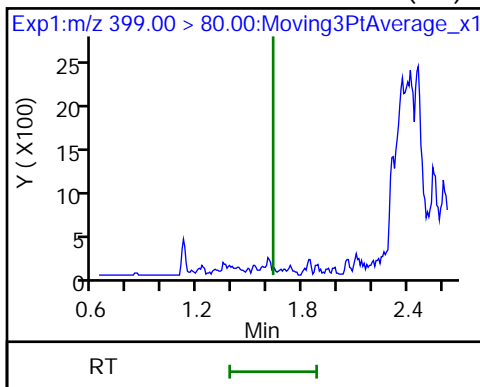
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid (ND)

4 Perfluoroheptanoic acid (ND)

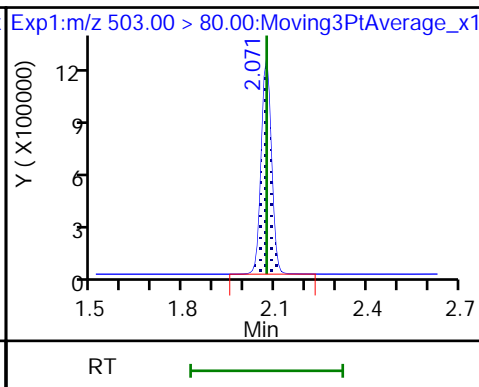
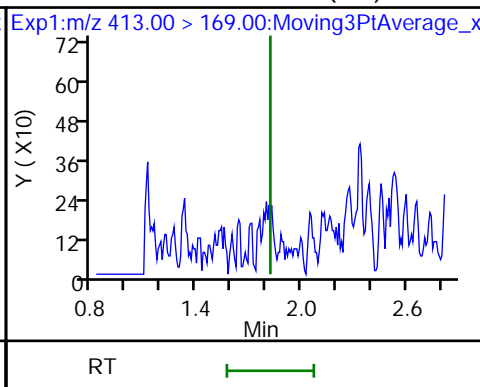
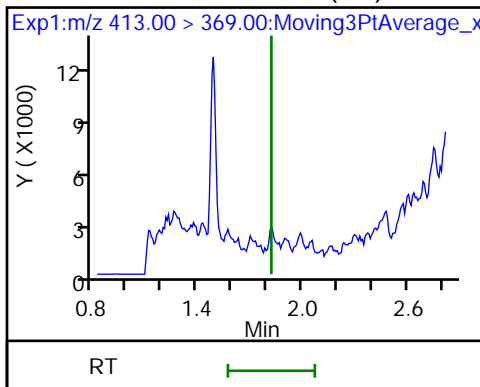
\* 6 13C2-PFOA



5 Perfluorooctanoic acid (ND)

5 Perfluorooctanoic acid (ND)

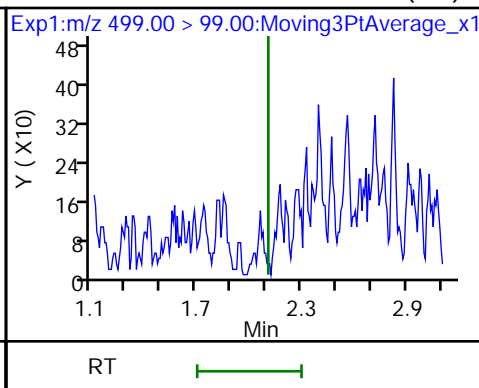
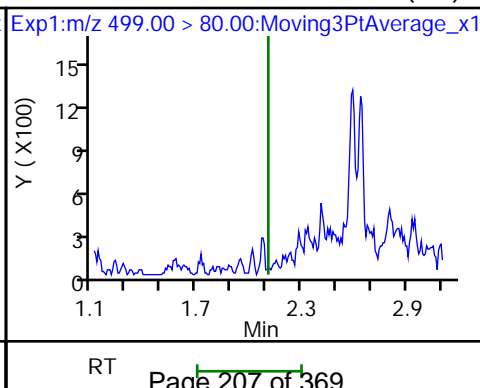
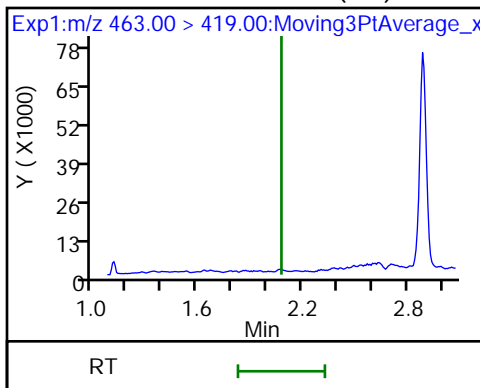
\* 7 13C4 PFOS



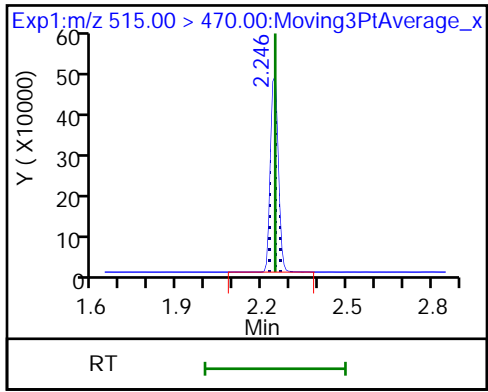
9 Perfluorononanoic acid (ND)

8 Perfluorooctane sulfonic acid (ND)

8 Perfluorooctane sulfonic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_073.d  
 Lims ID: 320-42363-A-12-A  
 Client ID: WGNA-082118-FRB-3556  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 08:11:39 ALS Bottle#: 52 Worklist Smp#: 37  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-12-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:50:47 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.72	97.24
\$ 10 13C2 PFDA	10.0	10.7	106.56

FORM VI  
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA  
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1 Analy Batch No.: 240166

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 08/15/2018 18:21 Calibration End Date: 08/15/2018 18:44 Calibration ID: 40641

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-240166/2	2018.08.15_537CURVE_003.d
Level 2	IC 320-240166/3	2018.08.15_537CURVE_004.d
Level 3	IC 320-240166/4	2018.08.15_537CURVE_005.d
Level 4	IC 320-240166/5	2018.08.15_537CURVE_006.d
Level 5	IC 320-240166/6	2018.08.15_537CURVE_007.d
Level 6	IC 320-240166/7	2018.08.15_537CURVE_008.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R <sup>2</sup> OR COD	#	MIN R <sup>2</sup> OR COD
	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanesulfonic acid (PFBS)	1.2479 0.9705	1.1886	1.2616	1.1091	1.0906	Ave		1.1447			9.6		30.0				
Perfluoroheptanoic acid (PFHpA)	1.0855 1.0407	1.0364	1.0489	1.0876	1.0460	Ave		1.0575			2.2		30.0				
Perfluorohexanesulfonic acid (PFHxS)	1.6492 1.6115	1.6167	1.6890	1.6380	1.7330	Ave		1.6562			2.8		30.0				
Perfluorooctanoic acid (PFOA)	1.0954 1.0842	1.0529	1.0915	1.1075	1.1058	Ave		1.0895			1.8		30.0				
Perfluorooctanesulfonic acid (PFOS)	1.0830 1.0982	1.0386	1.0683	1.0853	1.1084	Ave		1.0803			2.3		30.0				
Perfluorononanoic acid (PFNA)	0.8630 0.8350	0.7990	0.7881	0.8431	0.8177	Ave		0.8243			3.4		30.0				
13C2 PFHxA	1.0723 1.0545	1.0111	1.0024	1.0515	1.0447	Ave		1.0394			2.6		30.0				
13C2 PFDA	0.7972 0.7976	0.7443	0.7670	0.8351	0.8115	Ave		0.7921			4.1		30.0				

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI  
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA  
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1 Analy Batch No.: 240166

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 08/15/2018 18:21 Calibration End Date: 08/15/2018 18:44 Calibration ID: 40641

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-240166/2	2018.08.15_537CURVE_003.d
Level 2	IC 320-240166/3	2018.08.15_537CURVE_004.d
Level 3	IC 320-240166/4	2018.08.15_537CURVE_005.d
Level 4	IC 320-240166/5	2018.08.15_537CURVE_006.d
Level 5	IC 320-240166/6	2018.08.15_537CURVE_007.d
Level 6	IC 320-240166/7	2018.08.15_537CURVE_008.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5
Perfluorobutanesulfonic acid (PFBS)	PFOS	Ave	998954 15136483	2070355	4549188	9386038	11785636	9.00 180	20.0	45.0	90.1	135
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	106948 1986691	233189	488515	1105731	1440874	0.960 19.4	2.16	4.86	9.72	14.6
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	440547 8441814	945775	2045536	4655795	6289862	3.00 60.5	6.72	15.1	30.2	45.4
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	222587 4216218	482587	1035552	2293687	3102767	1.98 39.6	4.40	9.90	19.8	29.7
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	380845 7518443	794113	1690983	4031609	5257770	3.95 79.1	8.79	19.8	39.5	59.3
Perfluorononanoic acid (PFNA)	13PF OA	Ave	175370 3246932	366204	747749	1746006	2294540	1.98 39.6	4.40	9.90	19.8	29.7
13C2 PFHxA	13PF OA	Ave	1100508 1035478	1053216	960623	1099800	987004	10.0 10.0	10.0	10.0	10.0	10.0
13C2 PFDA	13PF OA	Ave	818198 783206	775306	735076	873467	766710	10.0 10.0	10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD

FORM VI  
 LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA  
 READBACK PERCENT ERROR

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1 Analy Batch No.: 240166

SDG No.: \_\_\_\_\_

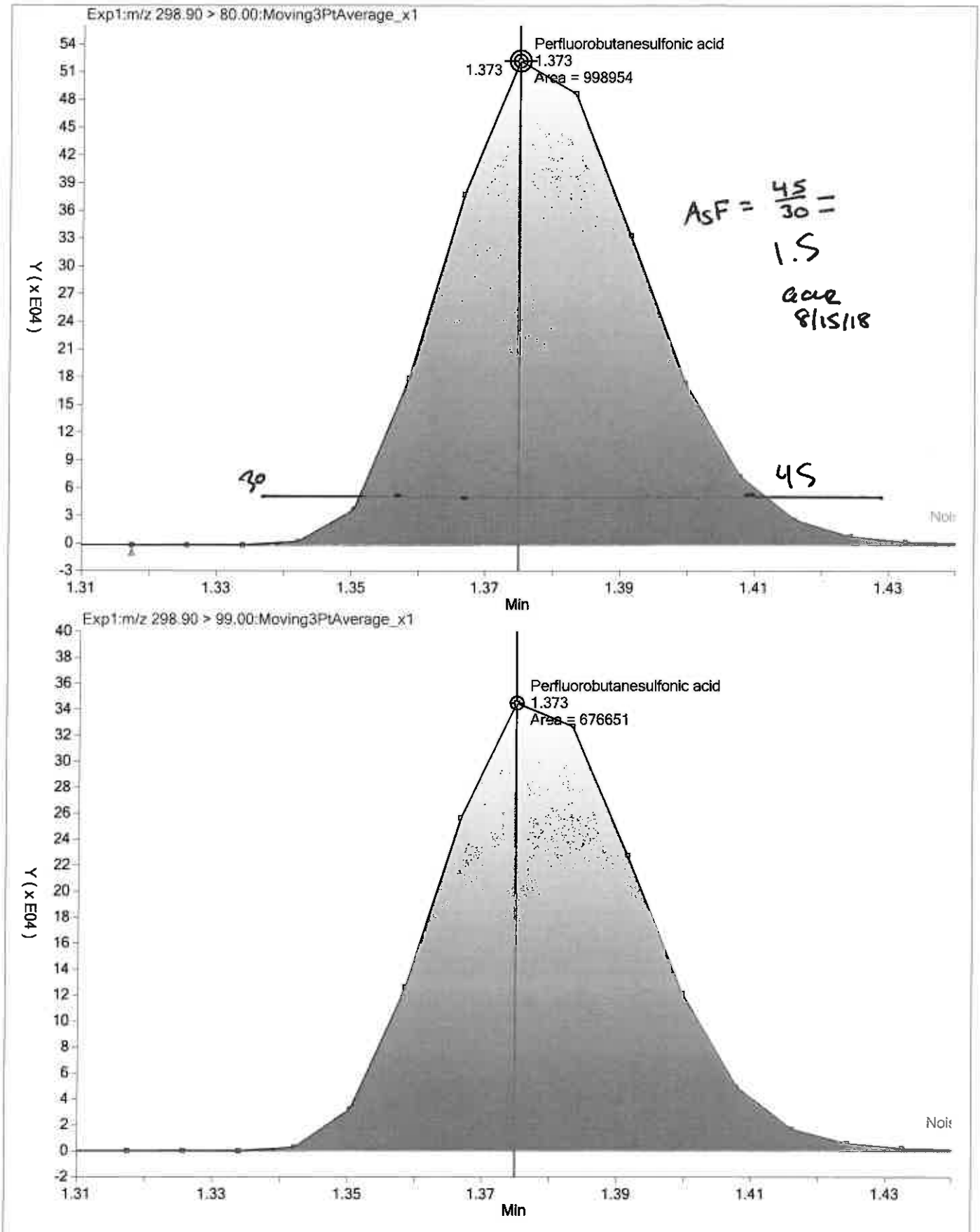
Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

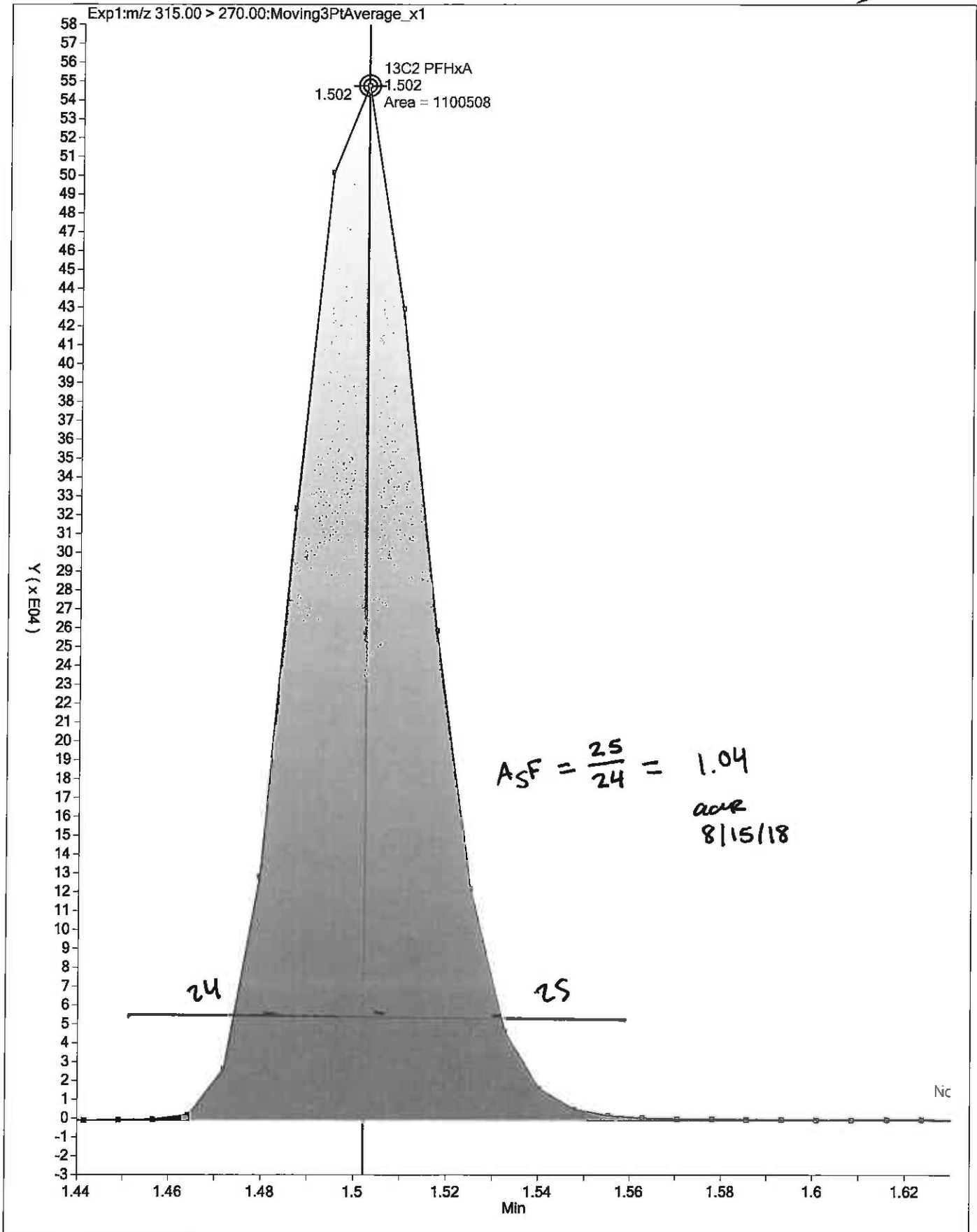
Calibration Start Date: 08/15/2018 18:21 Calibration End Date: 08/15/2018 18:44 Calibration ID: 40641

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-240166/2	2018.08.15_537CURVE_003.d
Level 2	IC 320-240166/3	2018.08.15_537CURVE_004.d
Level 3	IC 320-240166/4	2018.08.15_537CURVE_005.d
Level 4	IC 320-240166/5	2018.08.15_537CURVE_006.d
Level 5	IC 320-240166/6	2018.08.15_537CURVE_007.d
Level 6	IC 320-240166/7	2018.08.15_537CURVE_008.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanesulfonic acid (PFBS)	9.0	3.8	10.2	-3.1	-4.7	-15.2	50	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	2.6	-2.0	-0.8	2.8	-1.1	-1.6	50	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	-0.4	-2.4	2.0	-1.1	4.6	-2.7	50	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	0.5	-3.4	0.2	1.7	1.5	-0.5	50	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	0.2	-3.9	-1.1	0.5	2.6	1.7	50	30	30	30	30	30
Perfluorononanoic acid (PFNA)	4.7	-3.1	-4.4	2.3	-0.8	1.3	50	30	30	30	30	30
13C2 PFHxA	3.2	-2.7	-3.6	1.2	0.5	1.4	30	30	30	30	30	30
13C2 PFDA	0.6	-6.0	-3.2	5.4	2.4	0.7	30	30	30	30	30	30







TestAmerica Laboratories  
Istd/Surrogate Recovery Report

Worklist Name: 15AUG2018\_537\_ICAL      Worklist Num: 62769  
 Instrument: A8\_N      Method: 537\_A8\_N  
 Batch Directory: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b  
 Limit Group: LC 537 ICAL  
 Analysis Type: SemiVOA  
 Inj Volume: 2.00      Inj Vol Units: ul

Lims Batch: 240166  
 CCV IS Mode: Select Ical Level, Cal Level: 3  
 Non-Cal IS Mode: Last Ccal Sample

\$ 2 13C2 PFHxA  
 \$ 10 13C2 PFDA

Lab ID	Inj Date	\$ 2	\$ 10	* 6 13C2-PFOA	* 7 13C4 PFOS
	IS Std			1167019 1.78	2601656 2.01
# 1 RB	15-Aug-2018 18:16:30			1133890 97.2	2646770 101.7
	IS Std				
# 2 IC L1	15-Aug-2018 18:21:09	1.50 103.20	2.27 100.60	1.85 1026304> 100.0*	2.11 2551191> 100.0*
# 3 IC L2	15-Aug-2018 18:25:50	1.50 97.28	2.28 93.96	1.85 1041660> 101.5*	2.11 2496049> 97.8*
# 4 IC L3	15-Aug-2018 18:30:31	1.51 96.91	2.27 97.60	1.85 958352> 93.4*	2.11 2296598> 90.0*
# 5 IC L4	15-Aug-2018 18:35:11	1.50 101.20	2.28 105.40	1.85 1045953> 101.9*	2.11 2694948> 105.6*
# 6 IC L5	15-Aug-2018 18:39:51	1.51 100.50	2.27 102.40	1.85 944777> 92.1*	2.11 2294155> 89.9*
# 7 IC L6	15-Aug-2018 18:44:32	1.50 101.40	2.27 100.70	1.84 981996> 95.7*	2.10 2483425> 97.3*
	IS Std			958352 1.85	2296598 2.11
# 8 RB	15-Aug-2018 18:49:12			1.85 1059425 110.5	2.11 2535393 110.4
	IS Std			1045953 1.85	2694948 2.11
# 9 CCVL	15-Aug-2018 18:53:52	1.50 96.45	2.27 96.68	1.84 1006603 96.2	2.10 2388436 88.6
	IS Std			1006603 1.84	2388436 2.10
#10 ICB	15-Aug-2018 18:58:33			1.84 1042675 103.6	2.10 2354282 98.6
	IS Std			1045953 1.85	2694948 2.11
#11 ICV	15-Aug-2018 19:03:12	1.50 98.30	2.26 100.40	1.84 1022273 97.7	2.10 2551643 94.7

13C2 PFOA  

$$RPD = \frac{1045953 - 944777}{\left(\frac{1045953 + 944777}{2}\right)} \times 100 = 10.2\%$$

13C4 PFOS  

$$RPD = \frac{2694948 - 2294155}{\left(\frac{2694948 + 2294155}{2}\right)} \times 100 = 16.1\%$$

acc  
 8/16/18

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_003.d  
 Lims ID: IC L1  
 Client ID:  
 Sample Type: IC Calib Level: 1  
 Inject. Date: 15-Aug-2018 18:21:09 ALS Bottle#: 1 Worklist Smp#: 2  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: L1\_537  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 16-Aug-2018 08:51:49 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK001

First Level Reviewer: roycea Date: 15-Aug-2018 18:54:20

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.373	1.381	-0.008	1.000	998954	9.81		2568	
298.90 > 99.00	1.373	1.381	-0.008	1.000	676651		1.48(0.00-0.00)	998	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.502	1.505	-0.003	1.000	1100508	10.3		9954	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.654	1.654	0.0	1.000	106948	0.9854		20.4	M
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.654	1.654	0.0	1.000	440547	2.99		282	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.851	1.850	0.001	1.000	222587	1.99		30.5	
413.00 > 169.00	1.851	1.850	0.001	1.000	121100		1.84(0.00-0.00)	269	
* 6 13C2-PFOA									
415.00 > 370.00	1.851	1.850	0.001		1026304	10.0		6456	
* 7 13C4 PFOS									
503.00 > 80.00	2.109	2.108	0.001		2551191	28.7		5861	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.109	2.109	0.0	1.000	380845	3.96		606	
499.00 > 99.00	2.109	2.109	0.0	1.000	83364		4.57(0.00-0.00)	134	
9 Perfluorononanoic acid									
463.00 > 419.00	2.117	2.116	0.001	1.000	175370	2.07		29.0	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.271	-0.003	1.000	818198	10.1		6270	

**QC Flag Legend**

Review Flags

M - Manually Integrated

**Reagents:**

LC537-L1\_00022

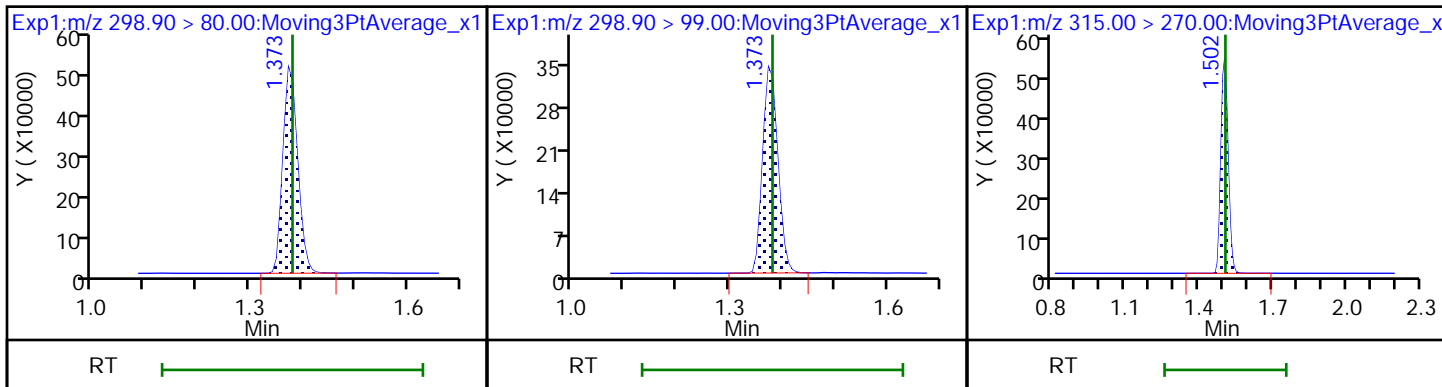
Amount Added: 1.00

Units: mL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

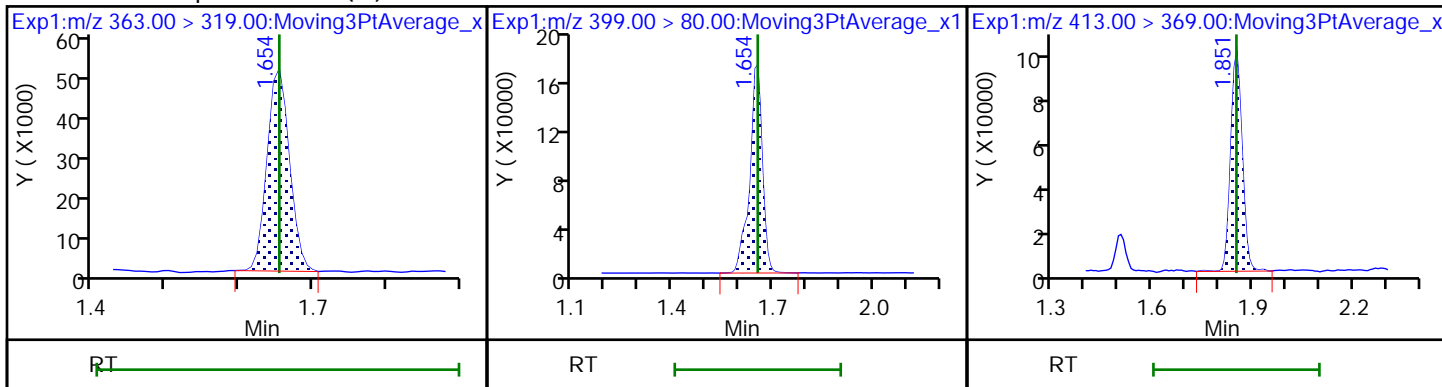
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid (M)

3 Perfluorohexanesulfonic acid

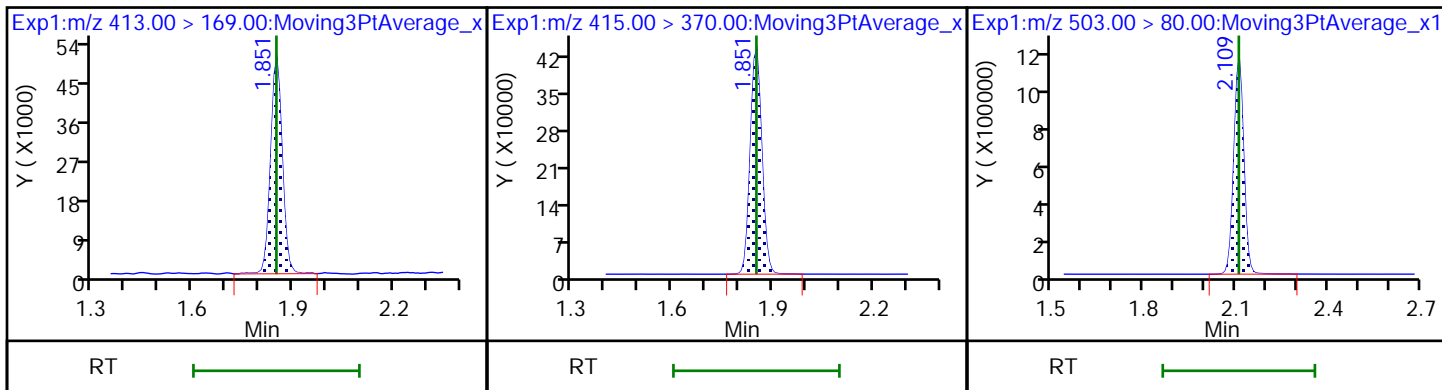
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

\* 6 13C2-PFOA

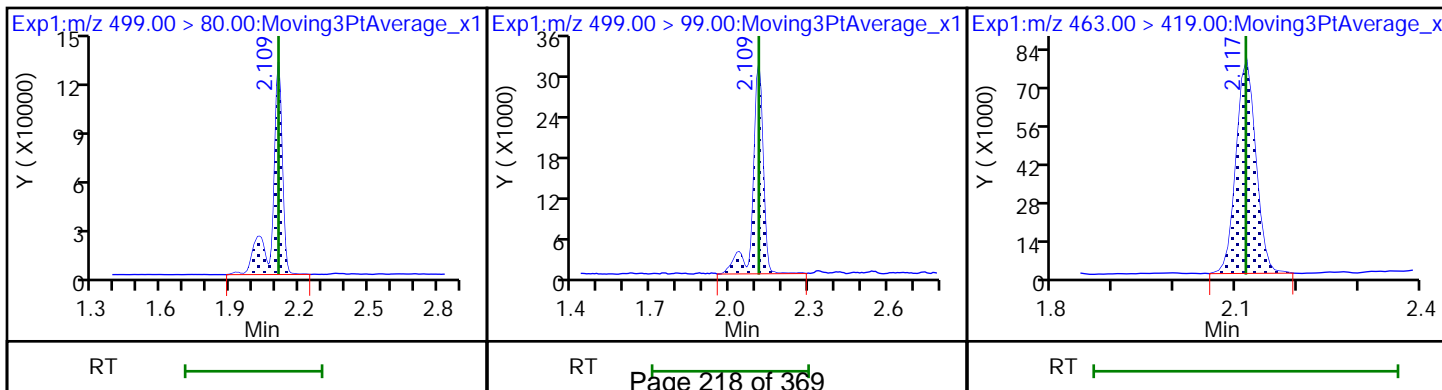
\* 7 13C4 PFOS



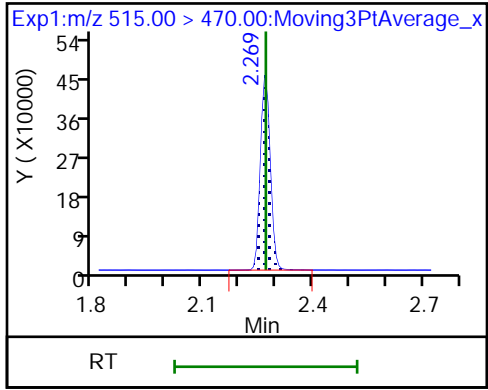
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

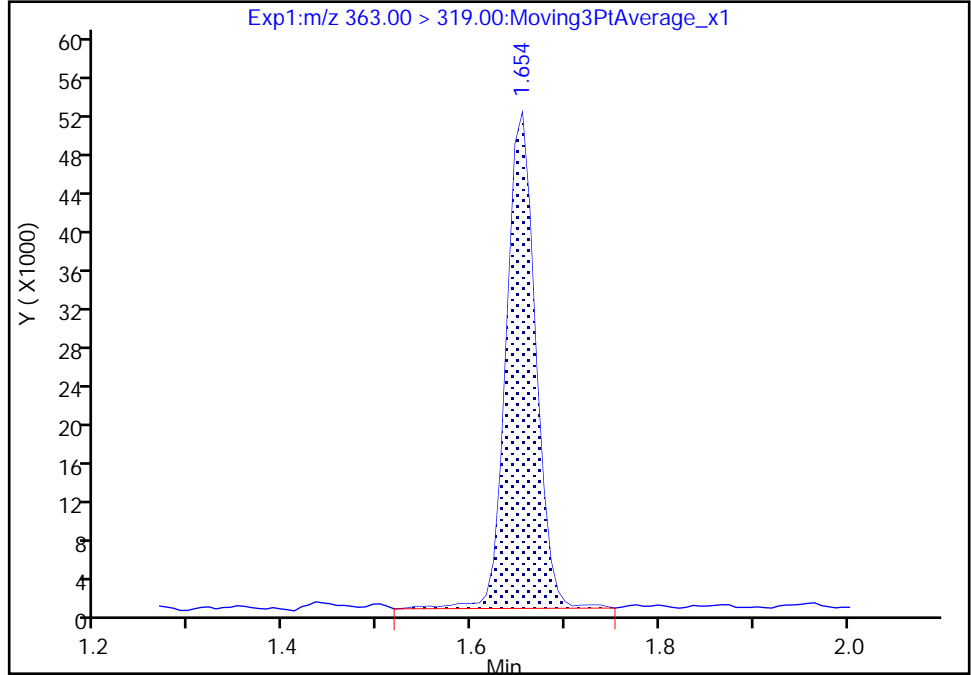
Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_003.d  
Injection Date: 15-Aug-2018 18:21:09 Instrument ID: A8\_N  
Lims ID: IC L1  
Client ID:  
Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 2  
Injection Vol: 2.0 ul Dil. Factor: 1.0000  
Method: 537\_A8\_N Limit Group: LC 537 ICAL  
Column: Detector EXP1

4 Perfluoroheptanoic acid, CAS: 375-85-9

Signal: 1

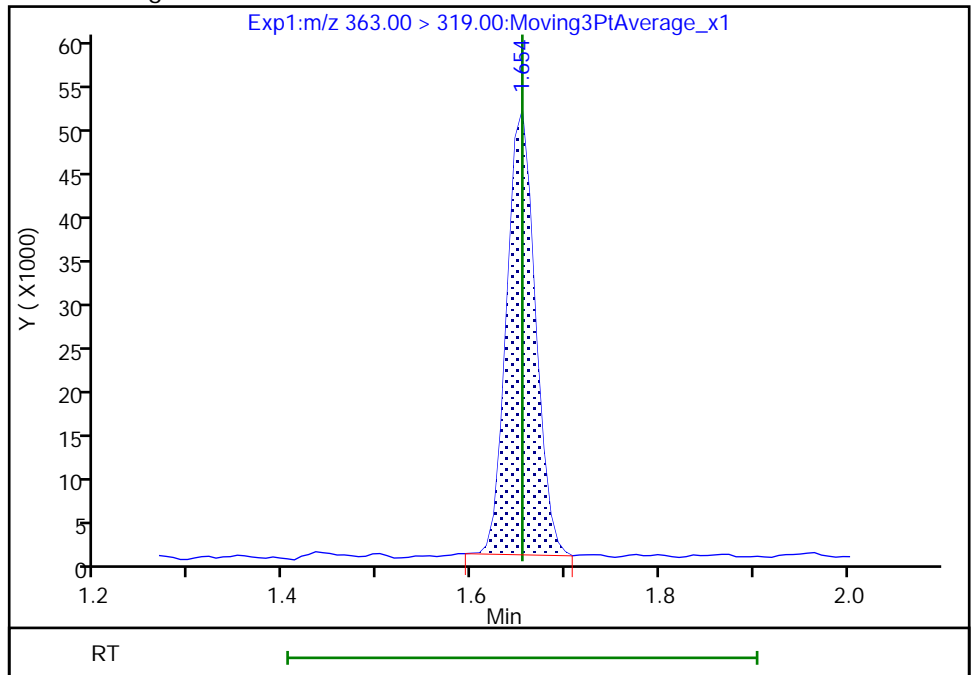
RT: 1.65  
Area: 110830  
Amount: 1.021059  
Amount Units: ng/ml

Processing Integration Results



RT: 1.65  
Area: 106948  
Amount: 0.985398  
Amount Units: ng/ml

Manual Integration Results



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_004.d  
 Lims ID: IC L2  
 Client ID:  
 Sample Type: IC Calib Level: 2  
 Inject. Date: 15-Aug-2018 18:25:50 ALS Bottle#: 2 Worklist Smp#: 3  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: L2\_537  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 16-Aug-2018 08:51:51 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK001

First Level Reviewer: roycea Date: 15-Aug-2018 18:54:32

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.381	1.381	0.0	1.000	2070355	20.8		4725	
298.90 > 99.00	1.381	1.381	0.0	1.000	1435059		1.44(0.00-0.00)	2152	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.502	1.505	-0.003	1.000	1053216	9.73		8501	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.654	1.654	0.0	1.000	233189	2.12		44.5	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.654	1.654	0.0	1.000	945775	6.56		643	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.851	1.850	0.001	1.000	482587	4.25		66.7	
413.00 > 169.00	1.851	1.850	0.001	1.000	253282		1.91(0.00-0.00)	550	
* 6 13C2-PFOA									
415.00 > 370.00	1.851	1.850	0.001		1041660	10.0		6420	
* 7 13C4 PFOS									
503.00 > 80.00	2.109	2.108	0.001		2496049	28.7		4617	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.109	2.109	0.0	1.000	794113	8.45		1241	
499.00 > 99.00	2.109	2.109	0.0	1.000	177724		4.47(0.00-0.00)	300	
9 Perfluorononanoic acid									
463.00 > 419.00	2.117	2.116	0.001	1.000	366204	4.26		60.0	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.276	2.271	0.005	1.000	775306	9.40		5522	

**Reagents:**

LC537-L2\_00022

Amount Added: 1.00

Units: mL



TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_004.d

Injection Date: 15-Aug-2018 18:25:50

Instrument ID: A8\_N

Lims ID: IC L2

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 3

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

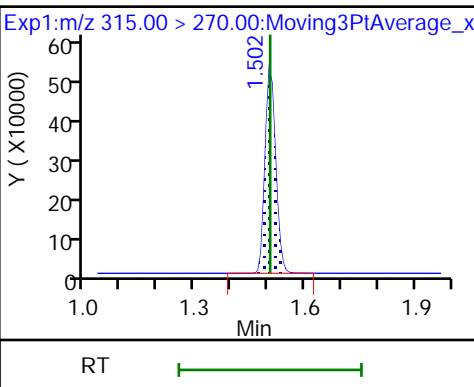
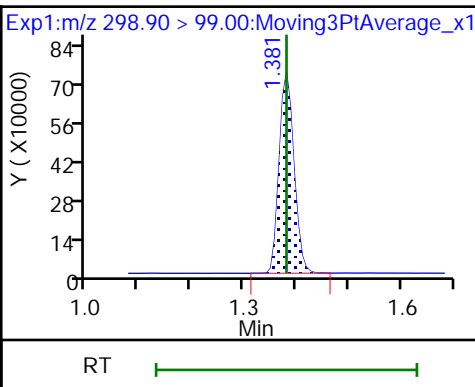
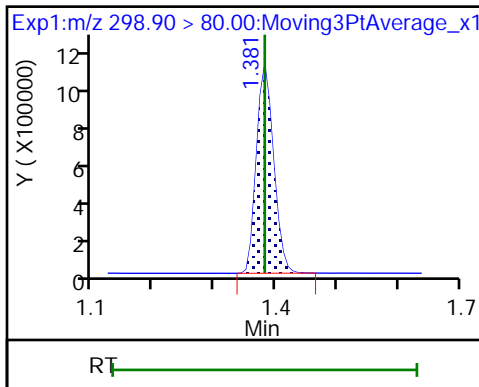
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

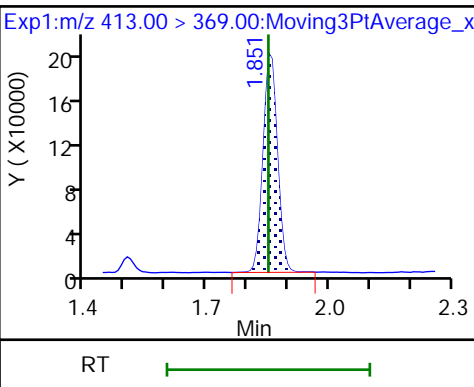
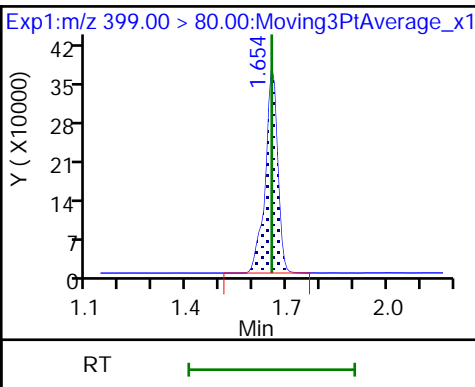
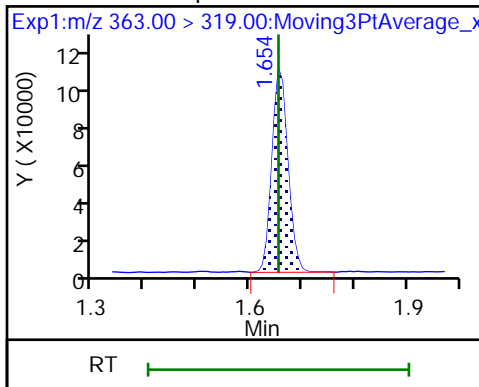
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

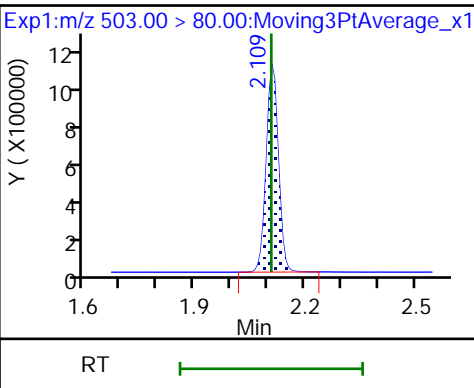
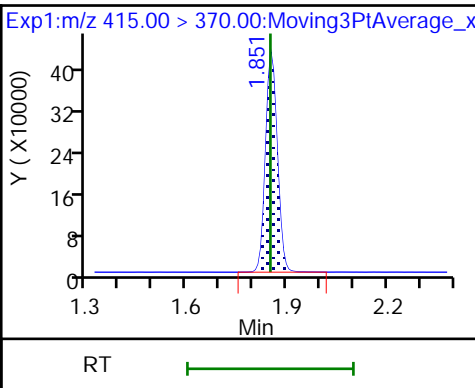
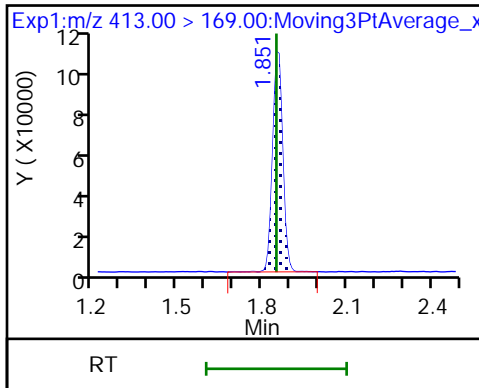
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

\* 6 13C2-PFOA

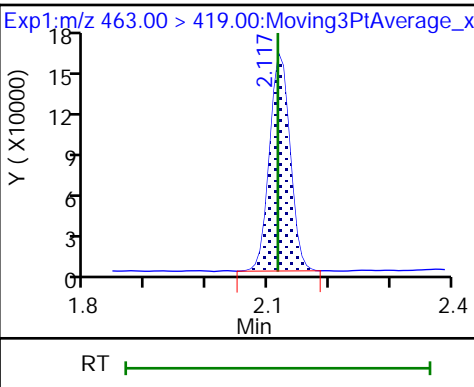
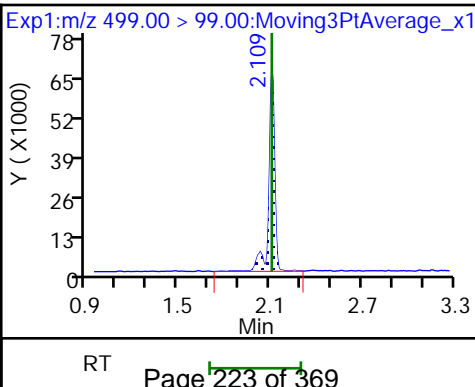
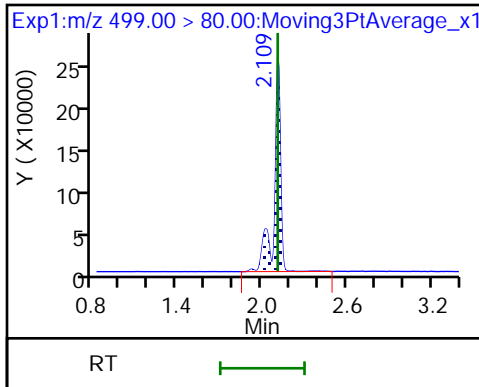
\* 7 13C4 PFOS



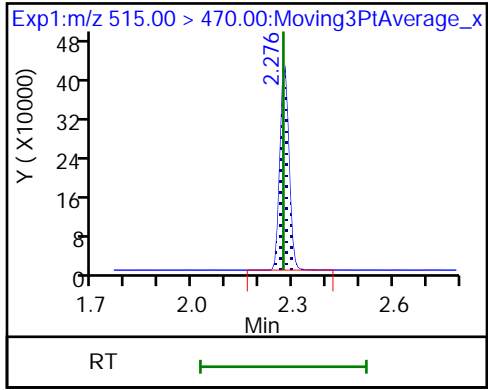
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_005.d  
 Lims ID: IC L3  
 Client ID:  
 Sample Type: IC Calib Level: 3  
 Inject. Date: 15-Aug-2018 18:30:31 ALS Bottle#: 3 Worklist Smp#: 4  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: L3\_537  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 16-Aug-2018 08:51:52 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK001

First Level Reviewer: roycea Date: 15-Aug-2018 18:54:46

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.381	1.381	0.0	1.000	4549188	49.6		9553	
298.90 > 99.00	1.381	1.381	0.0	1.000	3023433		1.50(0.00-0.00)	4386	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.510	1.505	0.005	1.000	960623	9.64		8278	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.654	1.654	0.0	1.000	488515	4.82		90.9	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.654	1.654	0.0	1.000	2045536	15.4		1357	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.851	1.850	0.001	1.000	1035552	9.92		136	
413.00 > 169.00	1.851	1.850	0.001	1.000	542050		1.91(0.00-0.00)	1191	
* 6 13C2-PFOA									
415.00 > 370.00	1.851	1.850	0.001		958352	10.0		6793	
* 7 13C4 PFOS									
503.00 > 80.00	2.109	2.108	0.001		2296598	28.7		5075	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.109	2.109	0.0	1.000	1690983	19.5		2539	
499.00 > 99.00	2.109	2.109	0.0	1.000	384764		4.39(0.00-0.00)	662	
9 Perfluorononanoic acid									
463.00 > 419.00	2.117	2.116	0.001	1.000	747749	9.47		118	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.271	-0.003	1.000	735076	9.68		5283	

**Reagents:**

LC537-L3\_00025

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_005.d

Injection Date: 15-Aug-2018 18:30:31

Instrument ID: A8\_N

Lims ID: IC L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 4

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

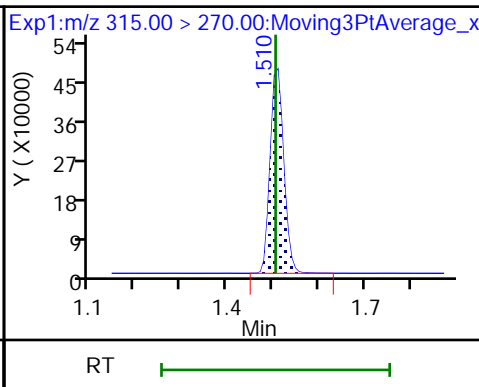
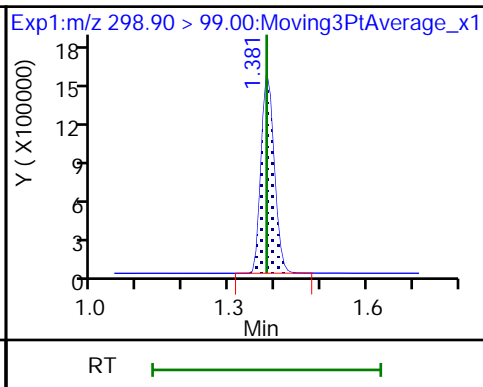
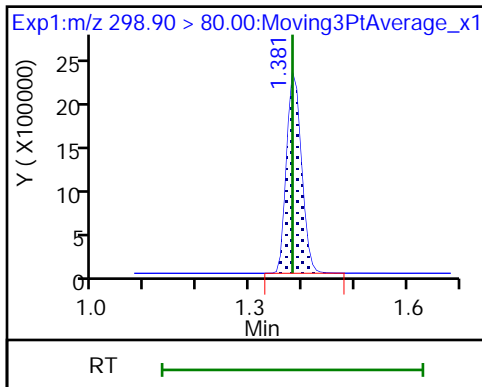
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

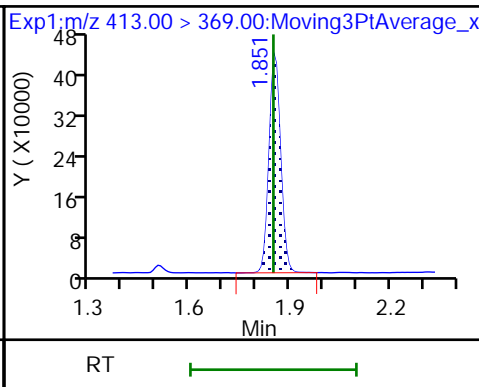
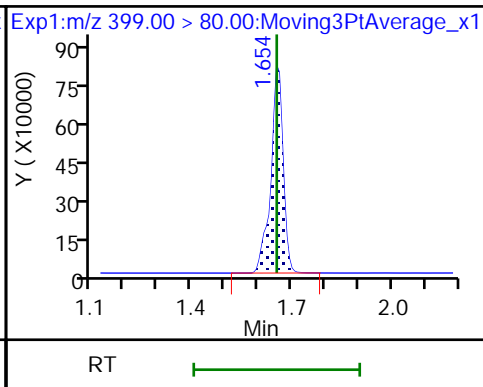
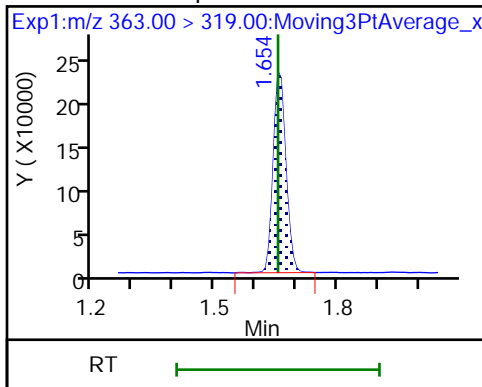
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

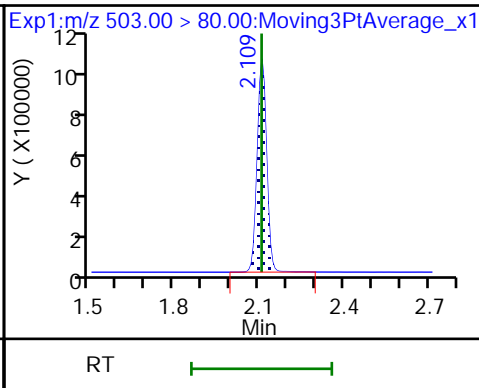
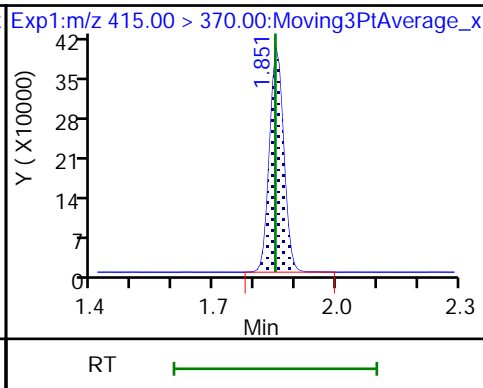
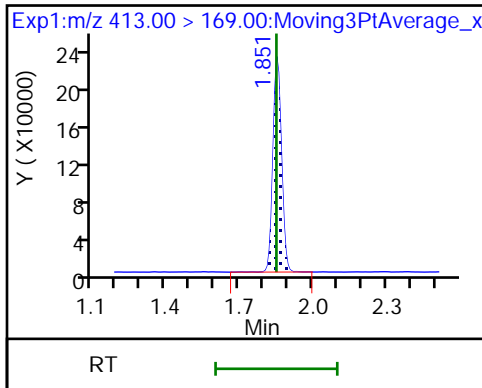
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

\* 6 13C2-PFOA

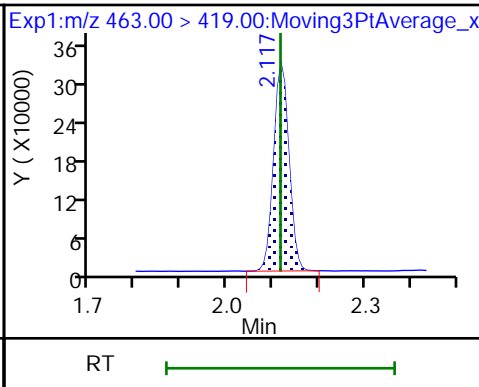
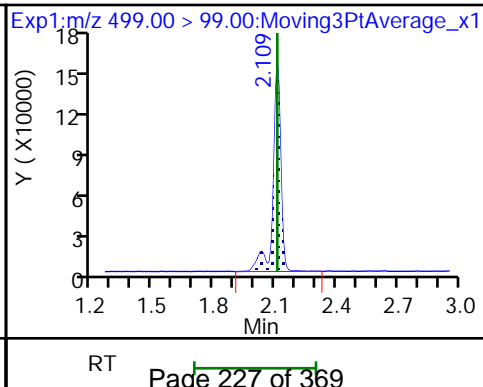
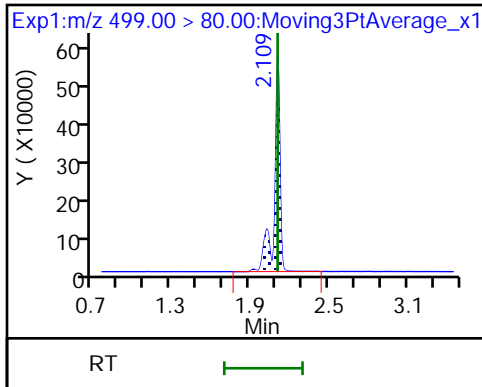
\* 7 13C4 PFOS



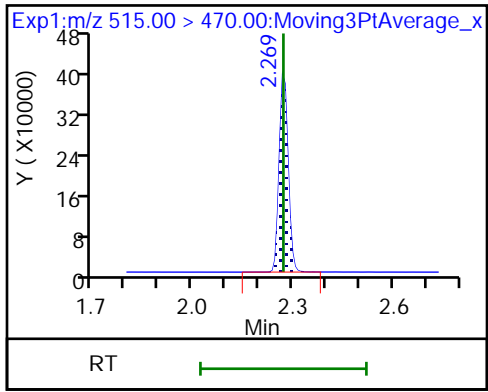
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_006.d  
 Lims ID: IC L4  
 Client ID:  
 Sample Type: ICISAV Calib Level: 4  
 Inject. Date: 15-Aug-2018 18:35:11 ALS Bottle#: 4 Worklist Smp#: 5  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: L4\_537  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 16-Aug-2018 08:51:53 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK001

First Level Reviewer: roycea Date: 16-Aug-2018 08:51:32

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.381	1.381	0.0	1.000	9386038	87.3		13589	
298.90 > 99.00	1.381	1.381	0.0	1.000	6689135		1.40(0.00-0.00)	8057	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.502	1.505	-0.003	1.000	1099800	10.1		8908	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.654	1.654	0.0	1.000	1105731	10.0		214	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.654	1.654	0.0	1.000	4655795	29.9		2833	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.851	1.850	0.001	1.000	2293687	20.1		314	
413.00 > 169.00	1.851	1.850	0.001	1.000	1177353		1.95(0.00-0.00)	2593	
* 6 13C2-PFOA									
415.00 > 370.00	1.851	1.850	0.001		1045953	10.0		8611	
* 7 13C4 PFOS									
503.00 > 80.00	2.109	2.108	0.001		2694948	28.7		5789	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.109	2.109	0.0	1.000	4031609	39.7		5452	
499.00 > 99.00	2.109	2.109	0.0	1.000	879709		4.58(0.00-0.00)	1346	
9 Perfluorononanoic acid									
463.00 > 419.00	2.117	2.116	0.001	1.000	1746006	20.3		261	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.276	2.271	0.005	1.000	873467	10.5		5675	

**Reagents:**

LC537-L4\_00022

Amount Added: 1.00

Units: mL



TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_006.d

Injection Date: 15-Aug-2018 18:35:11

Instrument ID: A8\_N

Lims ID: IC L4

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 4

Worklist Smp#: 5

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

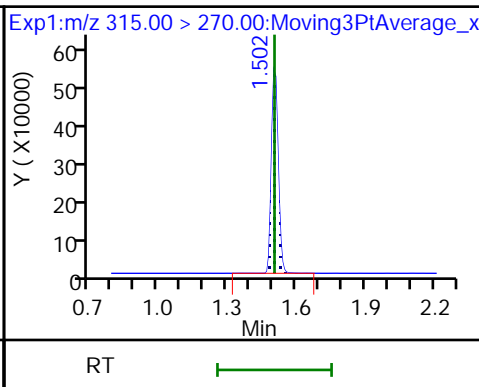
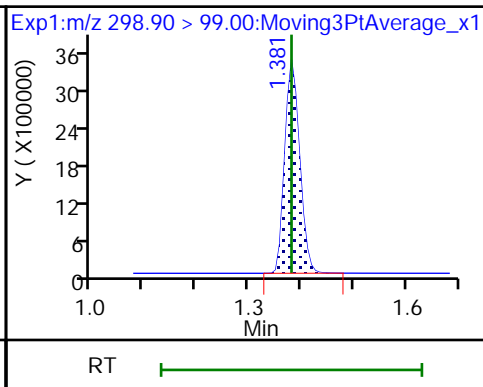
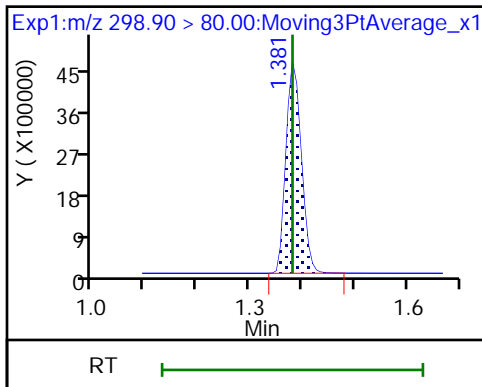
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

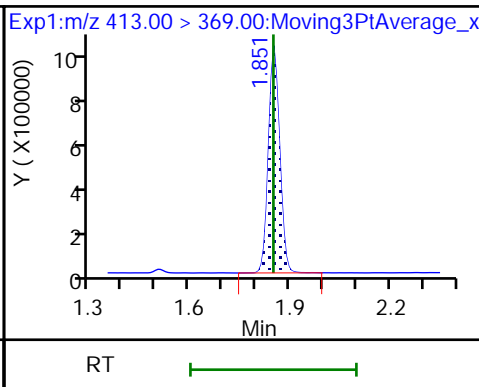
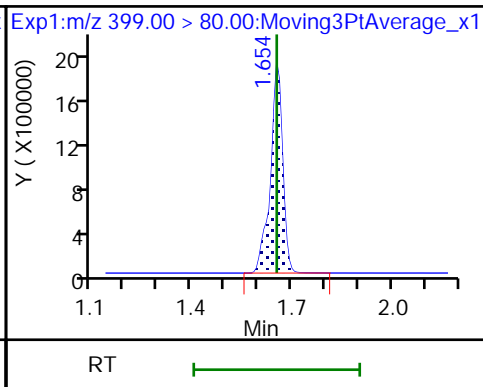
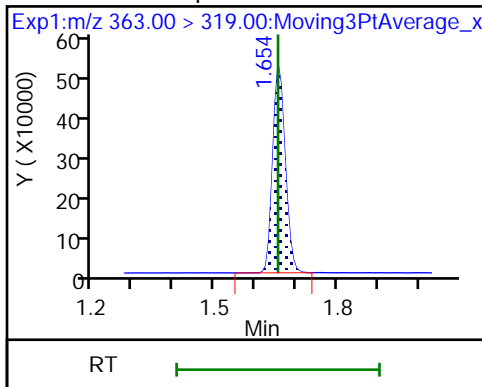
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

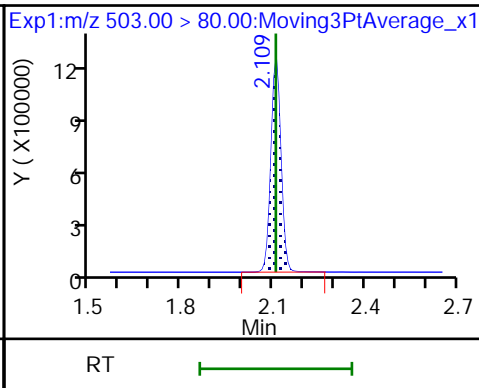
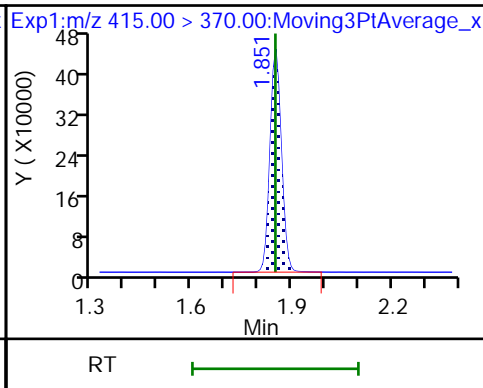
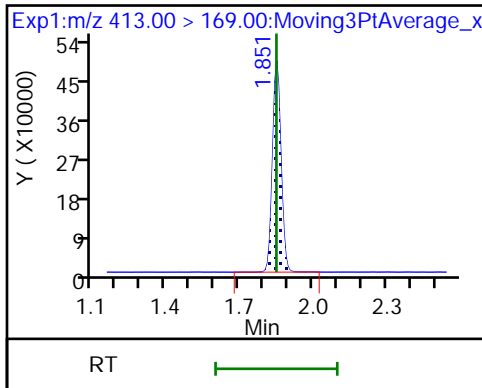
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

\* 6 13C2-PFOA

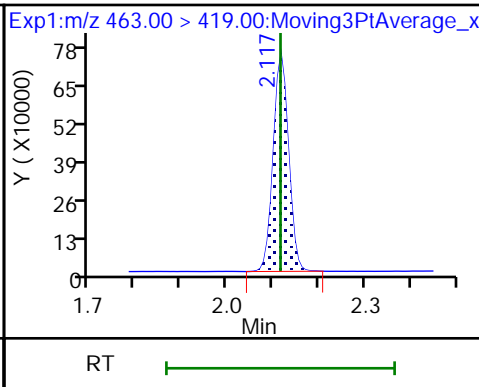
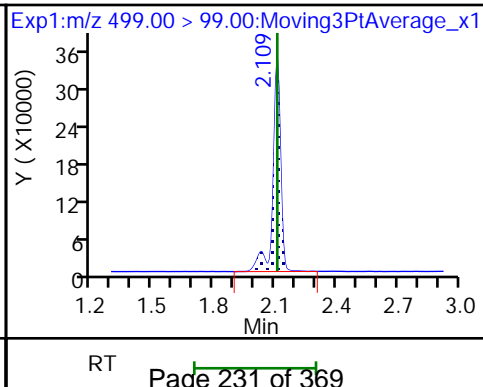
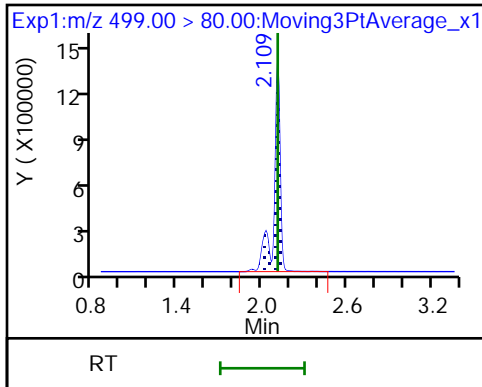
\* 7 13C4 PFOS



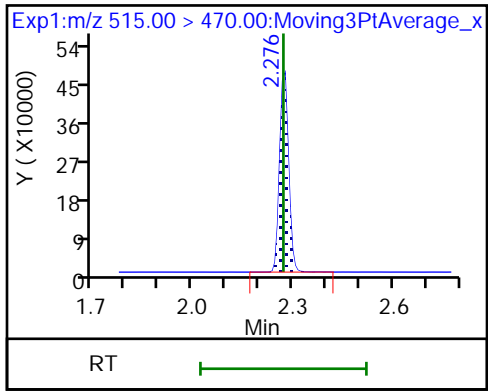
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_007.d  
 Lims ID: IC L5  
 Client ID:  
 Sample Type: IC Calib Level: 5  
 Inject. Date: 15-Aug-2018 18:39:51 ALS Bottle#: 5 Worklist Smp#: 6  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: L5\_537  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 16-Aug-2018 08:51:48 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK001

First Level Reviewer: roycea Date: 15-Aug-2018 18:55:29

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.388	1.381	0.007	1.000	11785636	128.7		14701	
298.90 > 99.00	1.388	1.381	0.007	1.000	8762661		1.34(0.00-0.00)	9668	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.510	1.505	0.005	1.000	987004	10.1		9370	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.654	1.654	0.0	1.000	6289862	47.5		3399	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.654	1.654	0.0	1.000	1440874	14.4		257	
* 6 13C2-PFOA									
415.00 > 370.00	1.851	1.850	0.001		944777	10.0		7532	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.851	1.850	0.001	1.000	3102767	30.1		420	
413.00 > 169.00	1.851	1.850	0.001	1.000	1613623		1.92(0.00-0.00)	3725	
* 7 13C4 PFOS									
503.00 > 80.00	2.109	2.108	0.001		2294155	28.7		5009	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.109	2.109	0.0	1.000	5257770	60.8		6360	
499.00 > 99.00	2.109	2.109	0.0	1.000	1128903		4.66(0.00-0.00)	1721	
9 Perfluorononanoic acid									
463.00 > 419.00	2.117	2.116	0.001	1.000	2294540	29.5		331	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.271	-0.003	1.000	766710	10.2		5627	

**Reagents:**

LC537-L5\_00026

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_007.d

Injection Date: 15-Aug-2018 18:39:51

Instrument ID: A8\_N

Lims ID: IC L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 6

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

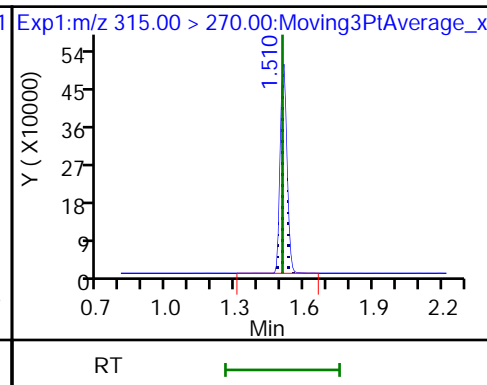
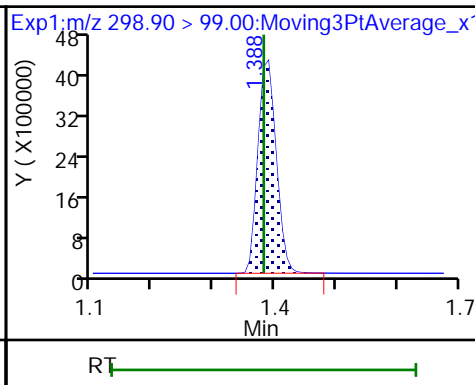
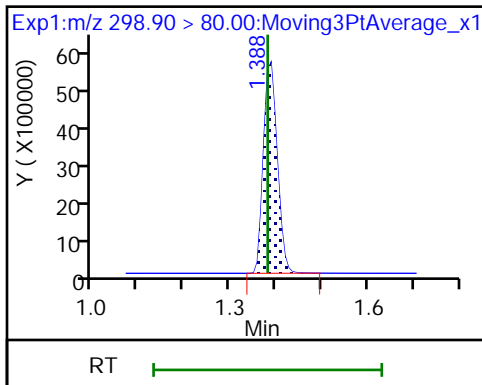
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

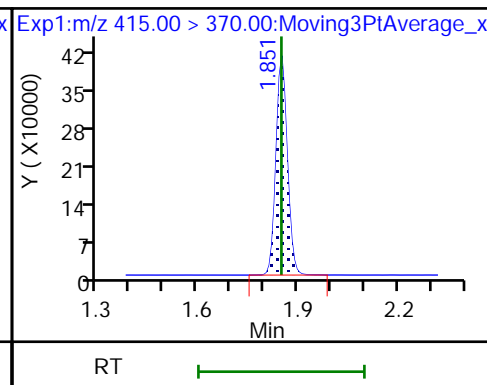
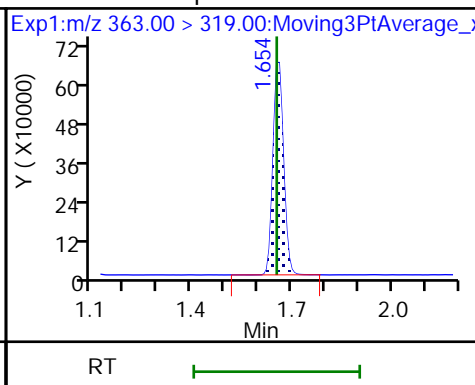
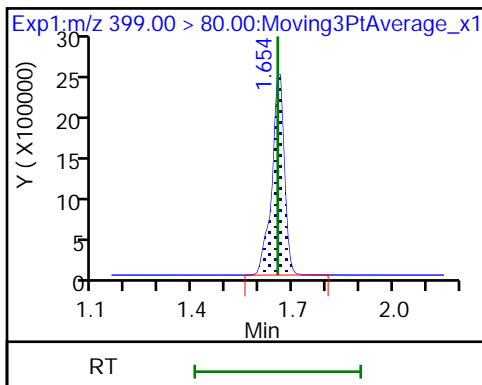
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

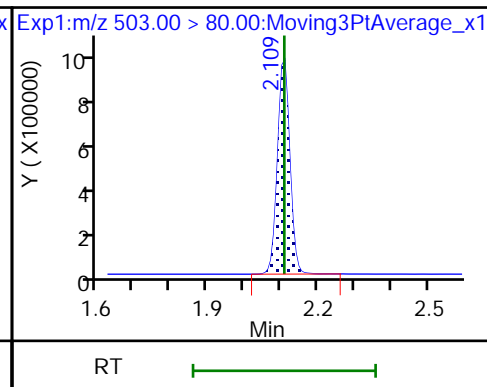
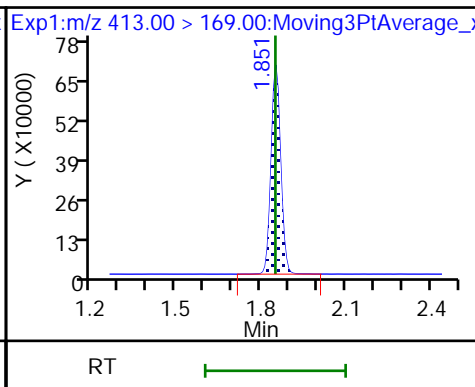
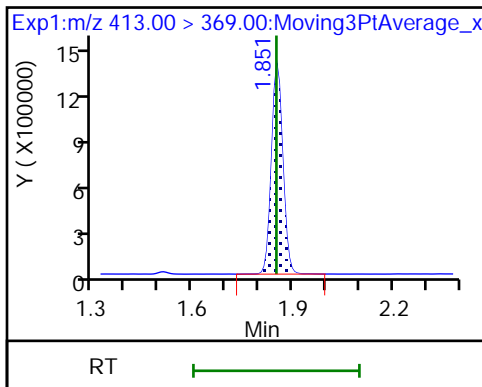
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

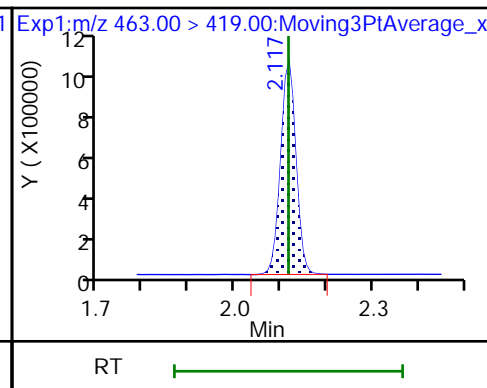
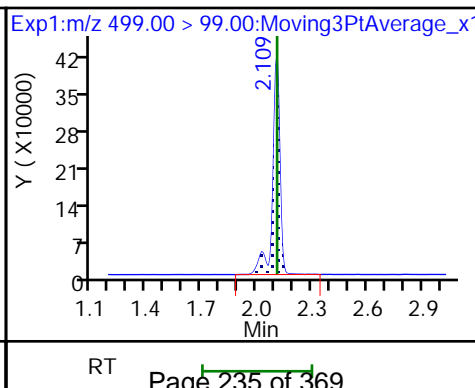
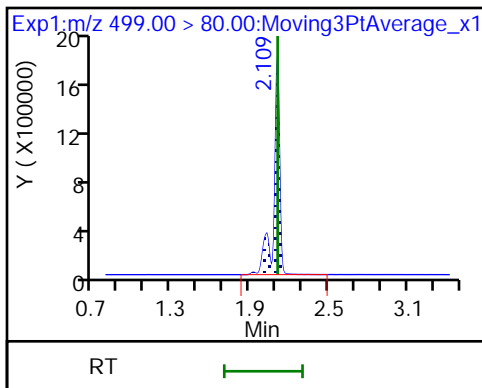
\* 7 13C4 PFOS



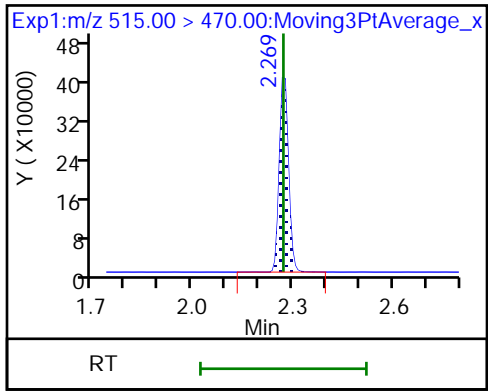
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Lims ID: IC L6  
 Client ID:  
 Sample Type: IC Calib Level: 6  
 Inject. Date: 15-Aug-2018 18:44:32 ALS Bottle#: 6 Worklist Smp#: 7  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: L6\_537  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 16-Aug-2018 08:51:54 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK001

First Level Reviewer: roycea Date: 15-Aug-2018 18:55:42

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.381	1.381	0.0	1.000	15136483	152.7		15082	
298.90 > 99.00	1.381	1.381	0.0	1.000	11077712		1.37(0.00-0.00)	11444	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.502	1.505	-0.003	1.000	1035478	10.1		10037	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.654	1.654	0.0	1.000	1986691	19.1		353	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.654	1.654	0.0	1.000	8441814	58.9		4544	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.844	1.850	-0.006	1.000	4216218	39.4		560	
413.00 > 169.00	1.844	1.850	-0.006	1.000	2187034		1.93(0.00-0.00)	4711	
* 6 13C2-PFOA									
415.00 > 370.00	1.844	1.850	-0.006		981996	10.0		8690	
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.108	-0.006		2483425	28.7		5512	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.102	2.109	-0.007	1.000	7518443	80.4		8718	
499.00 > 99.00	2.102	2.109	-0.007	1.000	1595089		4.71(0.00-0.00)	2315	
9 Perfluorononanoic acid									
463.00 > 419.00	2.109	2.116	-0.007	1.000	3246932	40.1		449	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.271	-0.003	1.000	783206	10.1		6018	

**Reagents:**

LC537-L6\_00022

Amount Added: 1.00

Units: mL



TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Injection Date: 15-Aug-2018 18:44:32

Instrument ID: A8\_N

Lims ID: IC L6

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 6

Worklist Smp#: 7

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

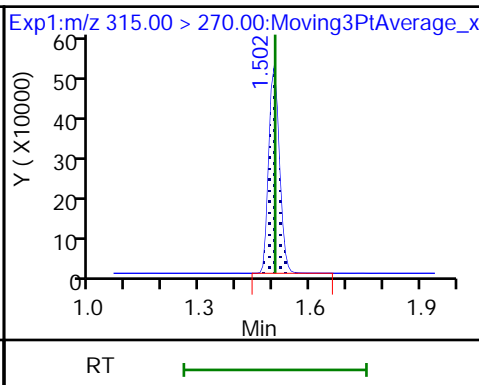
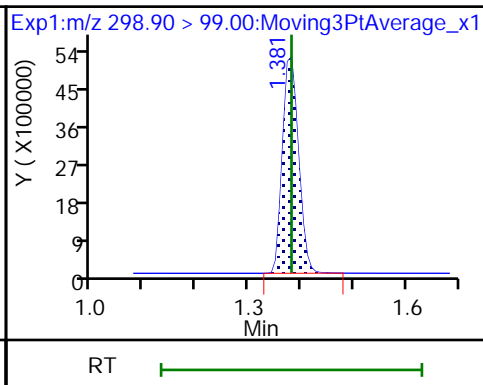
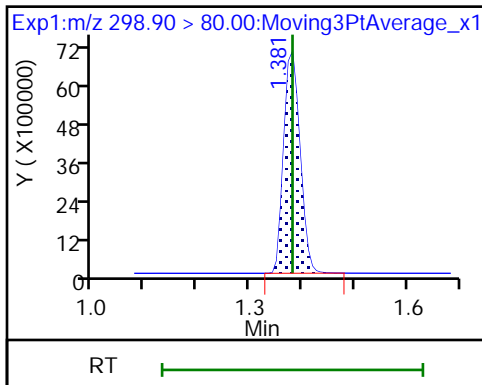
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

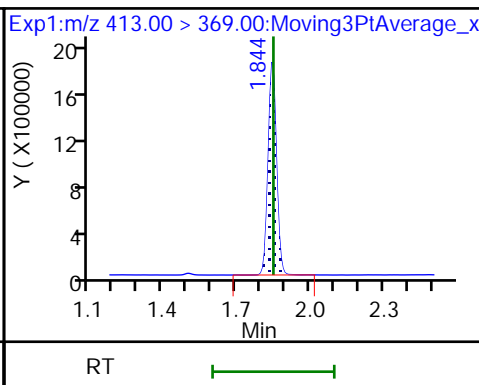
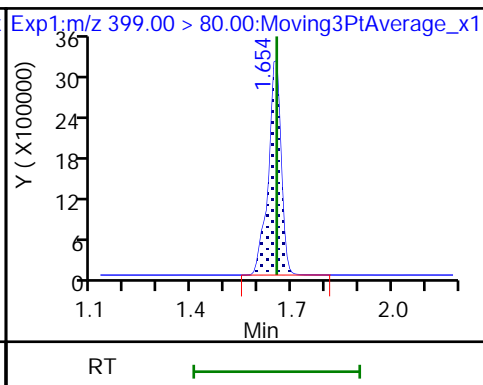
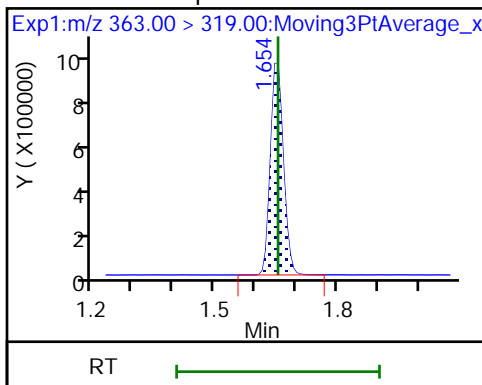
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

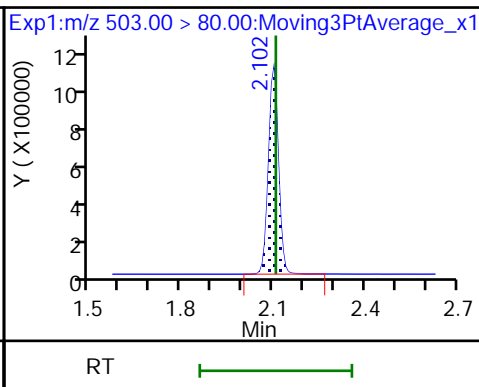
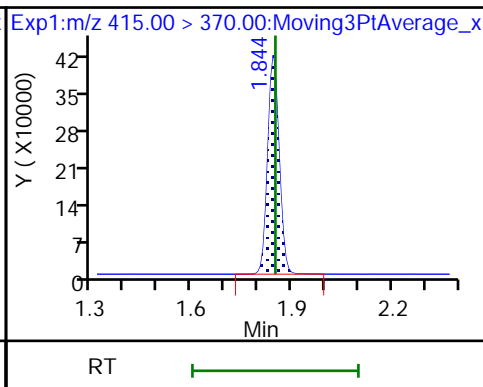
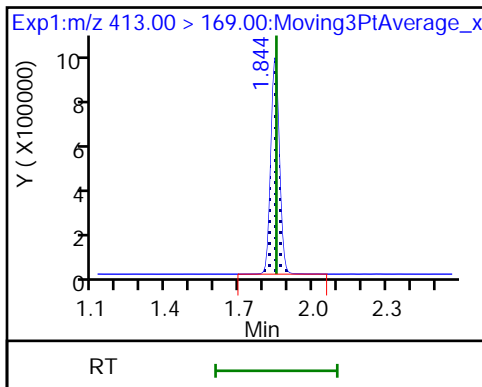
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

\* 6 13C2-PFOA

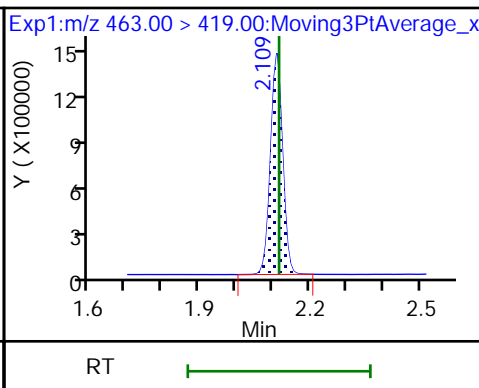
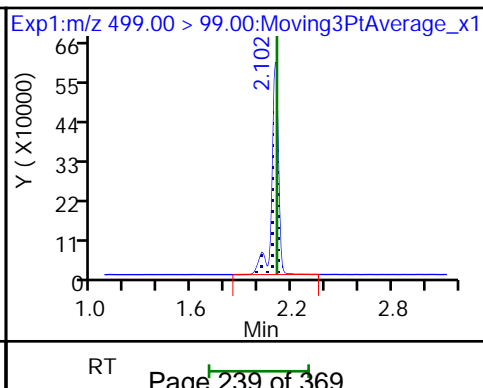
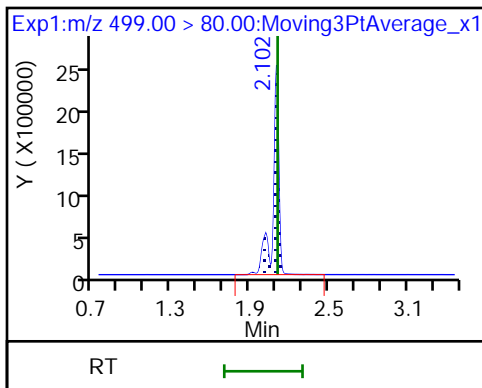
\* 7 13C4 PFOS



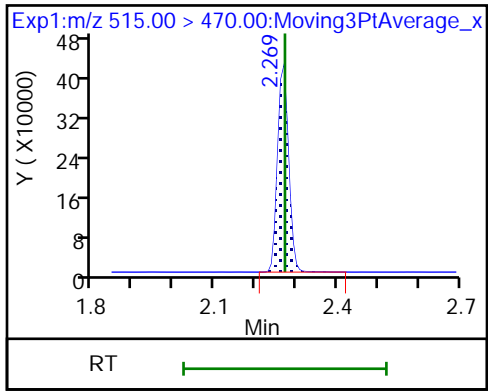
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



**Calibration**

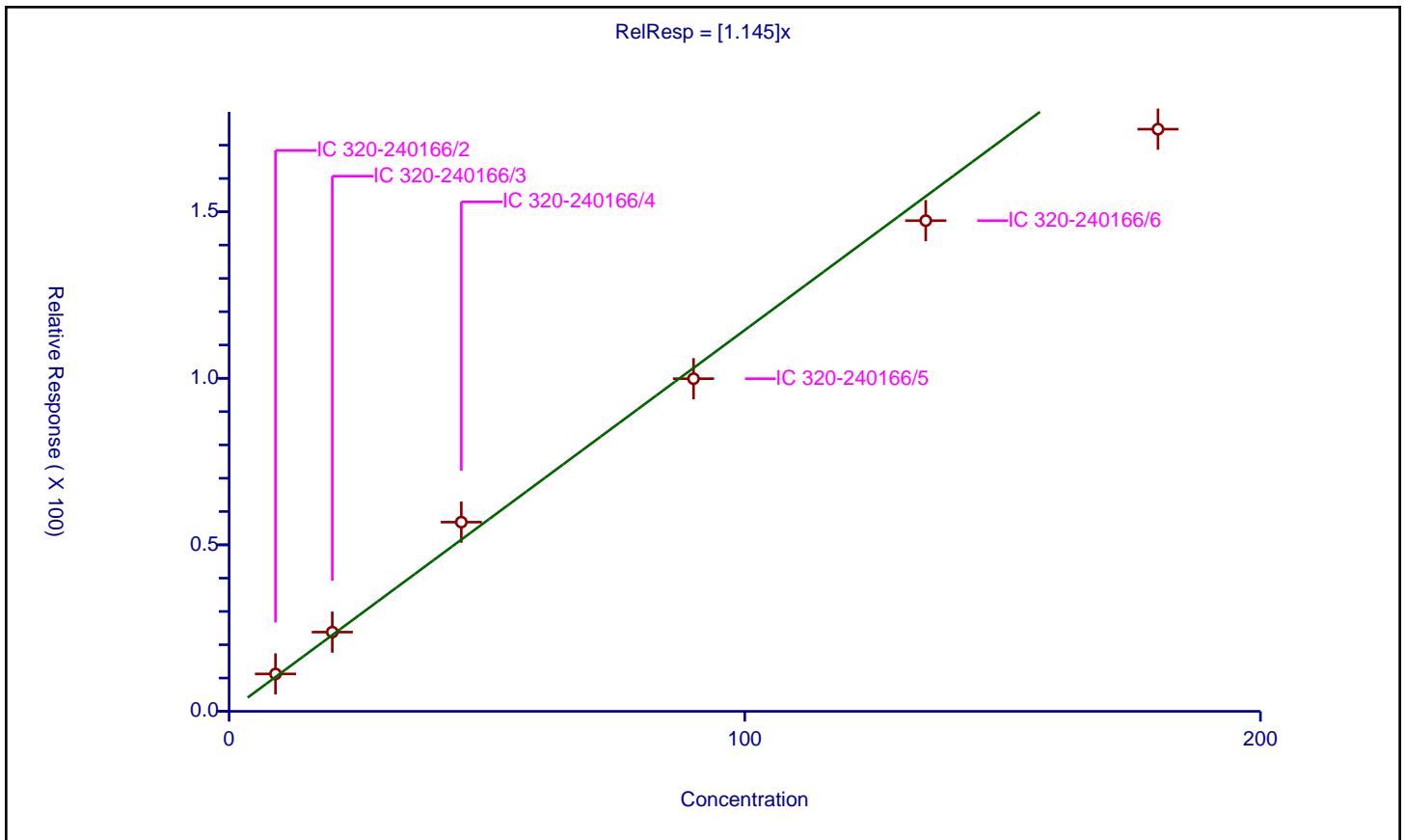
/ Perfluorobutanesulfonic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.145

Error Coefficients	
Standard Error:	9820000
Relative Standard Error:	9.6
Correlation Coefficient:	0.987
Coefficient of Determination (Adjusted):	0.984

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-240166/2	8.99912	11.230049	28.68	2551191.0	1.247905	Y
2	IC 320-240166/3	20.01376	23.788708	28.68	2496049.0	1.188618	Y
3	IC 320-240166/4	45.03096	56.810426	28.68	2296598.0	1.261586	Y
4	IC 320-240166/5	90.06192	99.887482	28.68	2694948.0	1.109098	Y
5	IC 320-240166/6	135.09288	147.336183	28.68	2294155.0	1.090629	Y
6	IC 320-240166/7	180.12384	174.804688	28.68	2483425.0	0.970469	Y



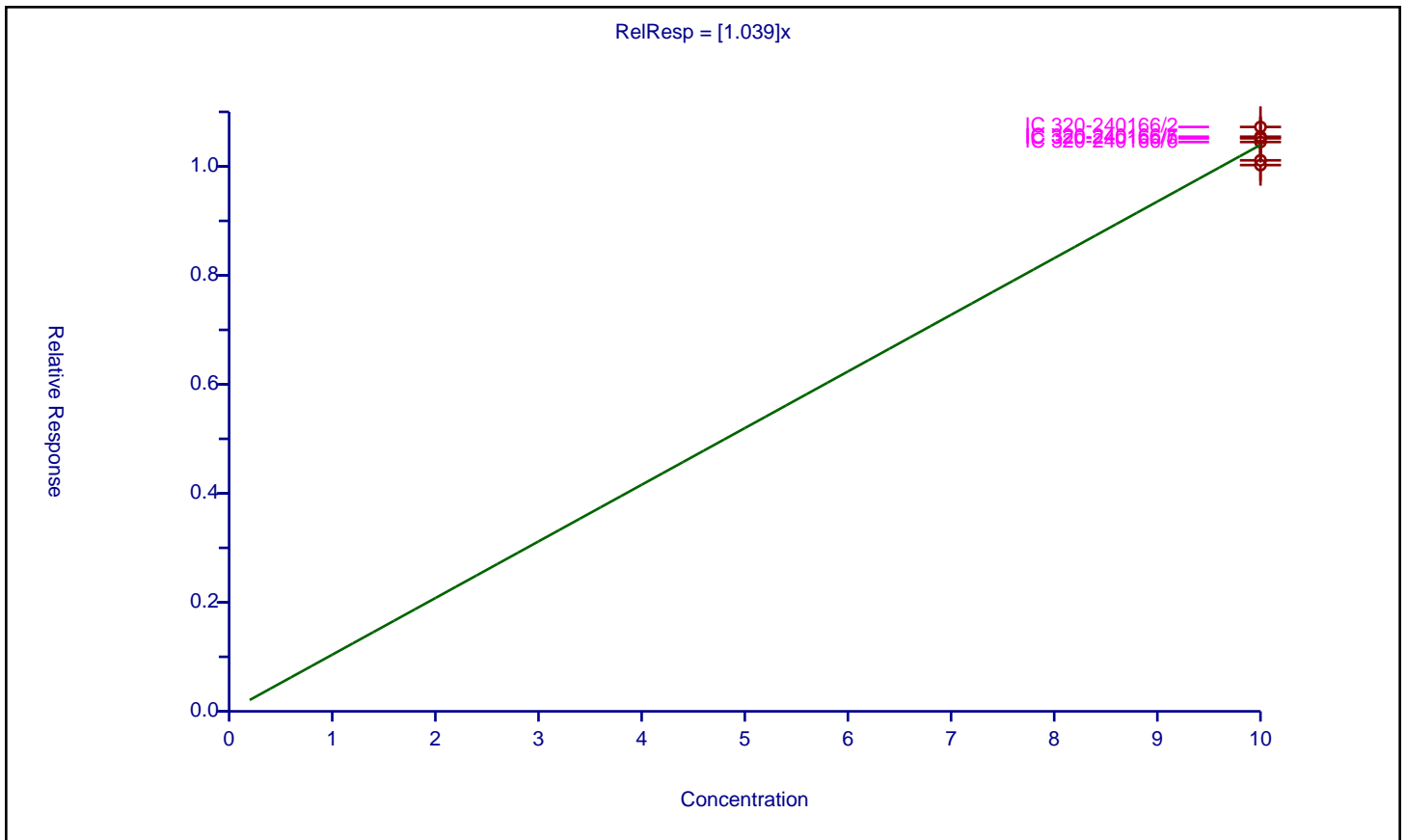
**Calibration**

/ 13C2 PFHxA

**Curve Type:** Average  
**Weighting:** Conc\_Sq  
**Origin:** Force  
**Dependency:** Response  
**Calib Mode:** ISTD  
**Response Base:** AREA  
**RF Rounding:** 0

Curve Coefficients	
Intercept:	0
Slope:	1.039
Error Coefficients	
Standard Error:	1140000
Relative Standard Error:	2.6
Correlation Coefficient:	NA
Coefficient of Determination (Adjusted):	0.0000000000000000111

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-240166/2	10.0	10.723022	10.0	1026304.0	1.072302	Y
2	IC 320-240166/3	10.0	10.110938	10.0	1041660.0	1.011094	Y
3	IC 320-240166/4	10.0	10.023697	10.0	958352.0	1.00237	Y
4	IC 320-240166/5	10.0	10.514813	10.0	1045953.0	1.051481	Y
5	IC 320-240166/6	10.0	10.446952	10.0	944777.0	1.044695	Y
6	IC 320-240166/7	10.0	10.544625	10.0	981996.0	1.054463	Y



**Calibration**

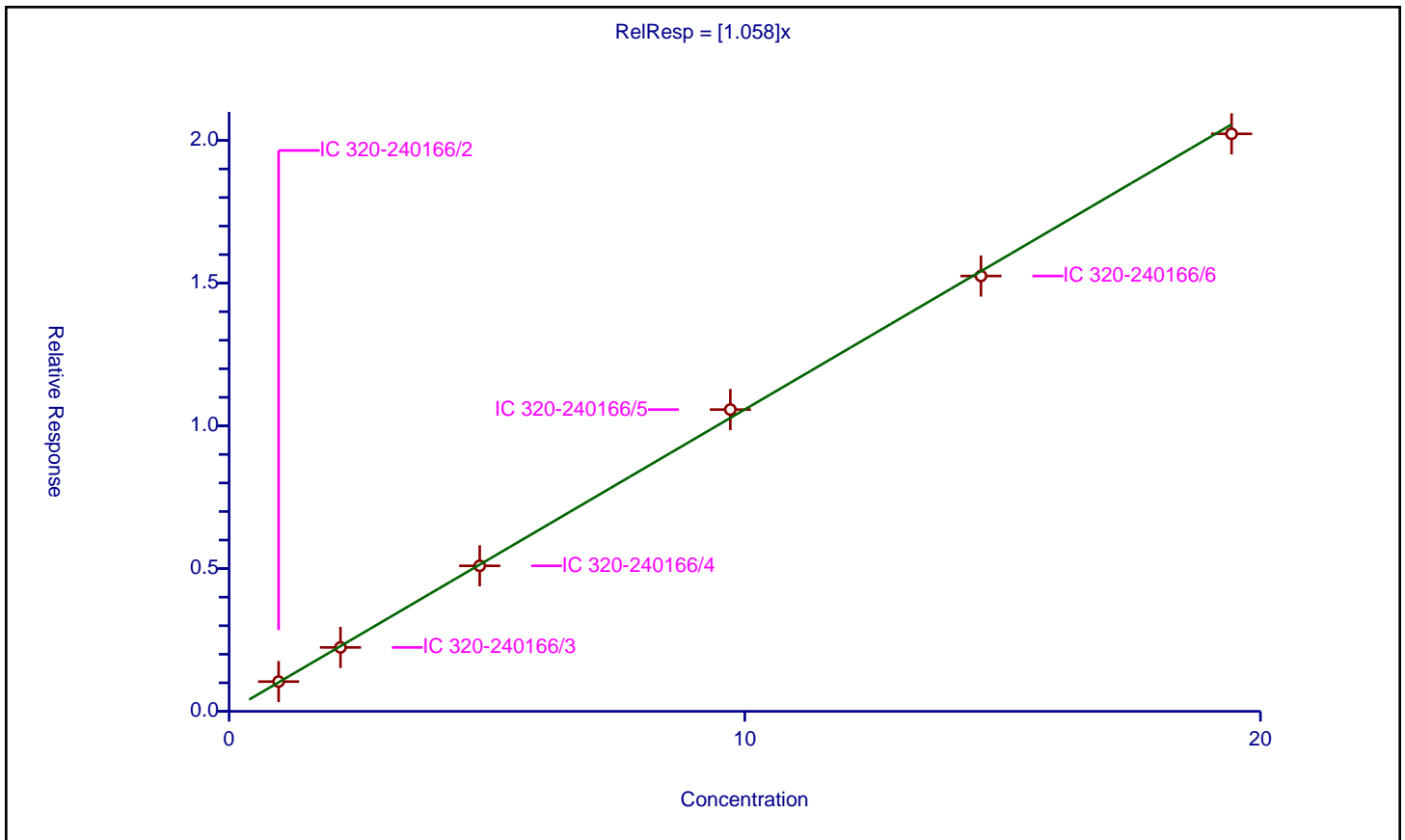
/ Perfluoroheptanoic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.058

Error Coefficients	
Standard Error:	1230000
Relative Standard Error:	2.2
Correlation Coefficient:	0.995
Coefficient of Determination (Adjusted):	0.999

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-240166/2	0.96	1.042069	10.0	1026304.0	1.085489	Y
2	IC 320-240166/3	2.16	2.238629	10.0	1041660.0	1.036402	Y
3	IC 320-240166/4	4.86	5.097449	10.0	958352.0	1.048858	Y
4	IC 320-240166/5	9.72	10.571517	10.0	1045953.0	1.087605	Y
5	IC 320-240166/6	14.58	15.250943	10.0	944777.0	1.046018	Y
6	IC 320-240166/7	19.44	20.231152	10.0	981996.0	1.040697	Y



**Calibration**

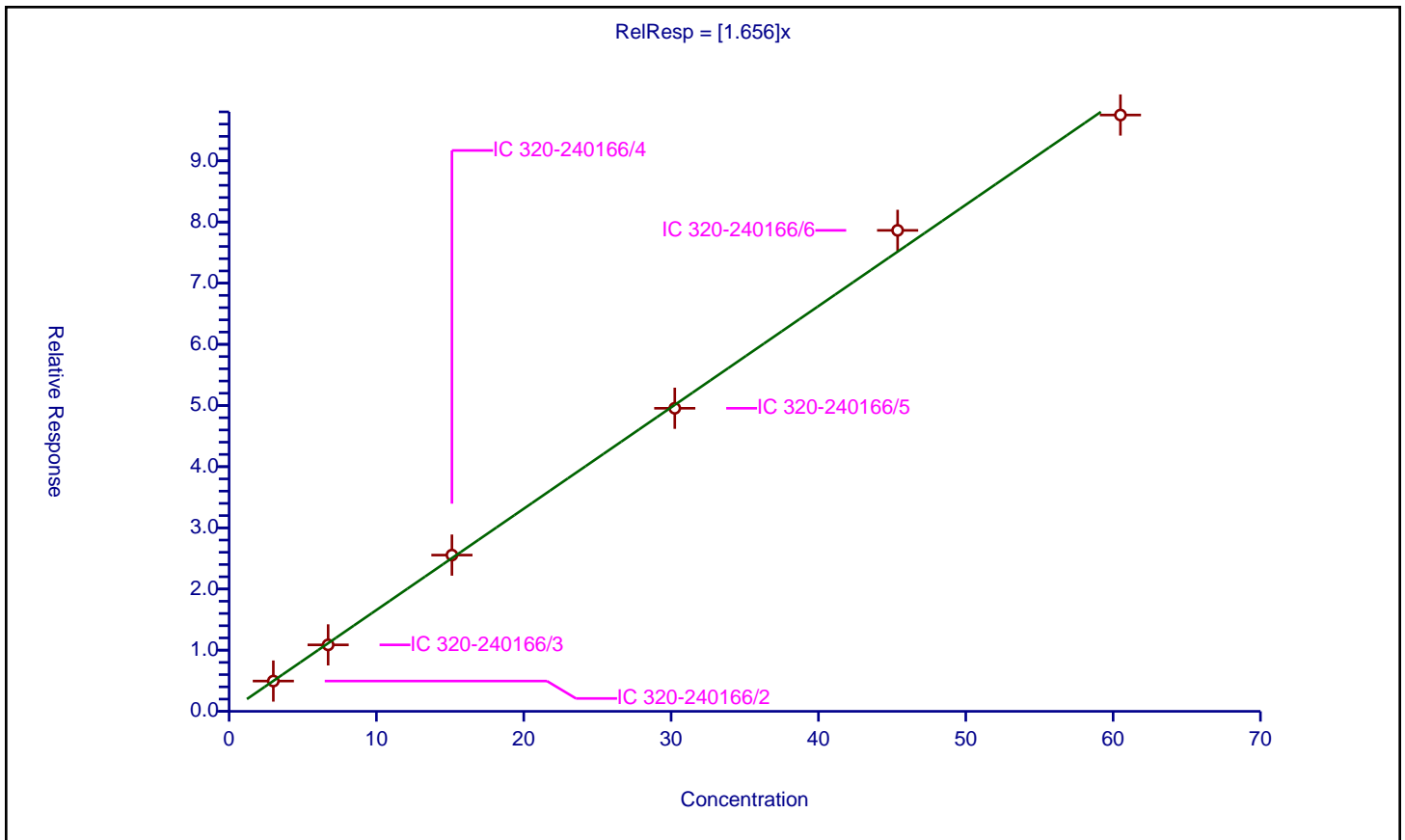
/ Perfluorohexanesulfonic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.656

Error Coefficients	
Standard Error:	5250000
Relative Standard Error:	2.8
Correlation Coefficient:	0.997
Coefficient of Determination (Adjusted):	0.999

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-240166/2	3.003	4.952545	28.68	2551191.0	1.649199	Y
2	IC 320-240166/3	6.721867	10.867105	28.68	2496049.0	1.61668	Y
3	IC 320-240166/4	15.1242	25.544729	28.68	2296598.0	1.688997	Y
4	IC 320-240166/5	30.2484	49.547598	28.68	2694948.0	1.638024	Y
5	IC 320-240166/6	45.3726	78.631671	28.68	2294155.0	1.733021	Y
6	IC 320-240166/7	60.4968	97.490855	28.68	2483425.0	1.611504	Y



**Calibration**

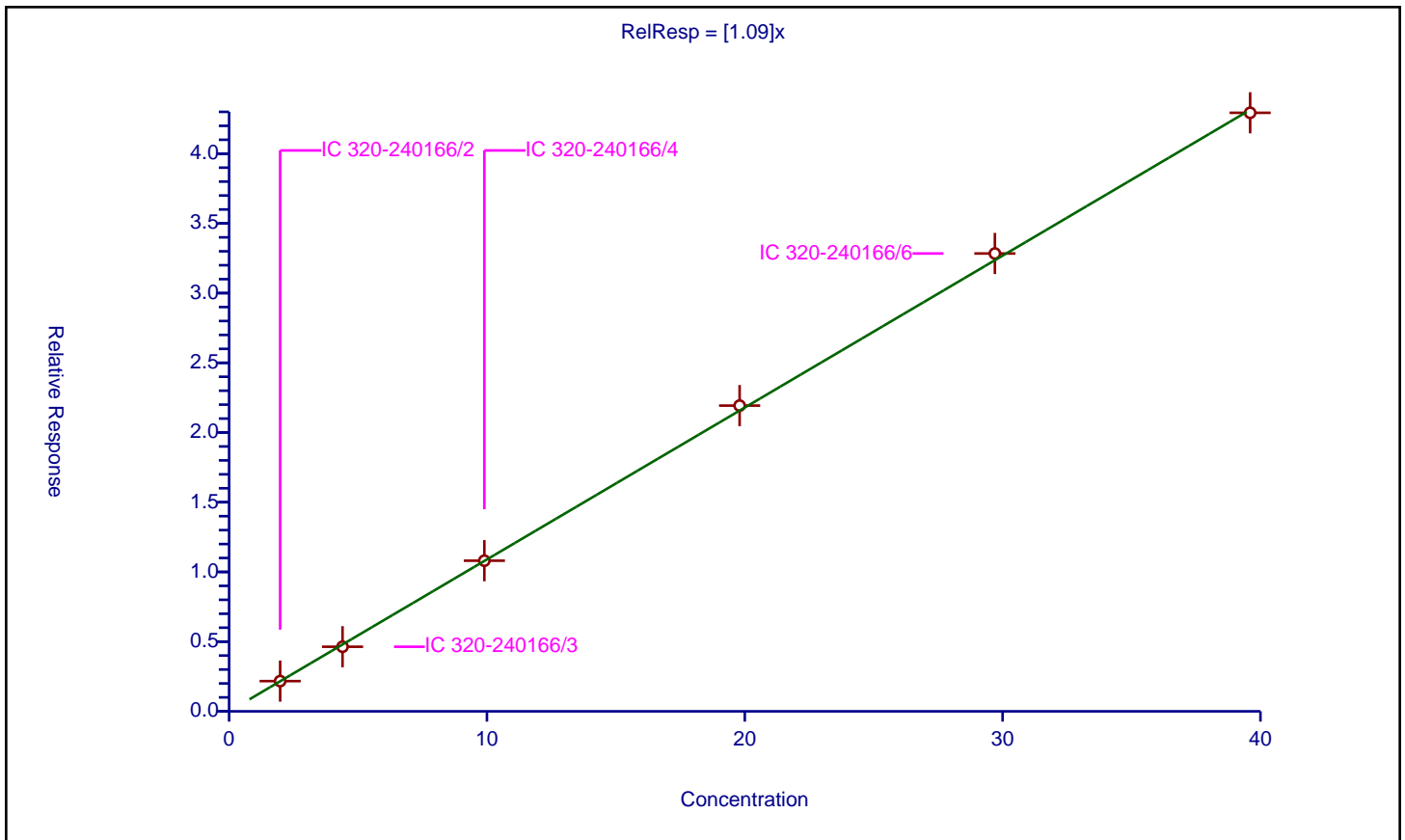
/ Perfluorooctanoic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.09

Error Coefficients	
Standard Error:	2610000
Relative Standard Error:	1.8
Correlation Coefficient:	0.997
Coefficient of Determination (Adjusted):	0.999

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-240166/2	1.98	2.168821	10.0	1026304.0	1.095364	Y
2	IC 320-240166/3	4.4	4.632865	10.0	1041660.0	1.052924	Y
3	IC 320-240166/4	9.9	10.80555	10.0	958352.0	1.09147	Y
4	IC 320-240166/5	19.8	21.929159	10.0	1045953.0	1.107533	Y
5	IC 320-240166/6	29.7	32.841263	10.0	944777.0	1.105766	Y
6	IC 320-240166/7	39.6	42.935185	10.0	981996.0	1.084222	Y



**Calibration**

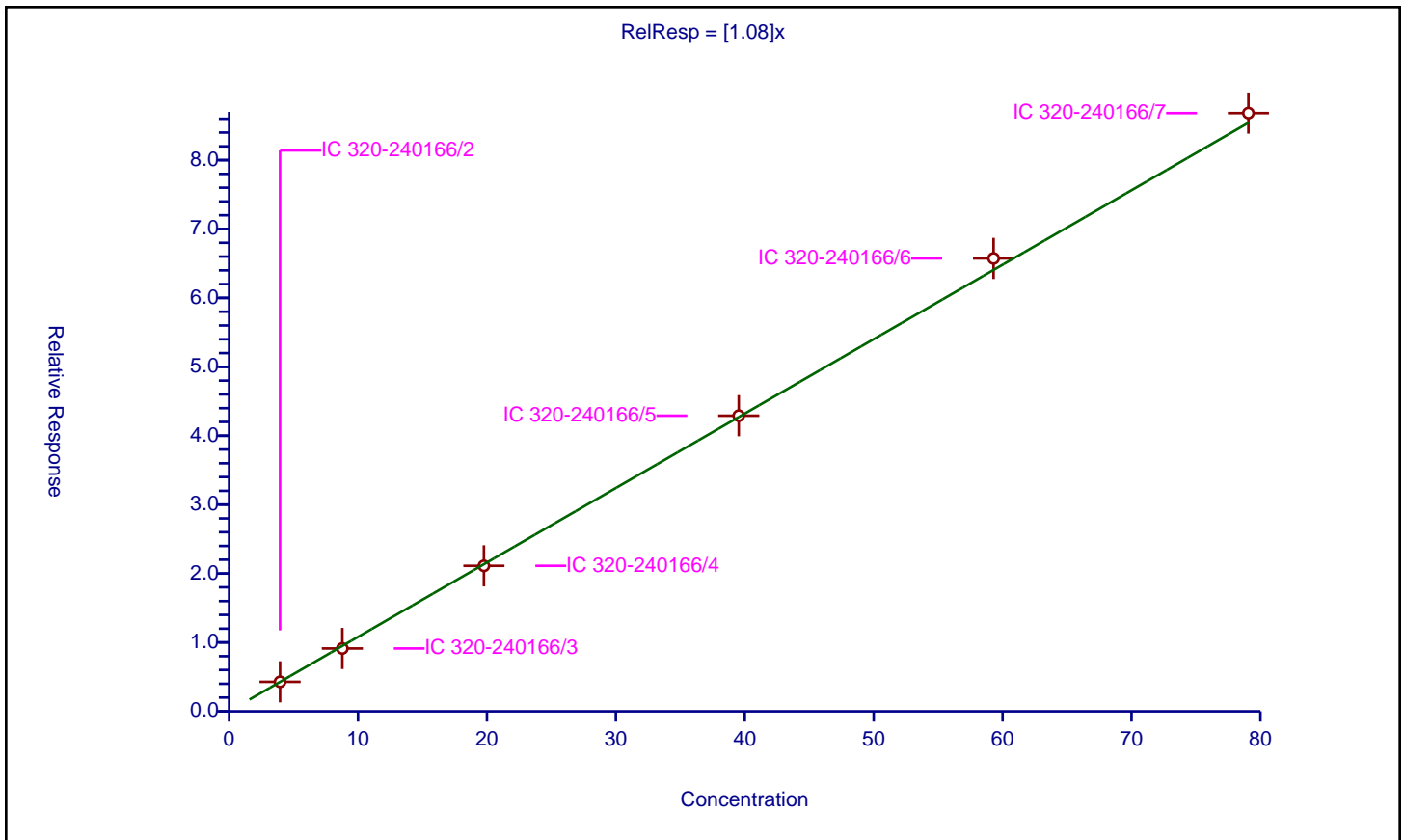
/ Perfluorooctane sulfonic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.08

Error Coefficients	
Standard Error:	4560000
Relative Standard Error:	2.3
Correlation Coefficient:	0.994
Coefficient of Determination (Adjusted):	0.999

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-240166/2	3.95328	4.281386	28.68	2551191.0	1.082996	Y
2	IC 320-240166/3	8.785067	9.124485	28.68	2496049.0	1.038636	Y
3	IC 320-240166/4	19.7664	21.117058	28.68	2296598.0	1.068331	Y
4	IC 320-240166/5	39.5328	42.904927	28.68	2694948.0	1.085299	Y
5	IC 320-240166/6	59.2992	65.729144	28.68	2294155.0	1.108432	Y
6	IC 320-240166/7	79.0656	86.827243	28.68	2483425.0	1.098167	Y





**Calibration**

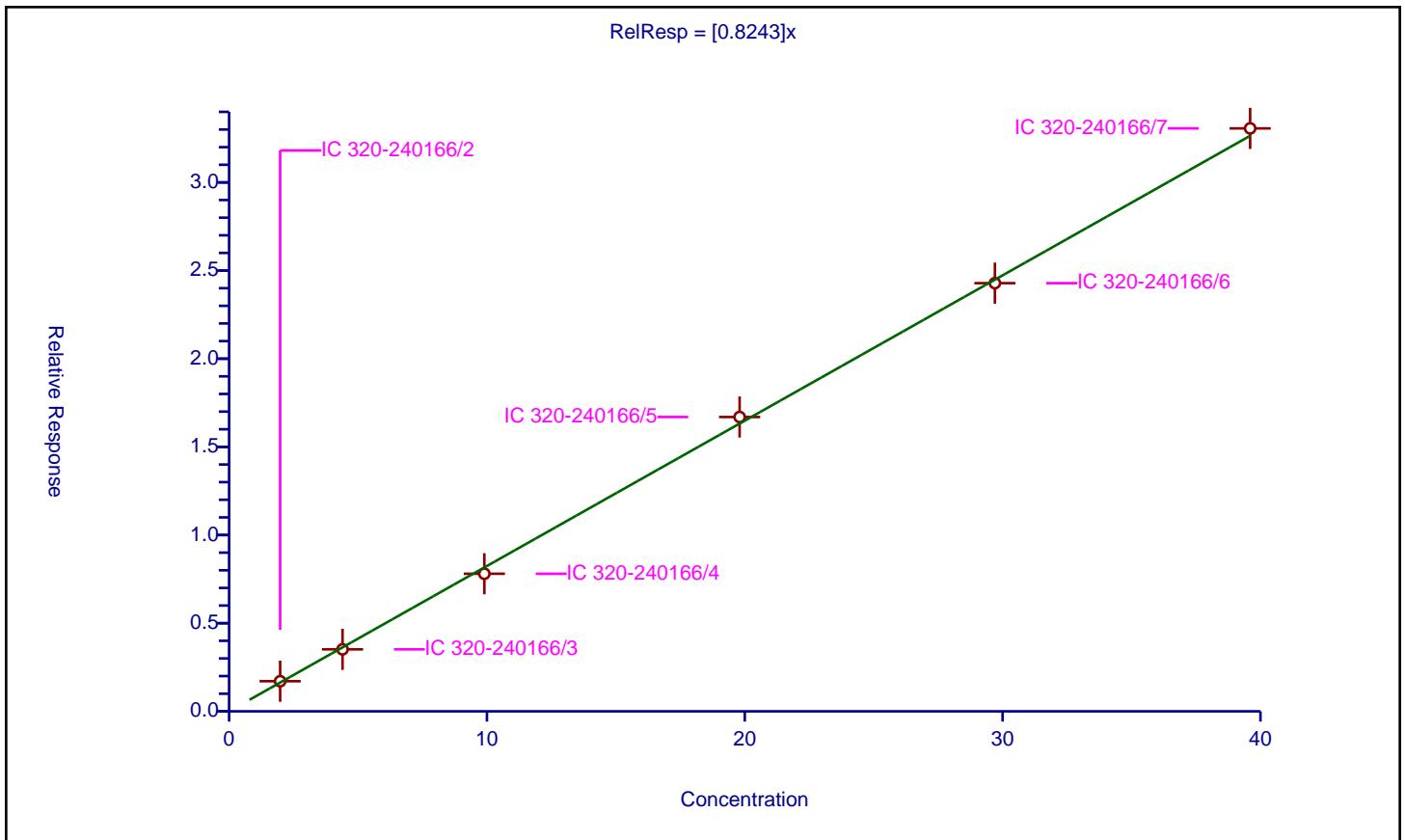
/ Perfluorononanoic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	0.8243

Error Coefficients	
Standard Error:	1980000
Relative Standard Error:	3.4
Correlation Coefficient:	0.995
Coefficient of Determination (Adjusted):	0.998

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-240166/2	1.98	1.708753	10.0	1026304.0	0.863007	Y
2	IC 320-240166/3	4.4	3.515581	10.0	1041660.0	0.798996	Y
3	IC 320-240166/4	9.9	7.802446	10.0	958352.0	0.788126	Y
4	IC 320-240166/5	19.8	16.692968	10.0	1045953.0	0.843079	Y
5	IC 320-240166/6	29.7	24.286578	10.0	944777.0	0.81773	Y
6	IC 320-240166/7	39.6	33.064615	10.0	981996.0	0.834965	Y



**Calibration**

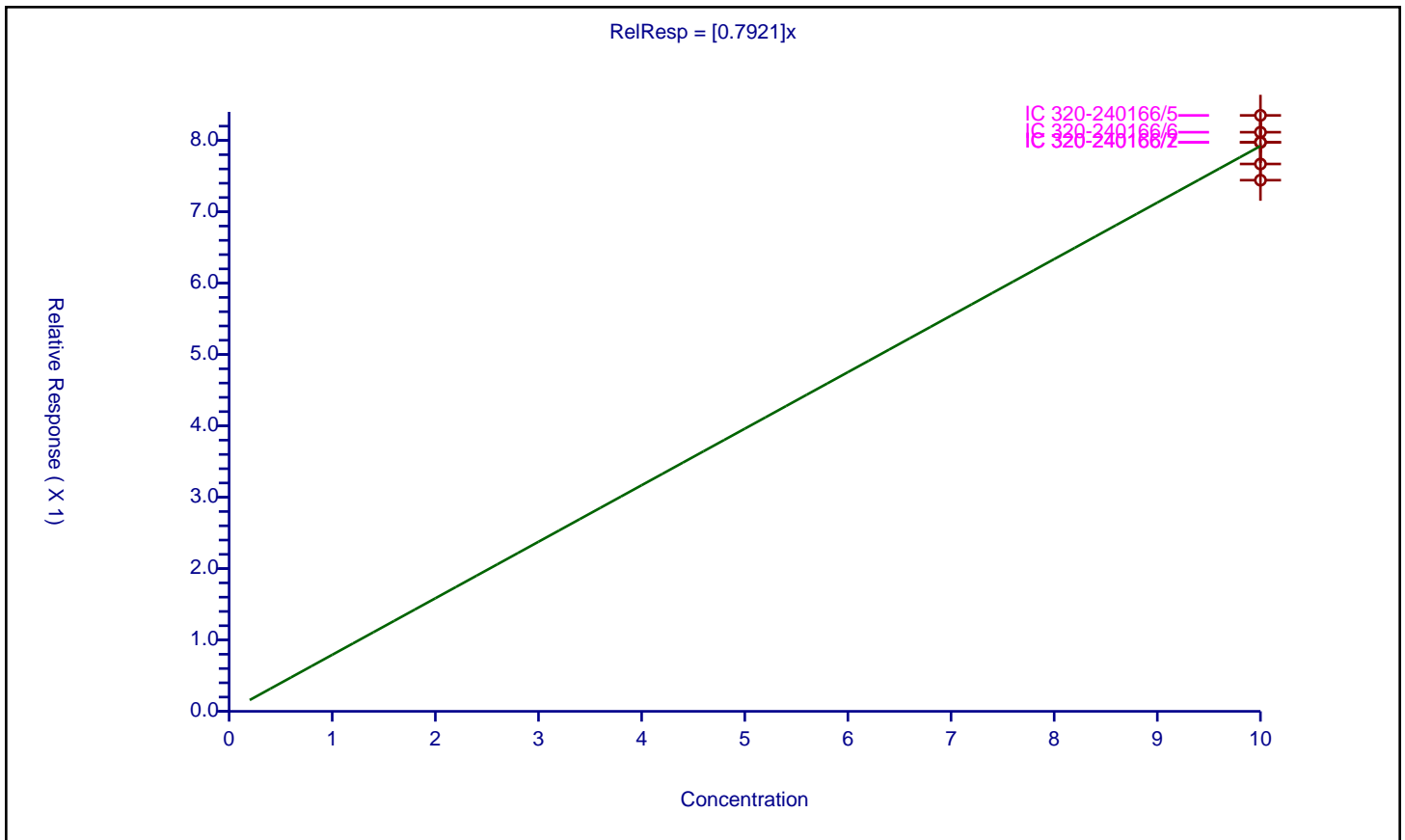
/ 13C2 PFDA

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	0.7921

Error Coefficients	
Standard Error:	869000
Relative Standard Error:	4.1
Correlation Coefficient:	NA
Coefficient of Determination (Adjusted):	0

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-240166/2	10.0	7.972277	10.0	1026304.0	0.797228	Y
2	IC 320-240166/3	10.0	7.442985	10.0	1041660.0	0.744299	Y
3	IC 320-240166/4	10.0	7.670209	10.0	958352.0	0.767021	Y
4	IC 320-240166/5	10.0	8.35092	10.0	1045953.0	0.835092	Y
5	IC 320-240166/6	10.0	8.115248	10.0	944777.0	0.811525	Y
6	IC 320-240166/7	10.0	7.975654	10.0	981996.0	0.797565	Y



FORM VI  
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA  
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1 Analy Batch No.: 243207

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 08/30/2018 16:19 Calibration End Date: 08/30/2018 16:42 Calibration ID: 40933

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-243207/2	2018.08.30_537ICALXX_003.d
Level 2	IC 320-243207/3	2018.08.30_537ICALXX_004.d
Level 3	IC 320-243207/4	2018.08.30_537ICALXX_005.d
Level 4	IC 320-243207/5	2018.08.30_537ICALXX_006.d
Level 5	IC 320-243207/6	2018.08.30_537ICALXX_007.d
Level 6	IC 320-243207/7	2018.08.30_537ICALXX_008.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R <sup>2</sup> OR COD	#	MIN R <sup>2</sup> OR COD
	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanesulfonic acid (PFBS)	1.2230 0.9930	1.1860	1.1753	1.1605	1.0890	Ave		1.1378			7.3		30.0				
Perfluoroheptanoic acid (PFHpA)	1.0381 1.0845	1.0721	1.0557	1.1770	1.1132	Ave		1.0901			4.6		30.0				
Perfluorohexanesulfonic acid (PFHxS)	1.6889 1.6717	1.6473	1.7005	1.7822	1.7495	Ave		1.7067			2.9		30.0				
Perfluorooctanoic acid (PFOA)	1.1238 1.0683	1.0221	1.0750	1.0854	1.1051	Ave		1.0799			3.2		30.0				
Perfluorooctanesulfonic acid (PFOS)	1.0648 1.0771	1.0440	1.0513	1.1032	1.0916	Ave		1.0720			2.1		30.0				
Perfluorononanoic acid (PFNA)	0.8008 0.7934	0.8096	0.8197	0.8356	0.8107	Ave		0.8116			1.8		30.0				
13C2 PFHxA	1.1521 1.1375	1.1090	1.1128	1.1379	1.1749	Ave		1.1374			2.2		30.0				
13C2 PFDA	0.8838 0.8930	0.8995	0.8727	0.9522	0.9127	Ave		0.9023			3.1		30.0				

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI  
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA  
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1 Analy Batch No.: 243207

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 08/30/2018 16:19 Calibration End Date: 08/30/2018 16:42 Calibration ID: 40933

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-243207/2	2018.08.30_537ICALXX_003.d
Level 2	IC 320-243207/3	2018.08.30_537ICALXX_004.d
Level 3	IC 320-243207/4	2018.08.30_537ICALXX_005.d
Level 4	IC 320-243207/5	2018.08.30_537ICALXX_006.d
Level 5	IC 320-243207/6	2018.08.30_537ICALXX_007.d
Level 6	IC 320-243207/7	2018.08.30_537ICALXX_008.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5
Perfluorobutanesulfonic acid (PFBS)	PFOS	Ave	885235 14291597	2051546	4145133	8657186	11998694	9.00 180	20.0	45.0	90.1	135
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	88795 1861705	225064	443367	1011347	1464161	0.960 19.4	2.16	4.86	9.72	14.6
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	407943 8080418	957042	2014325	4465219	6473859	3.00 60.5	6.72	15.1	30.2	45.4
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	198271 3735476	437086	919687	1899747	2960649	1.98 39.6	4.40	9.90	19.8	29.7
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	338576 6804405	792676	1627539	3612214	5279410	3.95 79.1	8.79	19.8	39.5	59.3
Perfluorononanoic acid (PFNA)	13PF OA	Ave	141277 2774537	346235	701242	1462550	2171914	1.98 39.6	4.40	9.90	19.8	29.7
13C2 PFHxA	13PF OA	Ave	1026522 1004475	1077815	961641	1005876	1059885	10.0 10.0	10.0	10.0	10.0	10.0
13C2 PFDA	13PF OA	Ave	787485 788559	874271	754115	841794	823302	10.0 10.0	10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD

FORM VI  
 LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA  
 READBACK PERCENT ERROR

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1 Analy Batch No.: 243207

SDG No.: \_\_\_\_\_

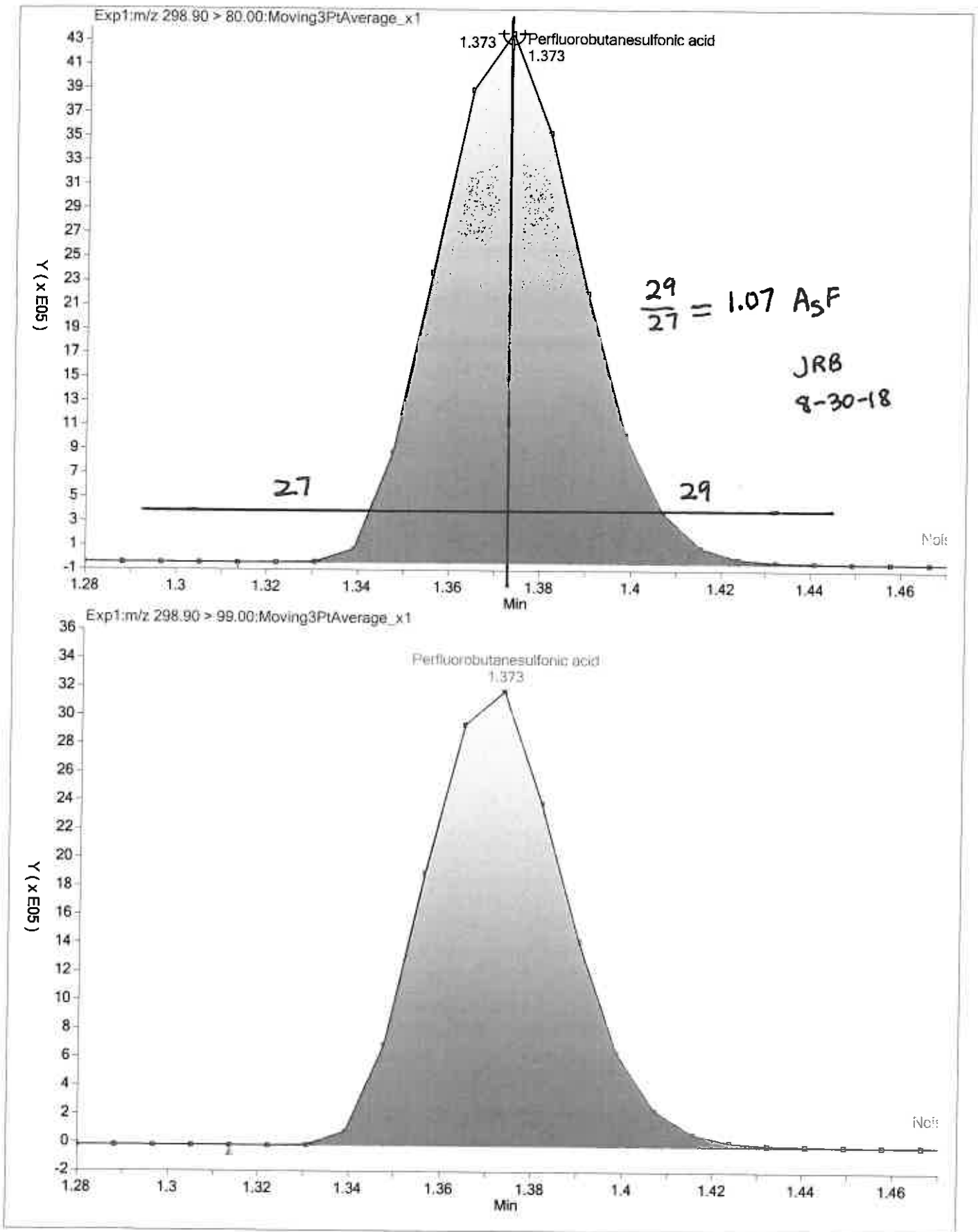
Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

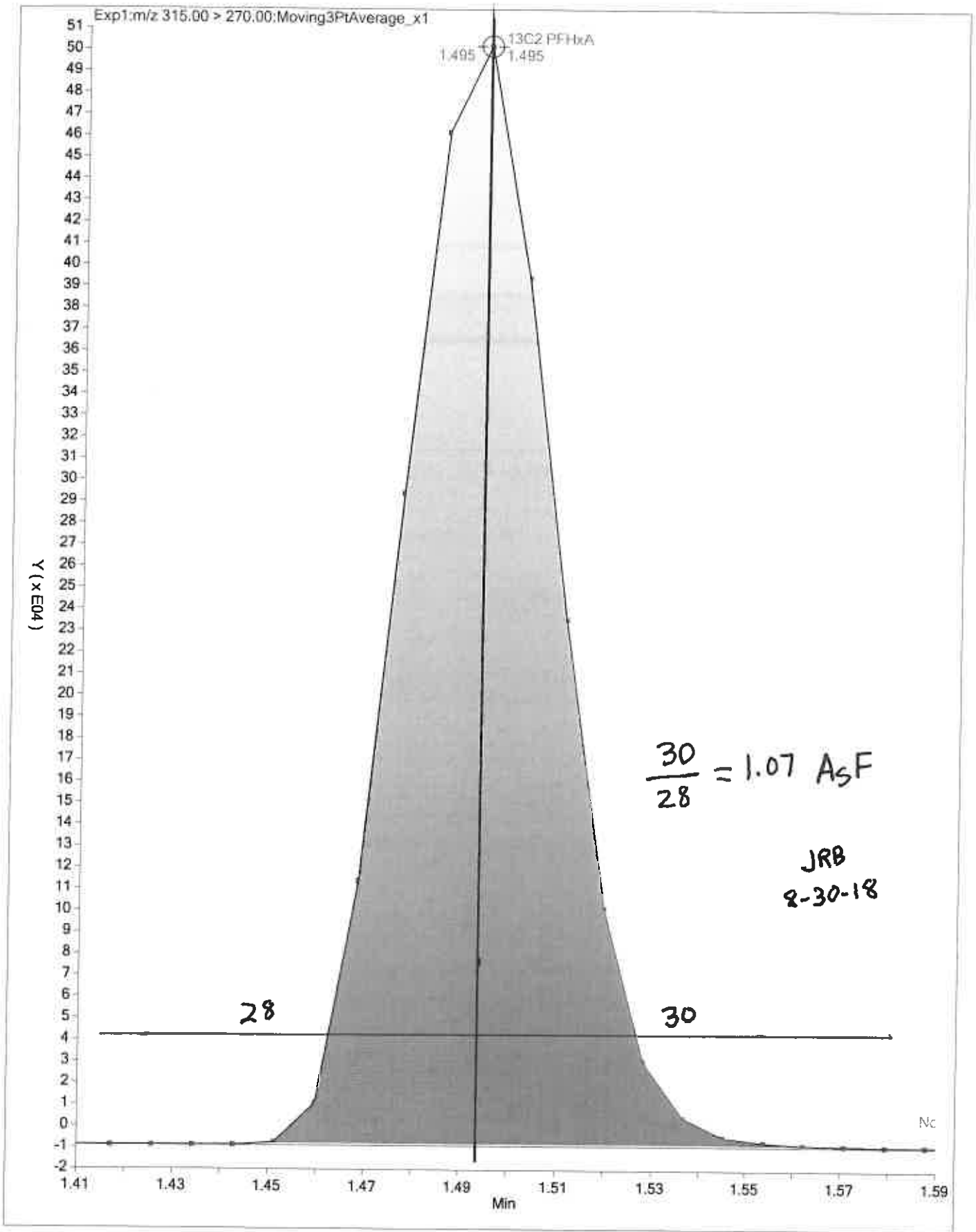
Calibration Start Date: 08/30/2018 16:19 Calibration End Date: 08/30/2018 16:42 Calibration ID: 40933

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-243207/2	2018.08.30_537ICALXX_003.d
Level 2	IC 320-243207/3	2018.08.30_537ICALXX_004.d
Level 3	IC 320-243207/4	2018.08.30_537ICALXX_005.d
Level 4	IC 320-243207/5	2018.08.30_537ICALXX_006.d
Level 5	IC 320-243207/6	2018.08.30_537ICALXX_007.d
Level 6	IC 320-243207/7	2018.08.30_537ICALXX_008.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanesulfonic acid (PFBS)	7.5	4.2	3.3	2.0	-4.3	-12.7	50	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	-4.8	-1.7	-3.2	8.0	2.1	-0.5	50	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	-1.0	-3.5	-0.4	4.4	2.5	-2.1	50	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	4.1	-5.4	-0.5	0.5	2.3	-1.1	50	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	-0.7	-2.6	-1.9	2.9	1.8	0.5	50	30	30	30	30	30
Perfluorononanoic acid (PFNA)	-1.3	-0.2	1.0	3.0	-0.1	-2.2	50	30	30	30	30	30
13C2 PFHxA	1.3	-2.5	-2.2	0.0	3.3	0.0	30	30	30	30	30	30
13C2 PFDA	-2.1	-0.3	-3.3	5.5	1.1	-1.0	30	30	30	30	30	30





TestAmerica Laboratories  
Istd/Surrogate Recovery Report

Worklist Name: 30AUG2018\_537\_ICALB      Worklist Num: 63556  
Instrument: A8\_N      Method: 537\_A8\_N  
Batch Directory: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b  
Limit Group: LC 537 ICAL  
Analysis Type: SemiVOA  
Inj Volume: 2.00      Inj Vol Units: ul

Lims Batch: 243207  
CCV IS Mode: Select Ical Level, Cal Level: 3  
Non-Cal IS Mode: Last Ccal Sample

\$ 2 13C2 PFHxA  
\$ 10 13C2 PFDA

Lab ID	Inj Date	\$ 2	\$ 10	6 13C2-PFOA	* 7 13C4 PFOS
	IS Std			864139 1.83	2246292 2.08
# 1 RB	30-Aug-2018 16:14:42			898985 104.0 1.83	2234437 99.5 2.09
	IS Std				
# 2 IC L1	30-Aug-2018 16:19:26	1.50 101.30	2.25 97.95	891025> 100.0* 1.83	2306829> 100.0* 2.09
# 3 IC L2	30-Aug-2018 16:24:08	1.50 97.50	2.25 99.69	971912> 109.1* 1.83	2478769> 107.5* 2.09
# 4 IC L3	30-Aug-2018 16:28:48	1.50 97.84	2.25 96.71	864139> 97.0* 1.83	2246292> 97.4* 2.08
# 5 IC L4	30-Aug-2018 16:33:28	1.50 100.00	2.25 105.50	884013> 99.2* 1.83	2375494> 103.0* 2.08
# 6 IC L5	30-Aug-2018 16:38:09	1.50 103.30	2.25 101.10	902081> 101.2* 1.83	2339063> 101.4* 2.09
# 7 IC L6	30-Aug-2018 16:42:48	1.49 100.00	2.25 98.97	883033> 99.1* 1.82	2291552> 99.3* 2.08

13C2-PFOA

$$RPD = \frac{971912 - 864139}{\frac{(971912 + 864139)}{2}} \times 100 = 11.7$$

13C4-PFOS

$$RPD = \frac{2478769 - 2246292}{\frac{(2478769 + 2246292)}{2}} \times 100 = 9.84$$

JRB  
8-30-18



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_003.d  
 Lims ID: IC L1  
 Client ID:  
 Sample Type: IC Calib Level: 1  
 Inject. Date: 30-Aug-2018 16:19:26 ALS Bottle#: 1 Worklist Smp#: 2  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: L1\_537  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 17:06:59 Calib Date: 30-Aug-2018 16:42:48  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 16:36:38

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.373	1.372	0.001	1.000	885235	9.67		4243	
298.90 > 99.00	1.373	1.372	0.001	1.000	642141		1.38(0.00-0.00)	1937	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.495	1.493	0.002	1.000	1026522	10.1		10481	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.639	1.639	0.0	1.000	88795	0.9142		24.9	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.639	1.639	0.0	1.000	407943	2.97		266	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.828	1.827	0.001	1.000	198271	2.06		31.7	
413.00 > 169.00	1.828	1.827	0.001	1.000	102081		1.94(0.00-0.00)	383	
* 6 13C2-PFOA									
415.00 > 370.00	1.828	1.827	0.001		891025	10.0		7408	
* 7 13C4 PFOS									
503.00 > 80.00	2.086	2.083	0.003		2306829	28.7		5507	
9 Perfluorononanoic acid									
463.00 > 419.00	2.094	2.093	0.001	1.000	141277	1.95		27.5	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.086	2.109	-0.023	1.000	338576	3.93		646	
499.00 > 99.00	2.086	2.109	-0.023	1.000	75852		4.46(0.00-0.00)	266	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.253	2.253	0.0	1.000	787485	9.79		4286	

**Reagents:**

LC537-L1\_00022

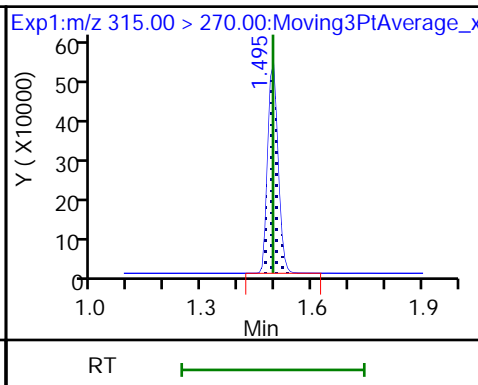
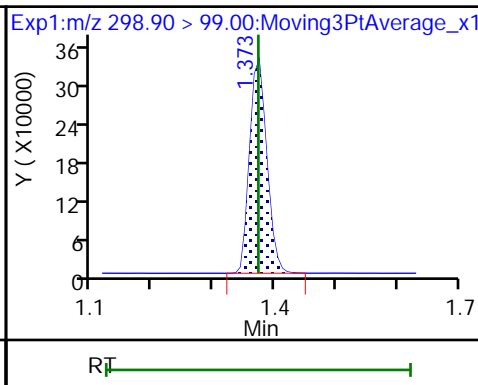
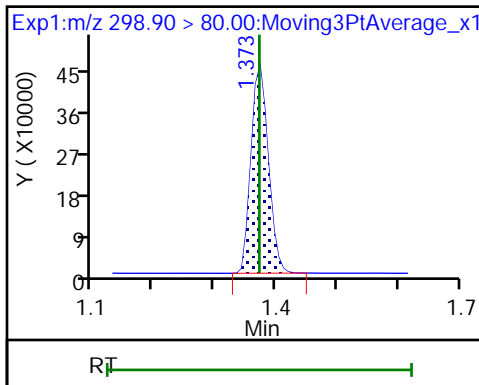
Amount Added: 1.00

Units: mL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

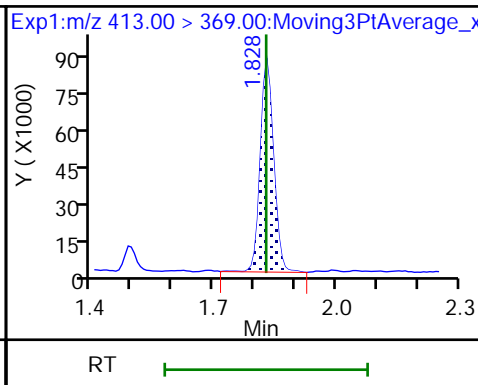
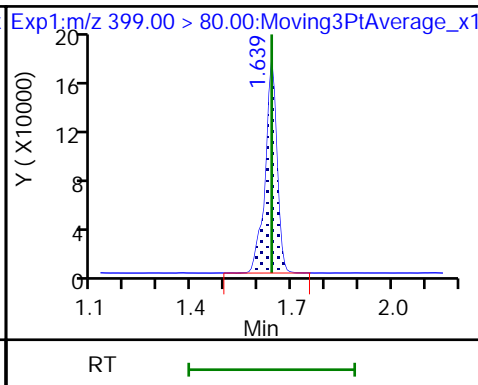
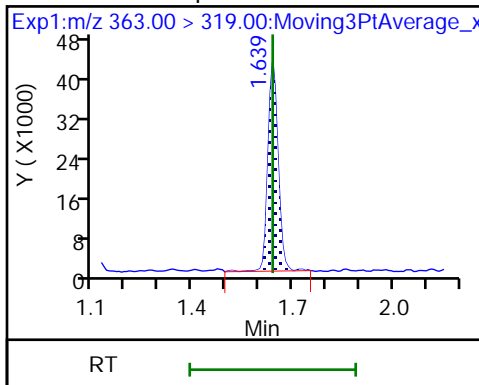
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

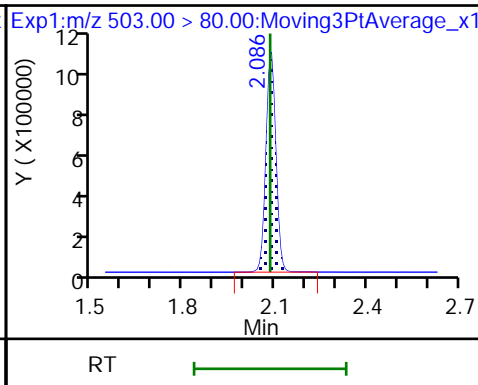
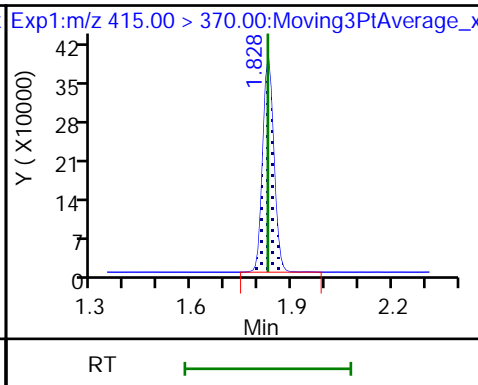
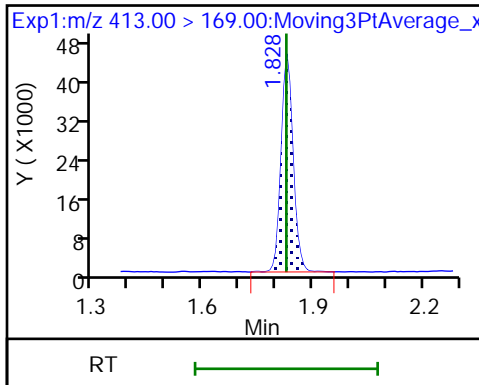
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

\* 6 13C2-PFOA

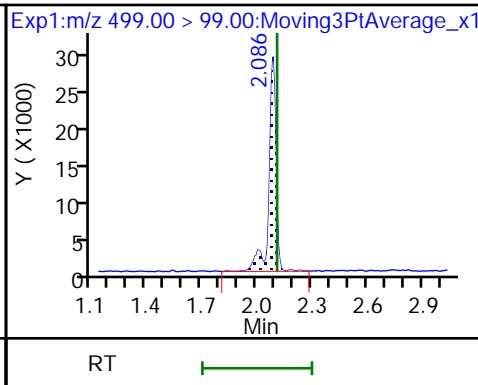
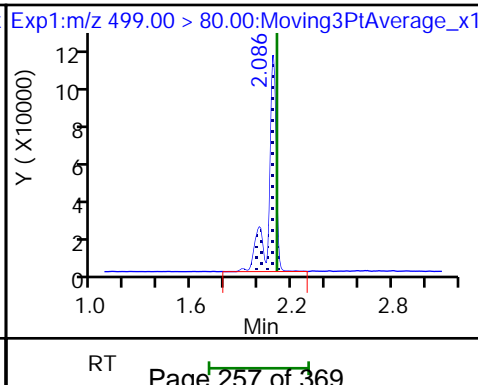
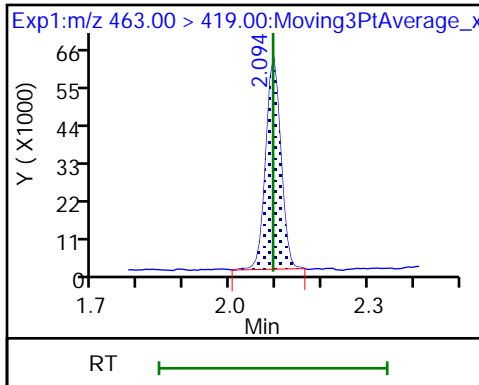
\* 7 13C4 PFOS



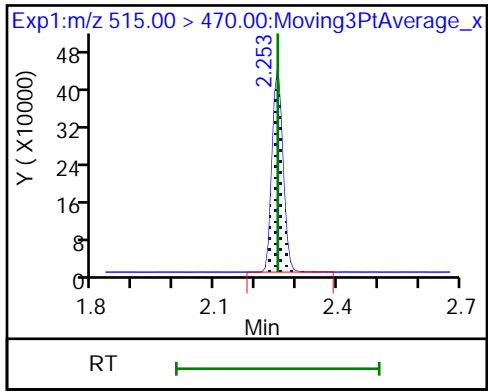
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_004.d  
 Lims ID: IC L2  
 Client ID:  
 Sample Type: IC Calib Level: 2  
 Inject. Date: 30-Aug-2018 16:24:08 ALS Bottle#: 2 Worklist Smp#: 3  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: L2\_537  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 17:07:01 Calib Date: 30-Aug-2018 16:42:48  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 16:38:24

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.373	1.372	0.001	1.000	2051546	20.9		9134	
298.90 > 99.00	1.373	1.372	0.001	1.000	1424011		1.44(0.00-0.00)	3524	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.495	1.493	0.002	1.000	1077815	9.75		9678	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.639	1.639	0.0	1.000	957042	6.49		615	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.639	1.639	0.0	1.000	225064	2.12		61.8	
* 6 13C2-PFOA									
415.00 > 370.00	1.828	1.827	0.001		971912	10.0		7693	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.828	1.827	0.001	1.000	437086	4.16		69.2	
413.00 > 169.00	1.828	1.827	0.001	1.000	234097		1.87(0.00-0.00)	815	
* 7 13C4 PFOS									
503.00 > 80.00	2.086	2.083	0.003		2478769	28.7		5657	
9 Perfluorononanoic acid									
463.00 > 419.00	2.094	2.093	0.001	1.000	346235	4.39		68.5	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.086	2.109	-0.023	1.000	792676	8.56		1635	
499.00 > 99.00	2.086	2.109	-0.023	1.000	174841		4.53(0.00-0.00)	646	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.253	2.253	0.0	1.000	874271	9.97		4640	

**Reagents:**

LC537-L2\_00022

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_004.d

Injection Date: 30-Aug-2018 16:24:08

Instrument ID: A8\_N

Lims ID: IC L2

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 3

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

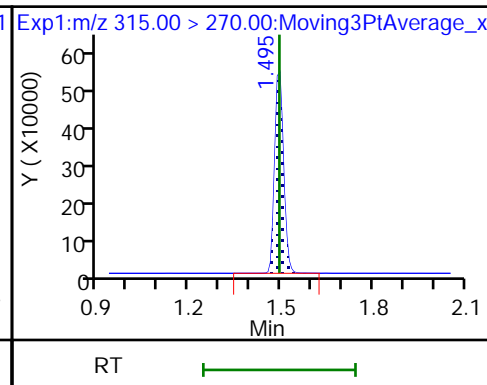
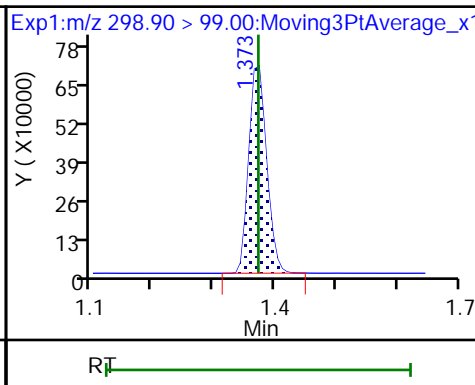
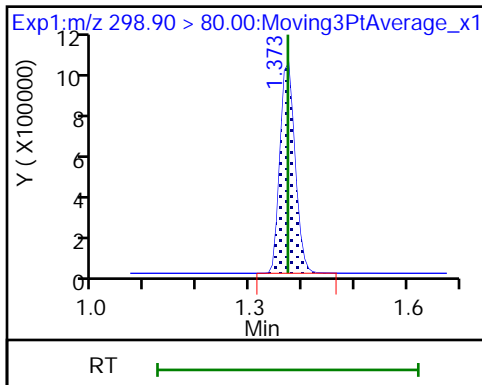
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

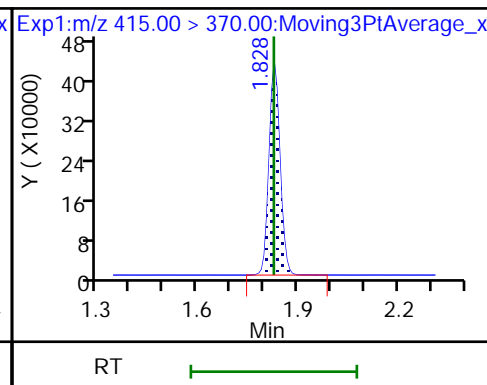
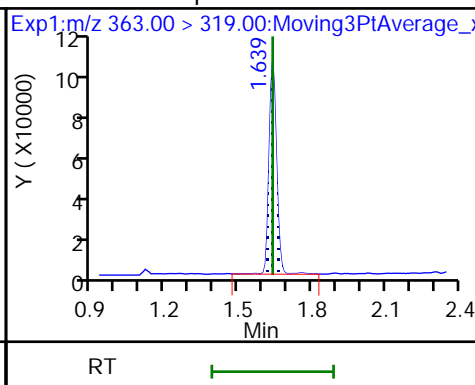
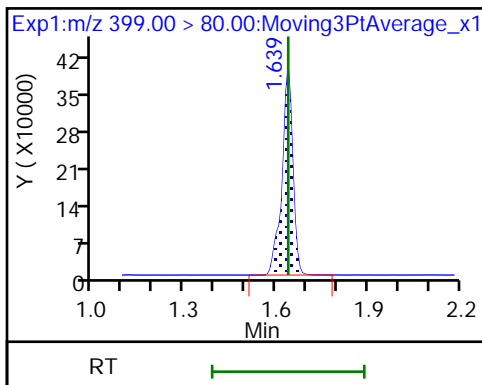
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

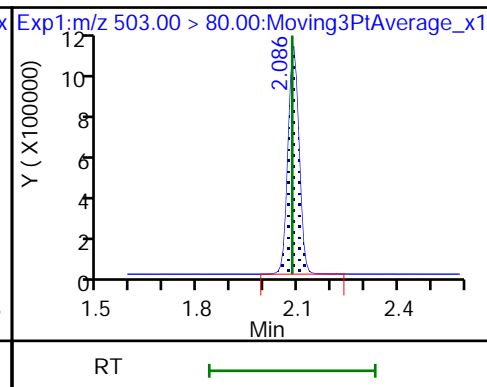
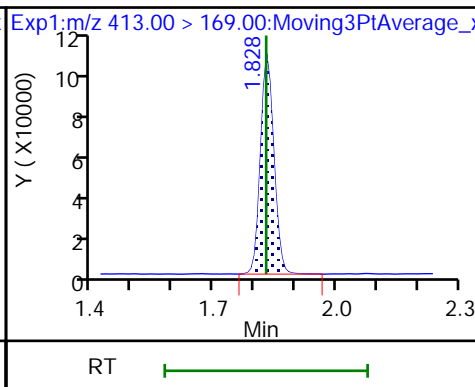
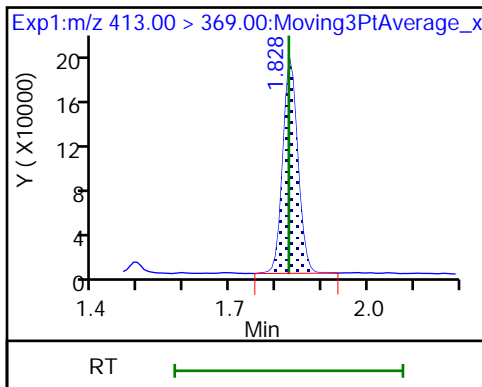
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

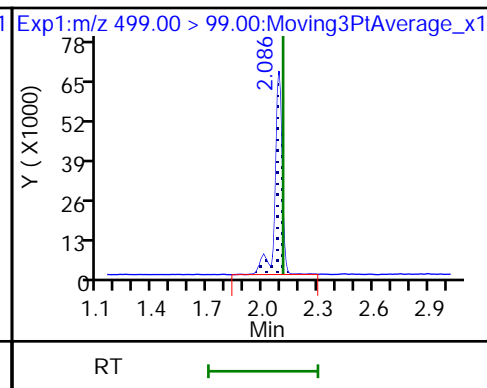
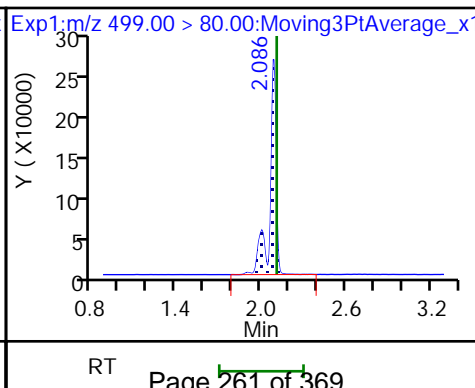
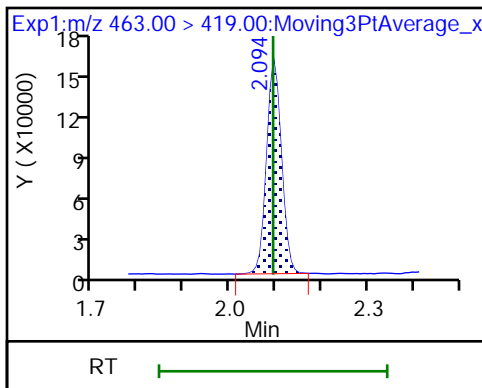
\* 7 13C4 PFOS



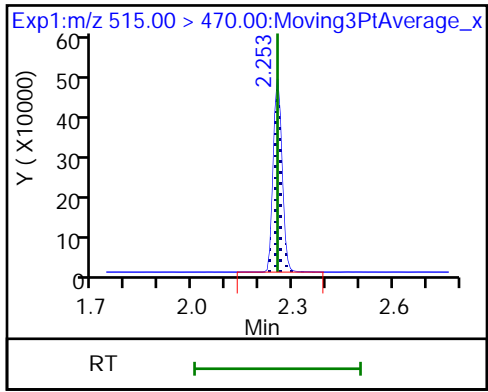
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA





TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_005.d  
 Lims ID: IC L3  
 Client ID:  
 Sample Type: IC Calib Level: 3  
 Inject. Date: 30-Aug-2018 16:28:48 ALS Bottle#: 3 Worklist Smp#: 4  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: L3\_537  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 17:07:02 Calib Date: 30-Aug-2018 16:42:48  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 16:42:25

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.373	1.372	0.001	1.000	4145133	46.5		14673	
298.90 > 99.00	1.373	1.372	0.001	1.000	2978447		1.39(0.00-0.00)	7598	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.495	1.493	0.002	1.000	961641	9.78		10250	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.639	1.639	0.0	1.000	443367	4.71		118	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.639	1.639	0.0	1.000	2014325	15.1		1239	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.828	1.827	0.001	1.000	919687	9.86		147	
413.00 > 169.00	1.828	1.827	0.001	1.000	473380		1.94(0.00-0.00)	1656	
* 6 13C2-PFOA									
415.00 > 370.00	1.828	1.827	0.001		864139	10.0		6969	
* 7 13C4 PFOS									
503.00 > 80.00	2.079	2.083	-0.004		2246292	28.7		5298	
9 Perfluorononanoic acid									
463.00 > 419.00	2.094	2.093	0.001	1.000	701242	10.0		130	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.086	2.109	-0.023	1.000	1627539	19.4		2714	
499.00 > 99.00	2.086	2.109	-0.023	1.000	362010		4.50(0.00-0.00)	1289	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.253	2.253	0.0	1.000	754115	9.67		3724	

**Reagents:**

LC537-L3\_00025

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_005.d

Injection Date: 30-Aug-2018 16:28:48

Instrument ID: A8\_N

Lims ID: IC L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 4

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

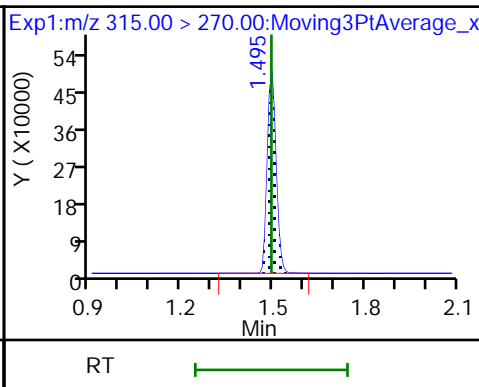
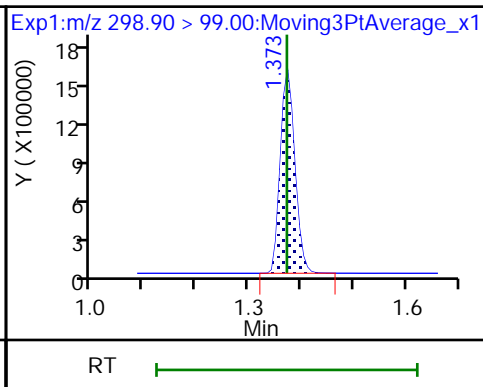
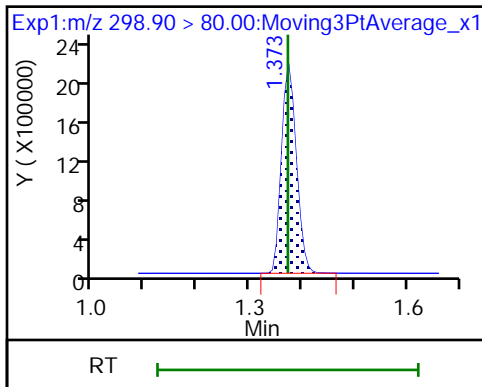
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

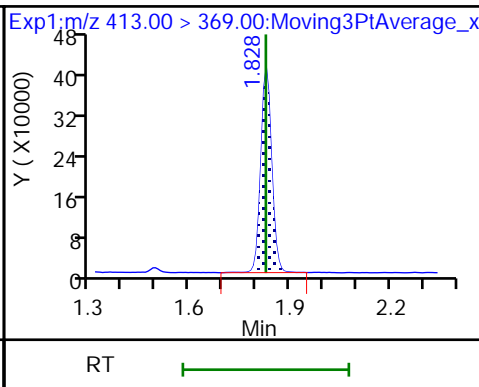
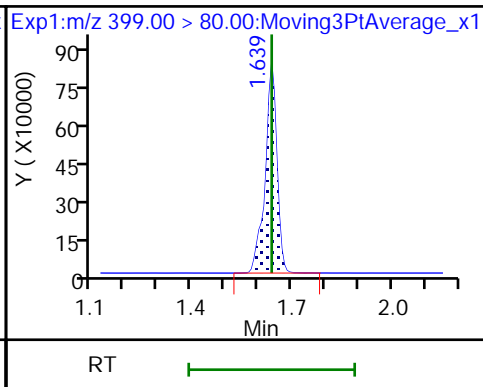
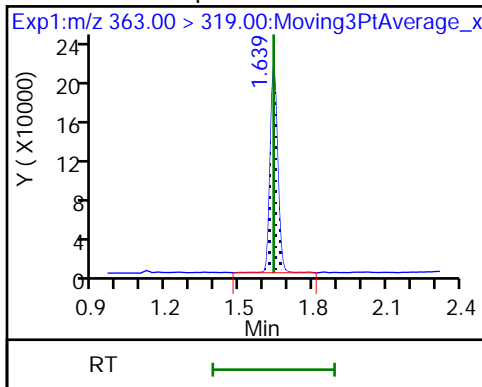
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

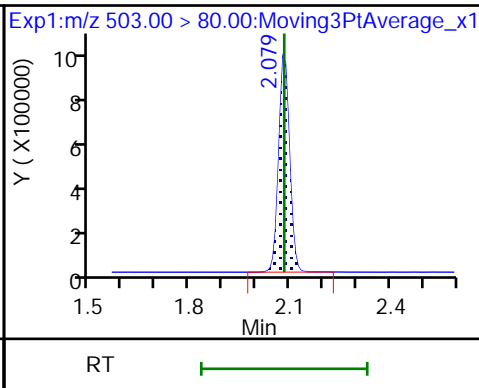
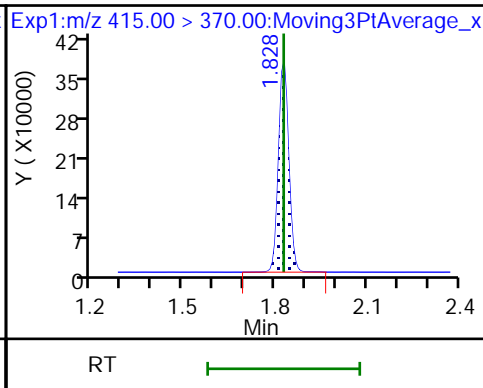
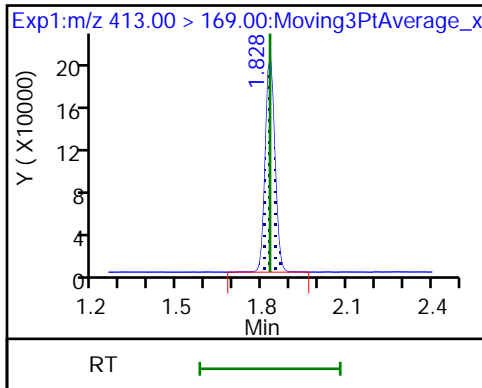
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

\* 6 13C2-PFOA

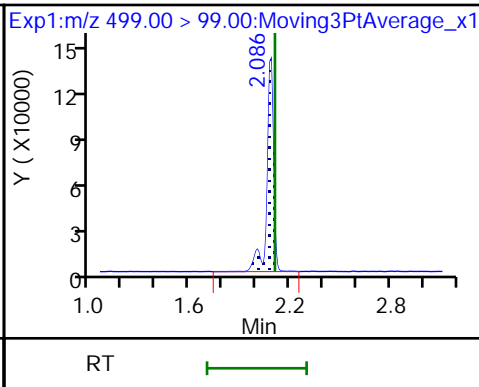
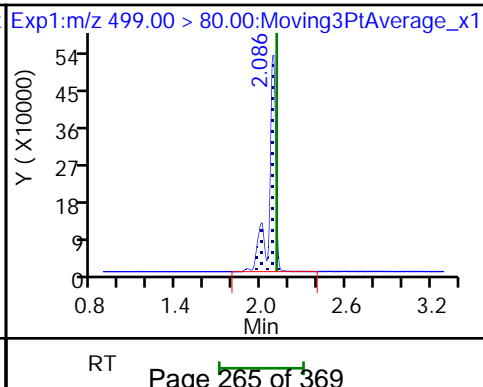
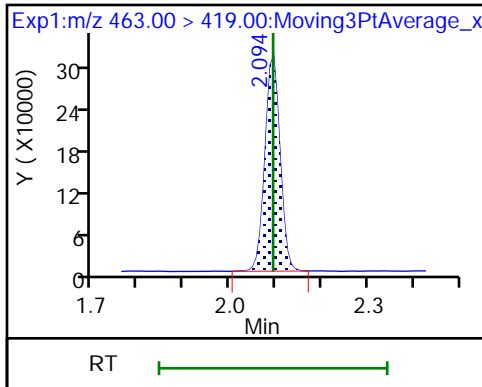
\* 7 13C4 PFOS



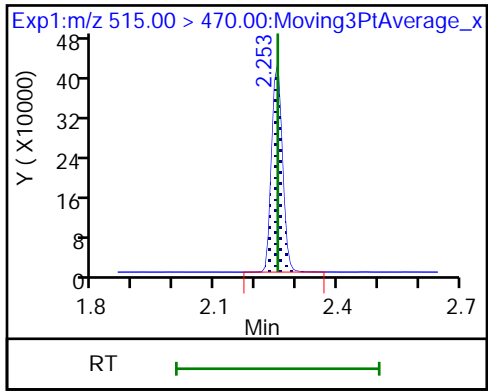
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_006.d  
 Lims ID: IC L4  
 Client ID:  
 Sample Type: ICISAV Calib Level: 4  
 Inject. Date: 30-Aug-2018 16:33:28 ALS Bottle#: 4 Worklist Smp#: 5  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: L4\_537  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9

Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 17:07:03 Calib Date: 30-Aug-2018 16:42:48  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 16:47:47

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.373	1.372	0.001	1.000	8657186	91.9		21276	
298.90 > 99.00	1.373	1.372	0.001	1.000	6156478		1.41(0.00-0.00)	12068	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.495	1.493	0.002	1.000	1005876	10.0		9296	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.639	1.639	0.0	1.000	4465219	31.6		2661	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.639	1.639	0.0	1.000	1011347	10.5		280	
* 6 13C2-PFOA									
415.00 > 370.00	1.828	1.827	0.001		884013	10.0		6353	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.828	1.827	0.001	1.000	1899747	19.9		294	
413.00 > 169.00	1.828	1.827	0.001	1.000	1058455		1.79(0.00-0.00)	3204	
* 7 13C4 PFOS									
503.00 > 80.00	2.079	2.083	-0.004		2375494	28.7		5107	
9 Perfluorononanoic acid									
463.00 > 419.00	2.094	2.093	0.001	1.000	1462550	20.4		267	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.086	2.109	-0.023	1.000	3612214	40.7		6141	
499.00 > 99.00	2.079	2.109	-0.030	0.996	775288		4.66(0.00-0.00)	2519	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.253	2.253	0.0	1.000	841794	10.6		4709	

**Reagents:**

LC537-L4\_00022

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_006.d

Injection Date: 30-Aug-2018 16:33:28

Instrument ID: A8\_N

Lims ID: IC L4

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 4

Worklist Smp#: 5

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

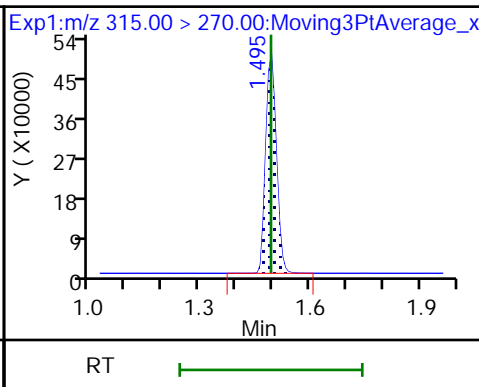
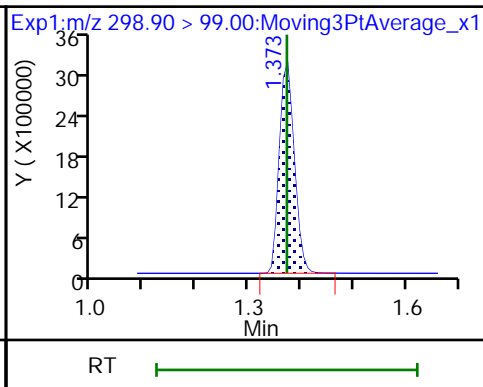
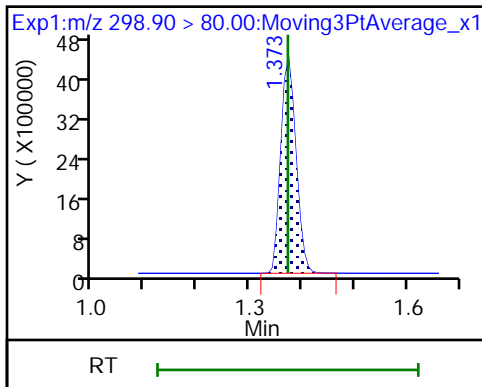
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

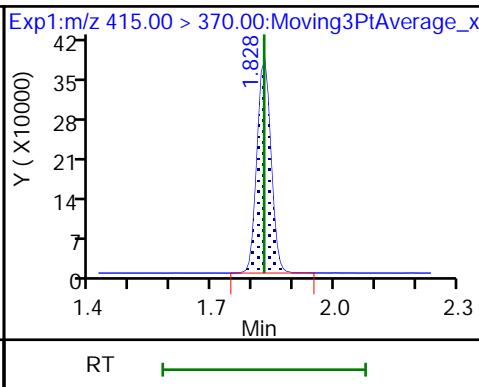
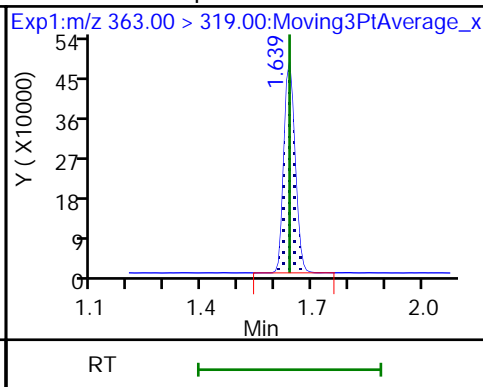
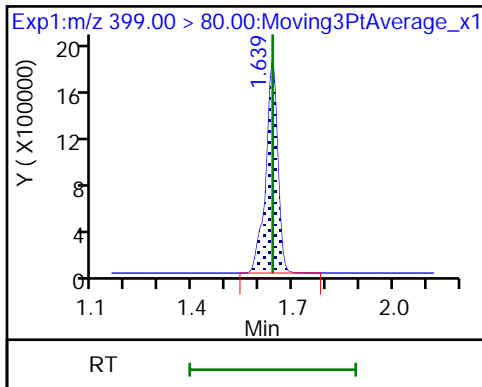
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

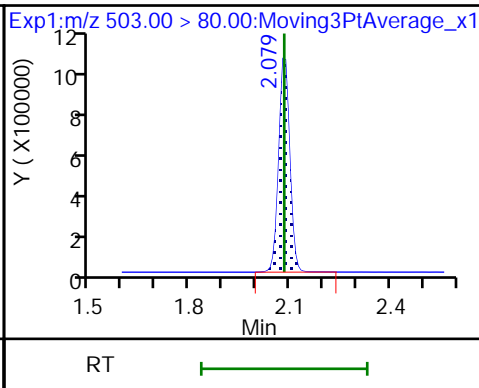
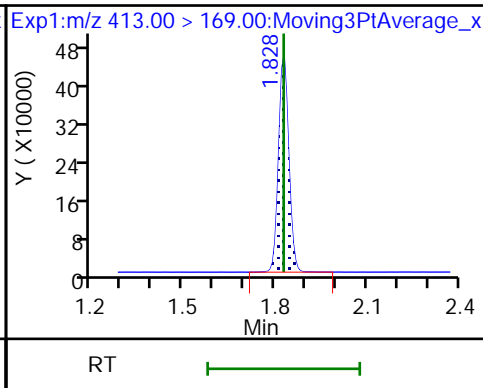
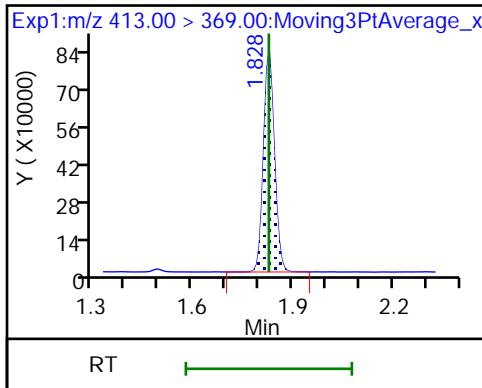
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

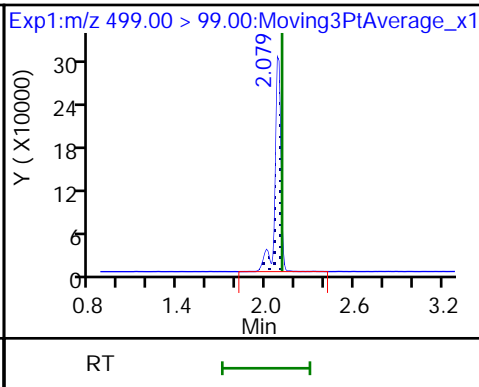
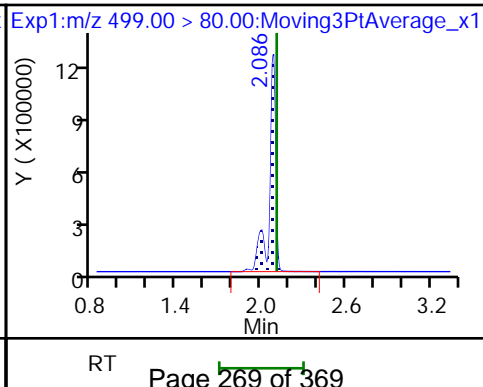
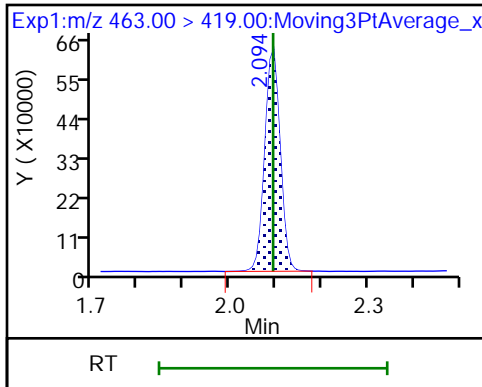
\* 7 13C4 PFOS



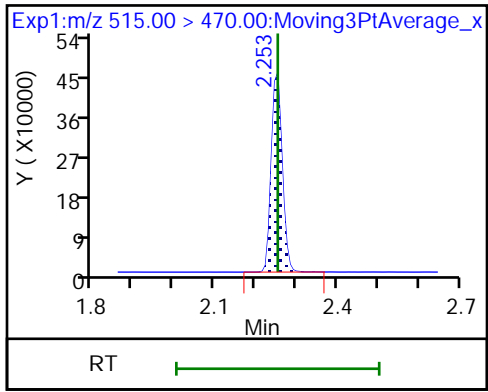
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA





TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_007.d  
 Lims ID: IC L5  
 Client ID:  
 Sample Type: IC Calib Level: 5  
 Inject. Date: 30-Aug-2018 16:38:09 ALS Bottle#: 5 Worklist Smp#: 6  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: L5\_537  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 17:07:04 Calib Date: 30-Aug-2018 16:42:48  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 16:48:57

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.373	1.372	0.001	1.000	11998694	129.3		24682	
298.90 > 99.00	1.373	1.372	0.001	1.000	8649032		1.39(0.00-0.00)	16832	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.495	1.493	0.002	1.000	1059885	10.3		10382	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.639	1.639	0.0	1.000	1464161	14.9		393	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.639	1.639	0.0	1.000	6473859	46.5		3818	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.828	1.827	0.001	1.000	2960649	30.4		452	
413.00 > 169.00	1.828	1.827	0.001	1.000	1546610		1.91(0.00-0.00)	4716	
* 6 13C2-PFOA									
415.00 > 370.00	1.828	1.827	0.001		902081	10.0		7371	
* 7 13C4 PFOS									
503.00 > 80.00	2.086	2.083	0.003		2339063	28.7		5475	
9 Perfluorononanoic acid									
463.00 > 419.00	2.094	2.093	0.001	1.000	2171914	29.7		409	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.086	2.109	-0.023	1.000	5279410	60.4		8022	
499.00 > 99.00	2.086	2.109	-0.023	1.000	1146085		4.61(0.00-0.00)	3820	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.253	2.253	0.0	1.000	823302	10.1		4442	

**Reagents:**

LC537-L5\_00026

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_007.d

Injection Date: 30-Aug-2018 16:38:09

Instrument ID: A8\_N

Lims ID: IC L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 6

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

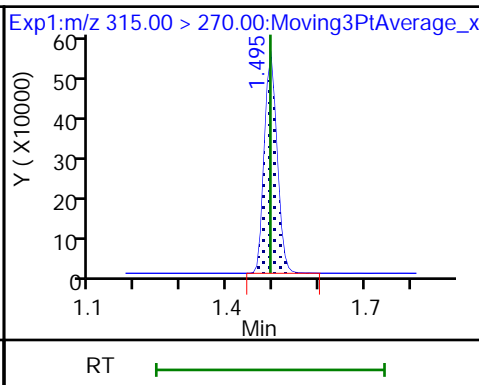
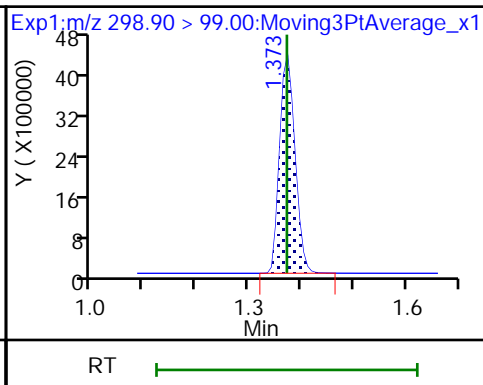
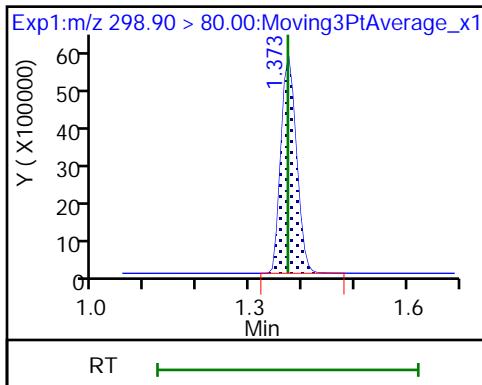
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

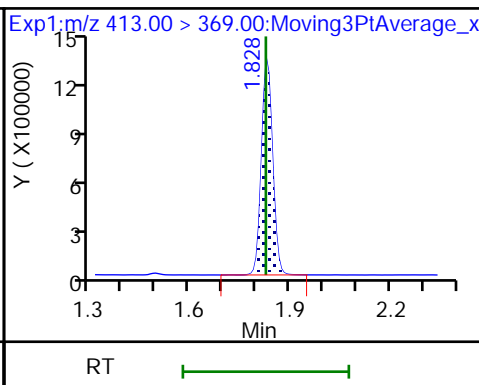
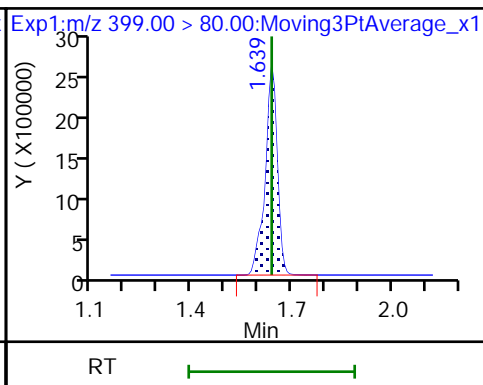
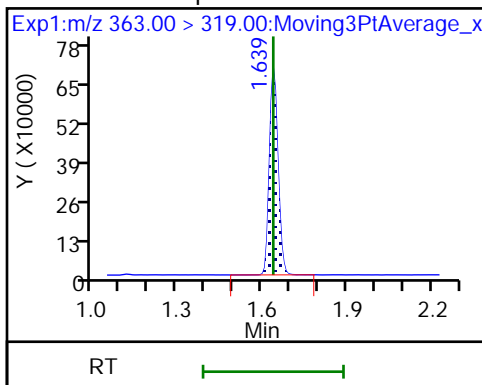
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

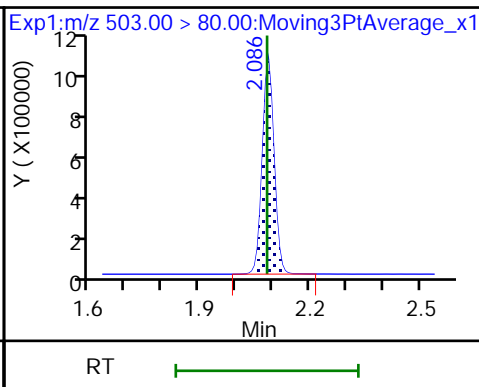
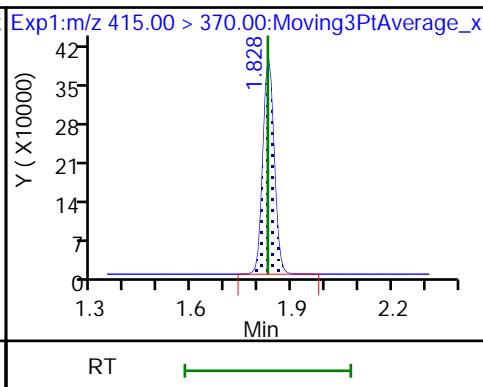
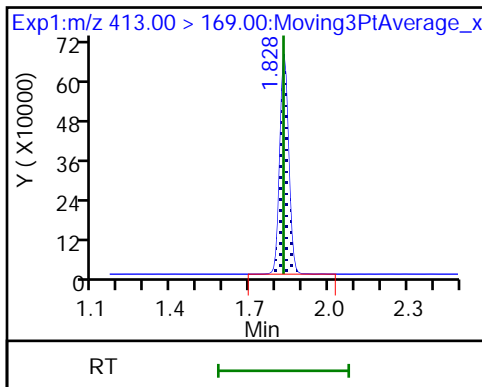
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

\* 6 13C2-PFOA

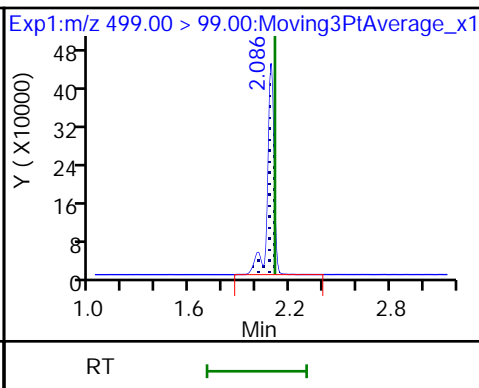
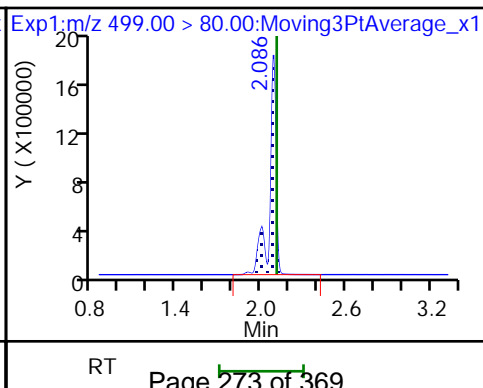
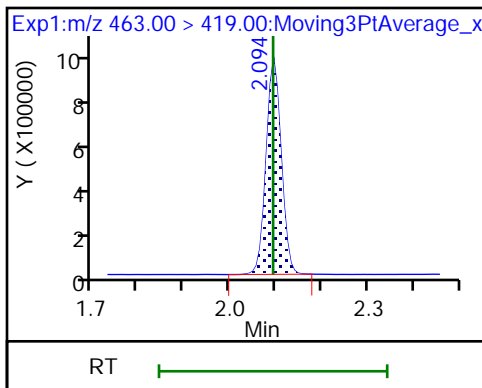
\* 7 13C4 PFOS



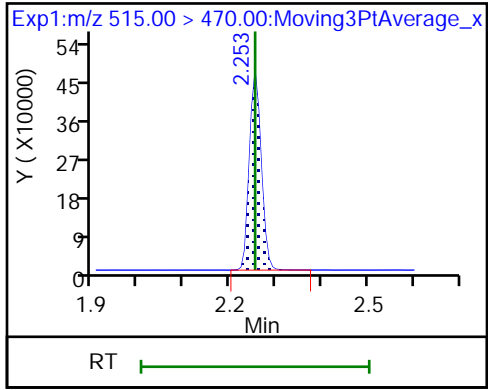
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d  
 Lims ID: IC L6  
 Client ID:  
 Sample Type: IC Calib Level: 6  
 Inject. Date: 30-Aug-2018 16:42:48 ALS Bottle#: 6 Worklist Smp#: 7  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: L6\_537  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 17:07:05 Calib Date: 30-Aug-2018 16:42:48  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 16:58:18

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.372	-0.006	1.000	14291597	157.2		21954	
298.90 > 99.00	1.366	1.372	-0.006	1.000	10507057		1.36(0.00-0.00)	16029	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.487	1.493	-0.006	1.000	1004475	10.0		9632	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.639	1.639	0.0	1.000	8080418	59.3		4290	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.639	1.639	0.0	1.000	1861705	19.3		487	
* 6 13C2-PFOA									
415.00 > 370.00	1.821	1.827	-0.006		883033	10.0		7408	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.821	1.827	-0.006	1.000	3735476	39.2		584	
413.00 > 169.00	1.821	1.827	-0.006	1.000	1966520		1.90(0.00-0.00)	5962	
* 7 13C4 PFOS									
503.00 > 80.00	2.079	2.083	-0.004		2291552	28.7		5219	
9 Perfluorononanoic acid									
463.00 > 419.00	2.086	2.093	-0.007	1.000	2774537	38.7		514	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.079	2.109	-0.030	1.000	6804405	79.4		8435	
499.00 > 99.00	2.079	2.109	-0.030	1.000	1472545		4.62(0.00-0.00)	4896	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.253	2.253	0.0	1.000	788559	9.90		4282	

**Reagents:**

LC537-L6\_00022

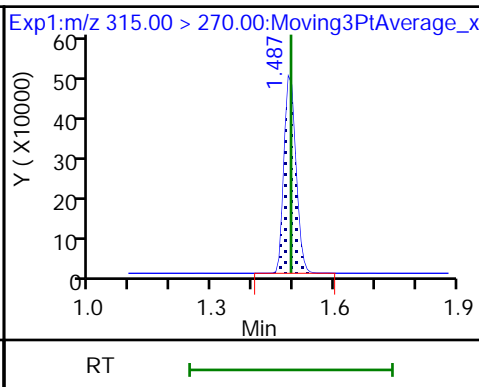
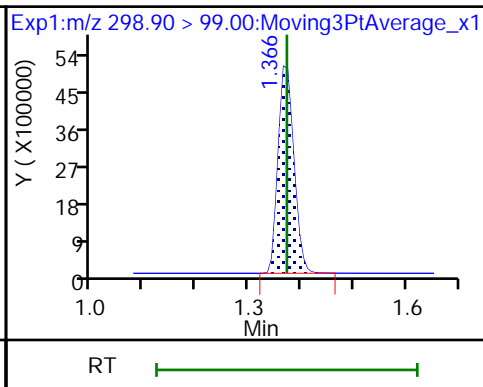
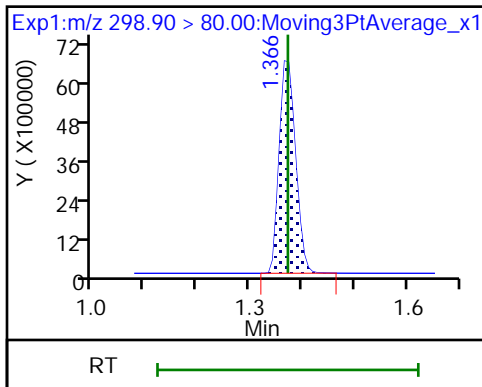
Amount Added: 1.00

Units: mL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

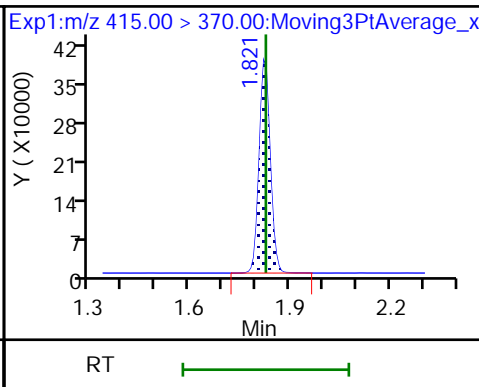
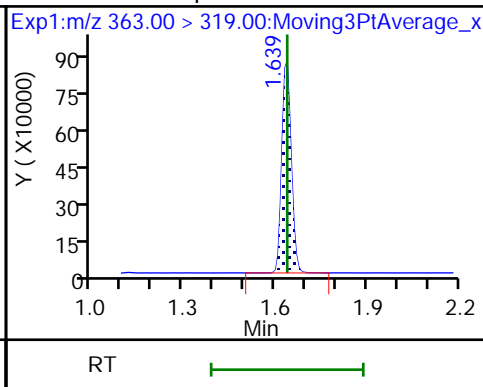
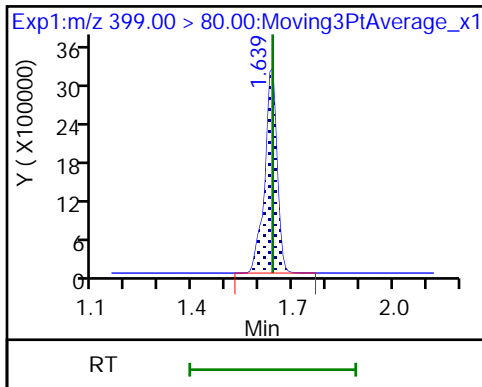
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

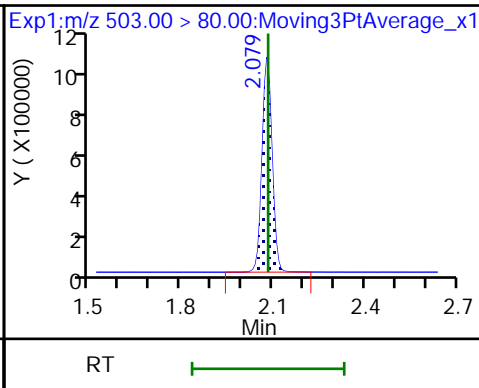
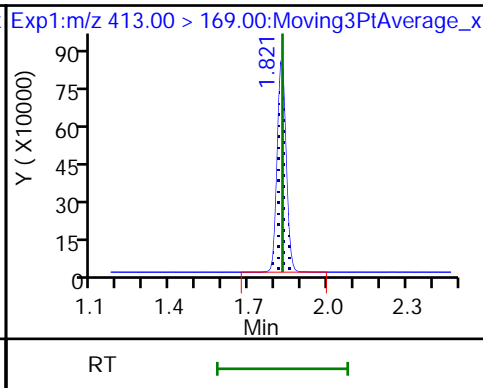
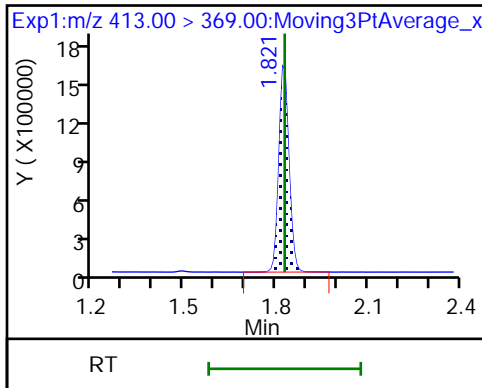
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

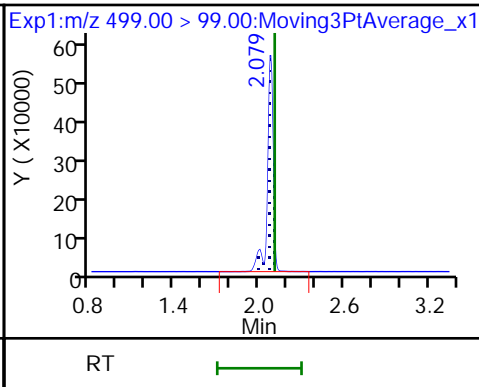
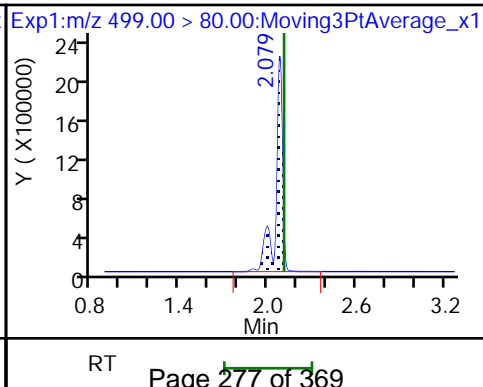
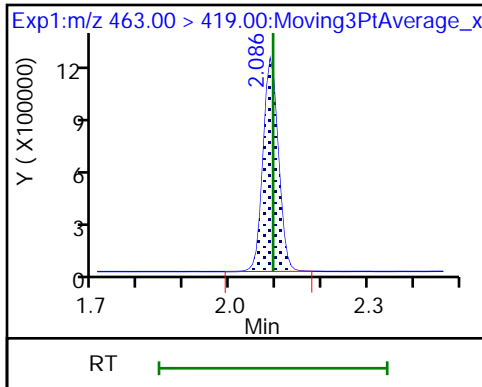
\* 7 13C4 PFOS



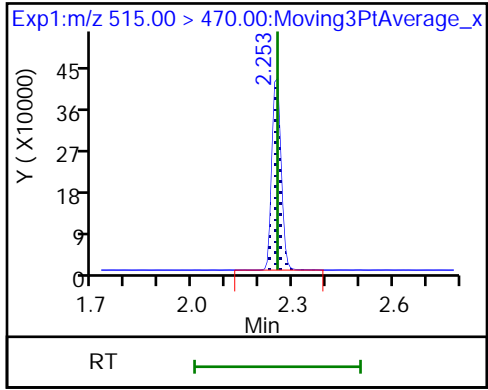
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA





**Calibration**

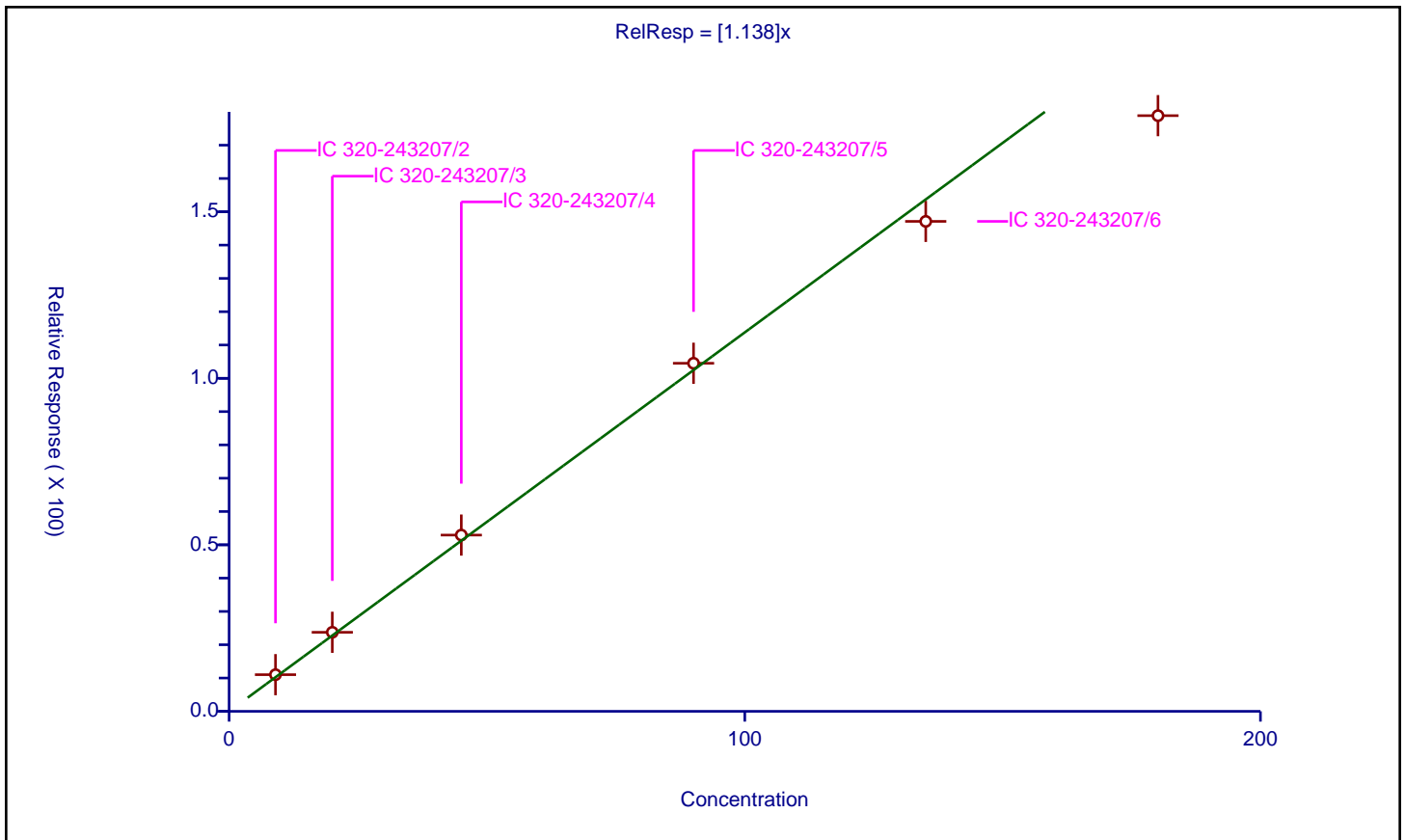
/ Perfluorobutanesulfonic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.138

Error Coefficients	
Standard Error:	9440000
Relative Standard Error:	7.3
Correlation Coefficient:	0.988
Coefficient of Determination (Adjusted):	0.991

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-243207/2	8.99912	11.005818	28.68	2306829.0	1.222988	Y
2	IC 320-243207/3	20.01376	23.736919	28.68	2478769.0	1.18603	Y
3	IC 320-243207/4	45.03096	52.923847	28.68	2246292.0	1.175277	Y
4	IC 320-243207/5	90.06192	104.520615	28.68	2375494.0	1.160542	Y
5	IC 320-243207/6	135.09288	147.119827	28.68	2339063.0	1.089027	Y
6	IC 320-243207/7	180.12384	178.866987	28.68	2291552.0	0.993022	Y



**Calibration**

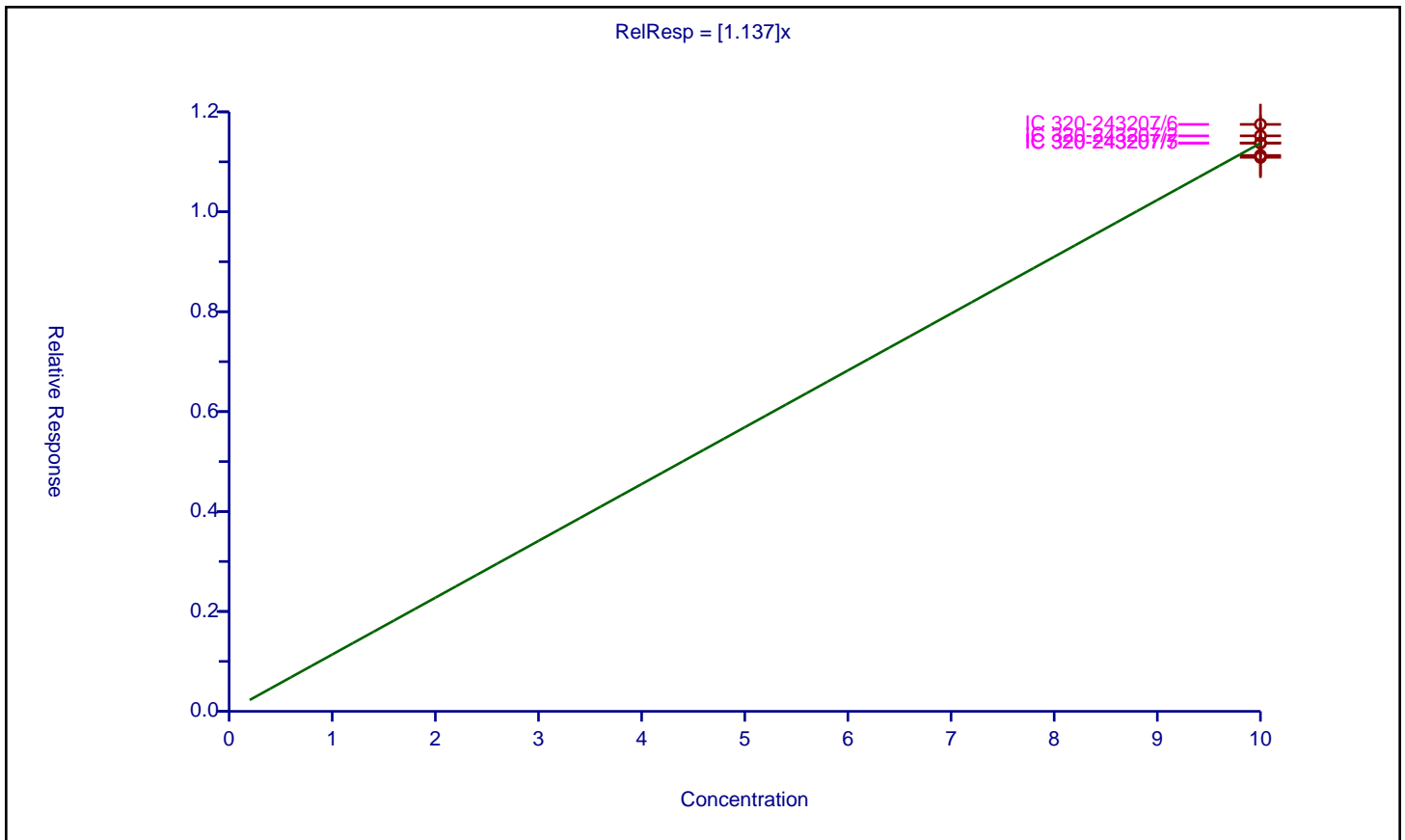
/ 13C2 PFHxA

**Curve Type:** Average  
**Weighting:** Conc\_Sq  
**Origin:** Force  
**Dependency:** Response  
**Calib Mode:** ISTD  
**Response Base:** AREA  
**RF Rounding:** 0

Curve Coefficients	
Intercept:	0
Slope:	1.137

Error Coefficients	
Standard Error:	1120000
Relative Standard Error:	2.2
Correlation Coefficient:	NA
Coefficient of Determination (Adjusted):	0

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-243207/2	10.0	11.520687	10.0	891025.0	1.152069	Y
2	IC 320-243207/3	10.0	11.089636	10.0	971912.0	1.108964	Y
3	IC 320-243207/4	10.0	11.128314	10.0	864139.0	1.112831	Y
4	IC 320-243207/5	10.0	11.37852	10.0	884013.0	1.137852	Y
5	IC 320-243207/6	10.0	11.749333	10.0	902081.0	1.174933	Y
6	IC 320-243207/7	10.0	11.375283	10.0	883033.0	1.137528	Y



**Calibration**

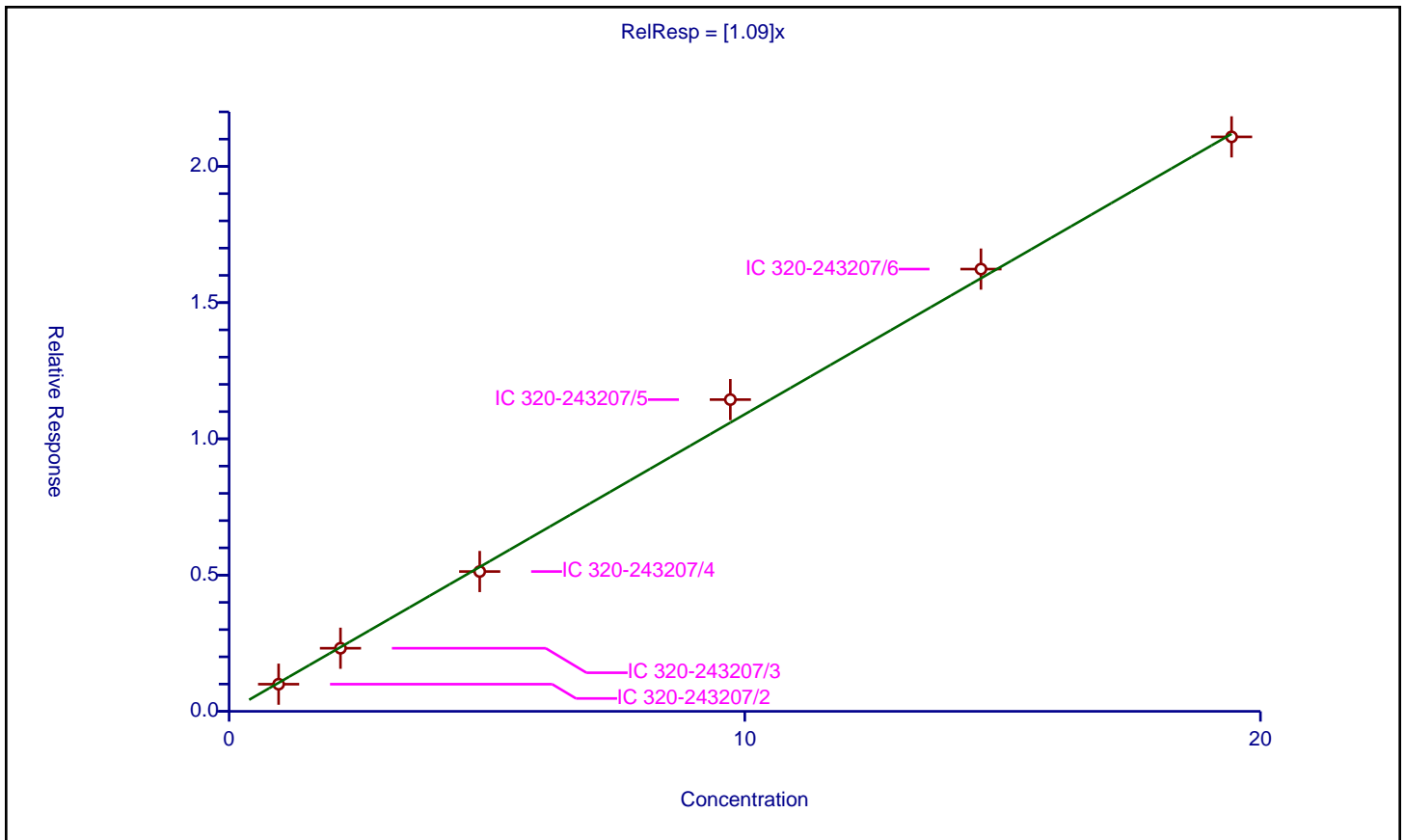
/ Perfluoroheptanoic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.09

Error Coefficients	
Standard Error:	1170000
Relative Standard Error:	4.6
Correlation Coefficient:	0.997
Coefficient of Determination (Adjusted):	0.997

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-243207/2	0.96	0.996549	10.0	891025.0	1.038072	Y
2	IC 320-243207/3	2.16	2.315683	10.0	971912.0	1.072075	Y
3	IC 320-243207/4	4.86	5.130737	10.0	864139.0	1.055707	Y
4	IC 320-243207/5	9.72	11.440409	10.0	884013.0	1.176997	Y
5	IC 320-243207/6	14.58	16.230926	10.0	902081.0	1.113232	Y
6	IC 320-243207/7	19.44	21.083074	10.0	883033.0	1.08452	Y



**Calibration**

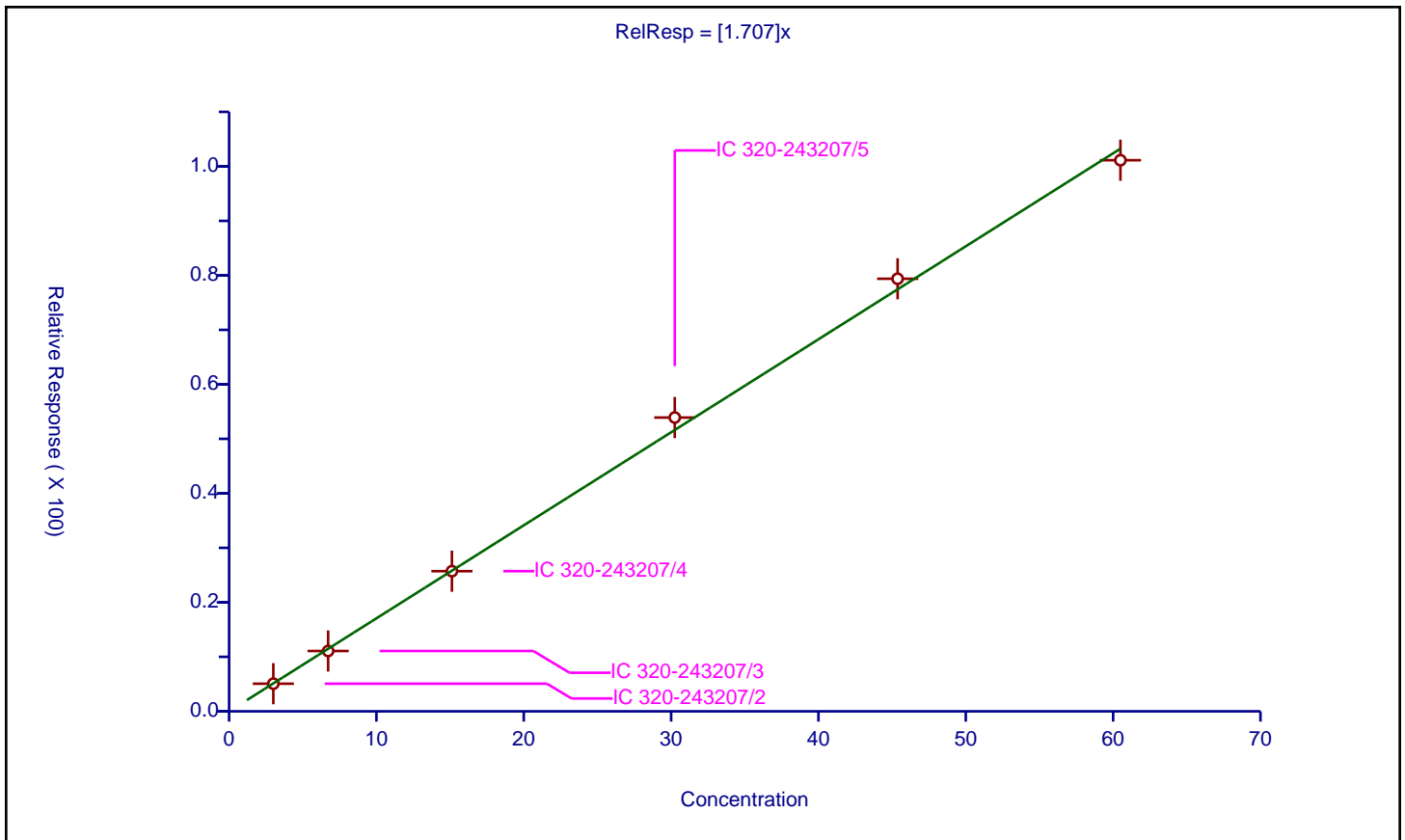
**/ Perfluorohexanesulfonic acid**

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.707

Error Coefficients	
Standard Error:	5140000
Relative Standard Error:	2.9
Correlation Coefficient:	0.996
Coefficient of Determination (Adjusted):	0.999

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-243207/2	3.003	5.071813	28.68	2306829.0	1.688915	Y
2	IC 320-243207/3	6.721867	11.073224	28.68	2478769.0	1.647344	Y
3	IC 320-243207/4	15.1242	25.718313	28.68	2246292.0	1.700474	Y
4	IC 320-243207/5	30.2484	53.909831	28.68	2375494.0	1.782237	Y
5	IC 320-243207/6	45.3726	79.378057	28.68	2339063.0	1.749471	Y
6	IC 320-243207/7	60.4968	101.130757	28.68	2291552.0	1.671671	Y



**Calibration**

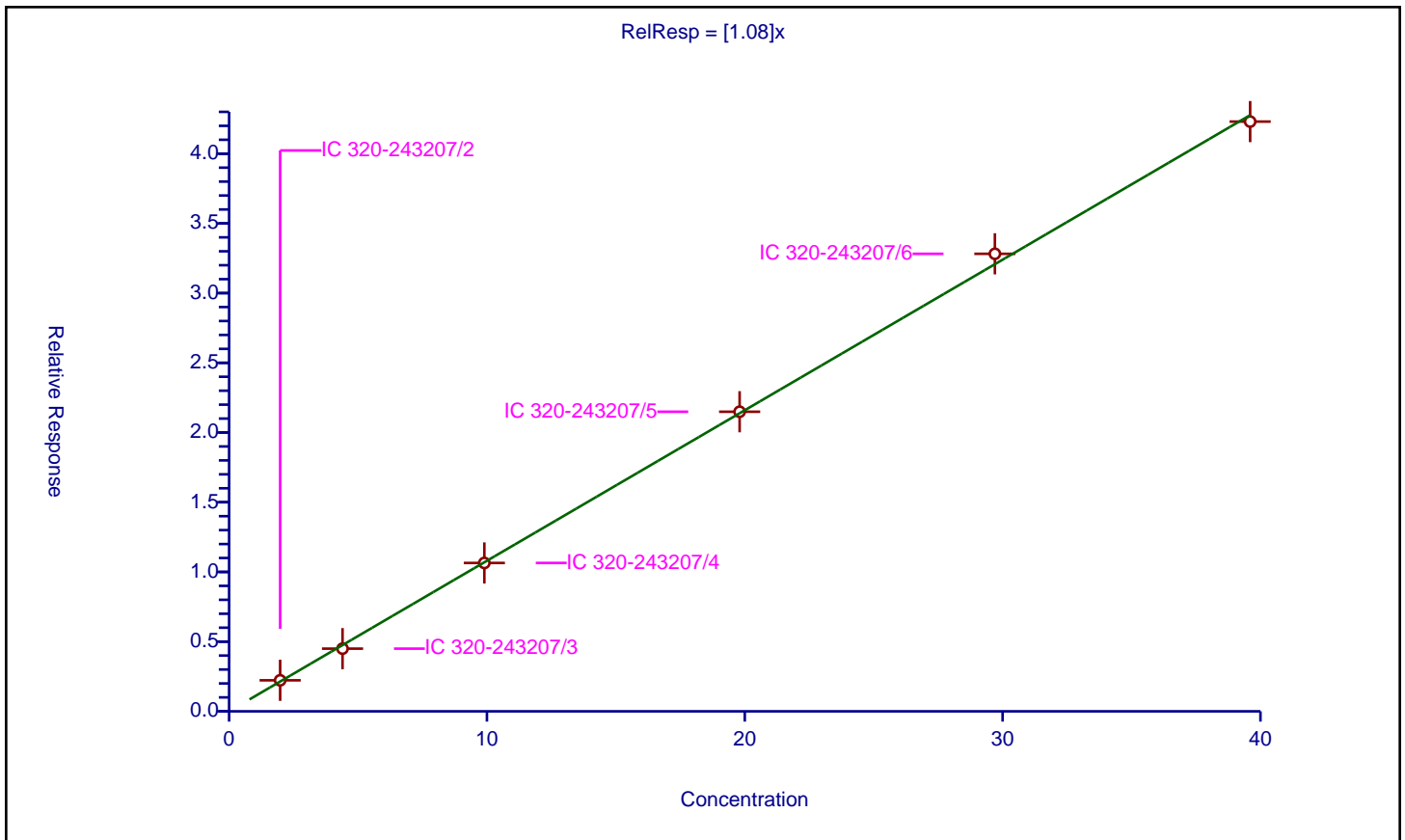
/ Perfluorooctanoic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.08

Error Coefficients	
Standard Error:	2340000
Relative Standard Error:	3.2
Correlation Coefficient:	0.998
Coefficient of Determination (Adjusted):	0.998

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-243207/2	1.98	2.225201	10.0	891025.0	1.123839	Y
2	IC 320-243207/3	4.4	4.497177	10.0	971912.0	1.022086	Y
3	IC 320-243207/4	9.9	10.642813	10.0	864139.0	1.075032	Y
4	IC 320-243207/5	19.8	21.490035	10.0	884013.0	1.085355	Y
5	IC 320-243207/6	29.7	32.820212	10.0	902081.0	1.105058	Y
6	IC 320-243207/7	39.6	42.30279	10.0	883033.0	1.068252	Y



**Calibration**

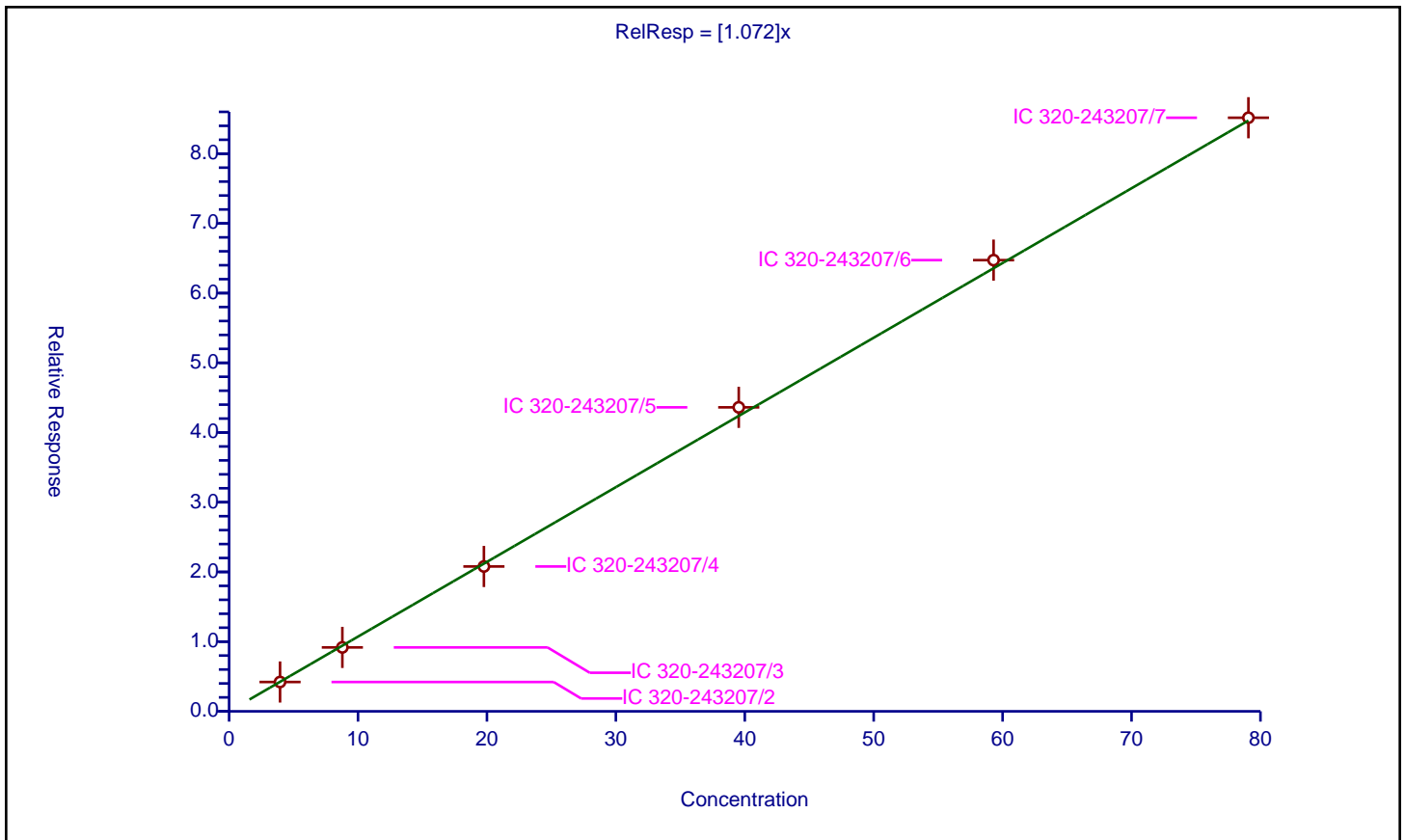
/ Perfluorooctane sulfonic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.072

Error Coefficients	
Standard Error:	4260000
Relative Standard Error:	2.1
Correlation Coefficient:	0.998
Coefficient of Determination (Adjusted):	0.999

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-243207/2	3.95328	4.209397	28.68	2306829.0	1.064786	Y
2	IC 320-243207/3	8.785067	9.171467	28.68	2478769.0	1.043984	Y
3	IC 320-243207/4	19.7664	20.779942	28.68	2246292.0	1.051276	Y
4	IC 320-243207/5	39.5328	43.611265	28.68	2375494.0	1.103167	Y
5	IC 320-243207/6	59.2992	64.732536	28.68	2339063.0	1.091626	Y
6	IC 320-243207/7	79.0656	85.160771	28.68	2291552.0	1.07709	Y



**Calibration**

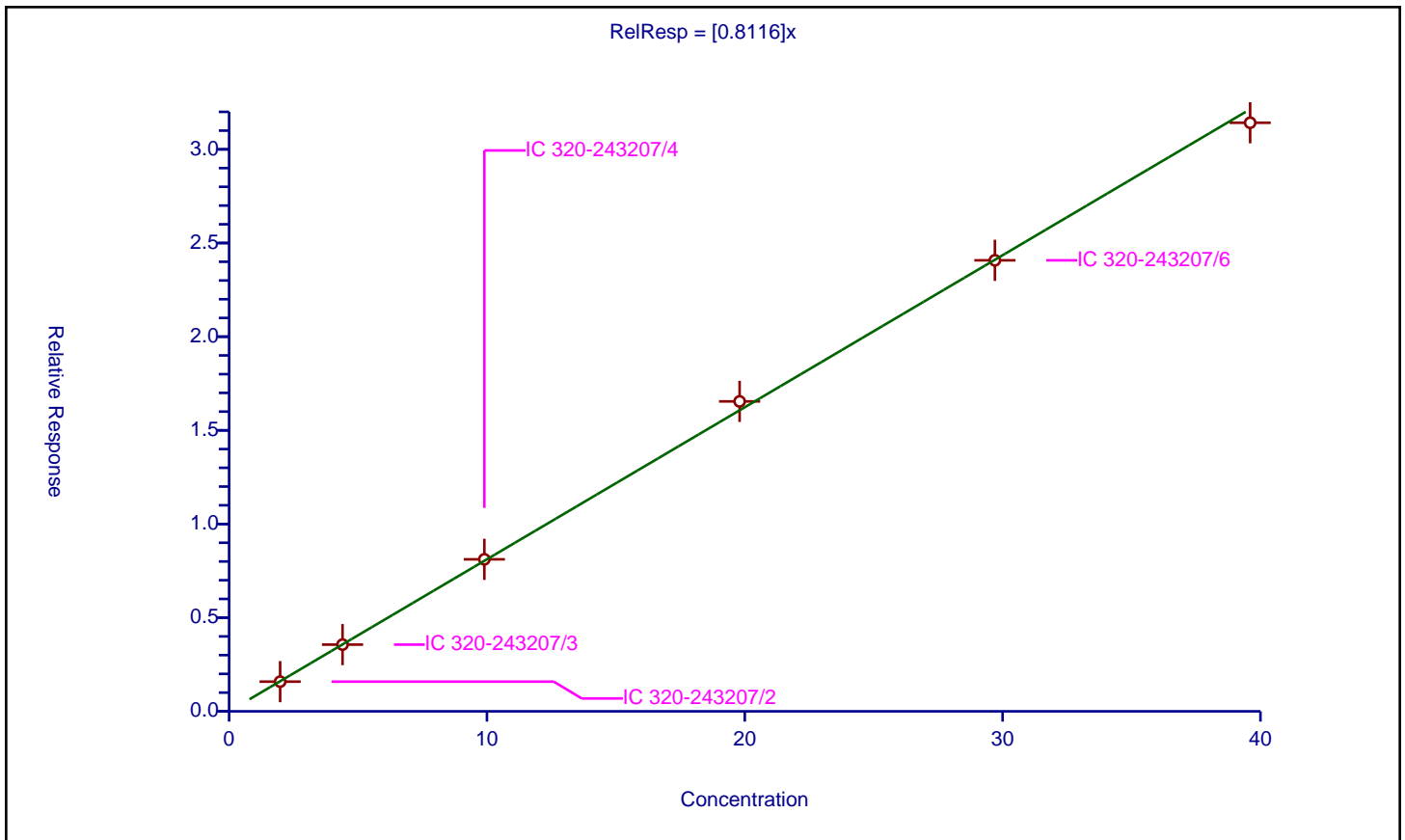
/ Perfluorononanoic acid

Curve Type: Average  
 Weighting: Conc\_Sq  
 Origin: Force  
 Dependency: Response  
 Calib Mode: ISTD  
 Response Base: AREA  
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	0.8116

Error Coefficients	
Standard Error:	1740000
Relative Standard Error:	1.8
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.999

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-243207/2	1.98	1.585556	10.0	891025.0	0.800786	Y
2	IC 320-243207/3	4.4	3.562411	10.0	971912.0	0.809639	Y
3	IC 320-243207/4	9.9	8.114921	10.0	864139.0	0.819689	Y
4	IC 320-243207/5	19.8	16.54444	10.0	884013.0	0.835578	Y
5	IC 320-243207/6	29.7	24.076707	10.0	902081.0	0.810664	Y
6	IC 320-243207/7	39.6	31.420536	10.0	883033.0	0.793448	Y



**Calibration**

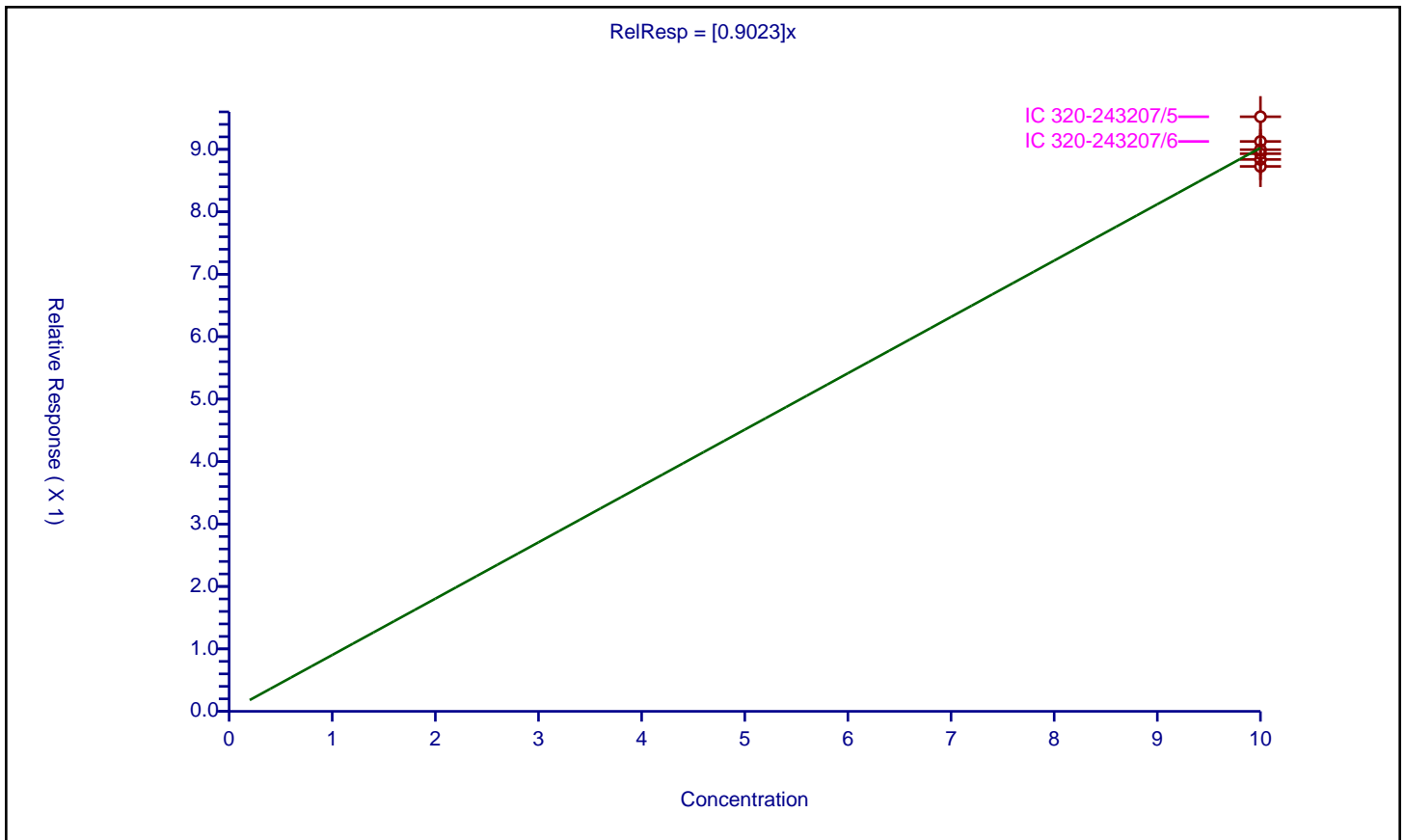
/ 13C2 PFDA

**Curve Type:** Average  
**Weighting:** Conc\_Sq  
**Origin:** Force  
**Dependency:** Response  
**Calib Mode:** ISTD  
**Response Base:** AREA  
**RF Rounding:** 0

Curve Coefficients	
Intercept:	0
Slope:	0.9023

Error Coefficients	
Standard Error:	890000
Relative Standard Error:	3.1
Correlation Coefficient:	NA
Coefficient of Determination (Adjusted):	0

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-243207/2	10.0	8.837968	10.0	891025.0	0.883797	Y
2	IC 320-243207/3	10.0	8.995372	10.0	971912.0	0.899537	Y
3	IC 320-243207/4	10.0	8.726779	10.0	864139.0	0.872678	Y
4	IC 320-243207/5	10.0	9.522417	10.0	884013.0	0.952242	Y
5	IC 320-243207/6	10.0	9.126697	10.0	902081.0	0.91267	Y
6	IC 320-243207/7	10.0	8.930119	10.0	883033.0	0.893012	Y





FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCVL 320-240166/9 Calibration Date: 08/15/2018 18:53  
 Instrument ID: A8\_N Calib Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/15/2018 18:44  
 Lab File ID: 2018.08.15\_537CURVE\_010.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.145	1.167		20.4	20.0	2.0	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.058	1.033		2.11	2.16	-2.4	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.656	1.611		6.54	6.72	-2.7	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.090	1.020		4.12	4.40	-6.4	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.080	1.039		8.45	8.79	-3.8	50.0
Perfluorononanoic acid (PFNA)	Ave	0.8243	0.8023		4.28	4.40	-2.7	50.0
13C2 PFHxA	Ave	1.039	1.002		9.64	10.0	-3.6	30.0
13C2 PFDA	Ave	0.7921	0.7658		9.67	10.0	-3.3	30.0

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_010.d  
 Lims ID: CCVL  
 Client ID:  
 Sample Type: CCVL  
 Inject. Date: 15-Aug-2018 18:53:52 ALS Bottle#: 2 Worklist Smp#: 9  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: CCV L2  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 16-Aug-2018 08:40:39 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK001

First Level Reviewer: roycea Date: 15-Aug-2018 19:08:57

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.381	1.381	0.0	1.000	1945320	20.4		4245	
298.90 > 99.00	1.381	1.381	0.0	1.000	1331599		1.46(0.00-0.00)	1955	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.502	1.505	-0.003	1.000	1009111	9.64		8281	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.654	1.654	0.0	1.000	901941	6.54		565	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.654	1.654	0.0	1.000	224502	2.11		42.5	M
* 6 13C2-PFOA									
415.00 > 370.00	1.844	1.850	-0.006		1006603	10.0		8231	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.844	1.850	-0.006	1.000	451556	4.12		60.4	
413.00 > 169.00	1.844	1.850	-0.006	1.000	246955		1.83(0.00-0.00)	568	
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.108	-0.006		2388436	28.7		5214	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.102	2.109	-0.007	1.000	760165	8.45		1715	
499.00 > 99.00	2.102	2.109	-0.007	1.000	165858		4.58(0.00-0.00)	275	
9 Perfluorononanoic acid									
463.00 > 419.00	2.109	2.116	-0.007	1.000	355358	4.28		52.6	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.271	-0.003	1.000	770892	9.67		5141	

**QC Flag Legend**

Review Flags

M - Manually Integrated

**Reagents:**

LC537-L2\_00022

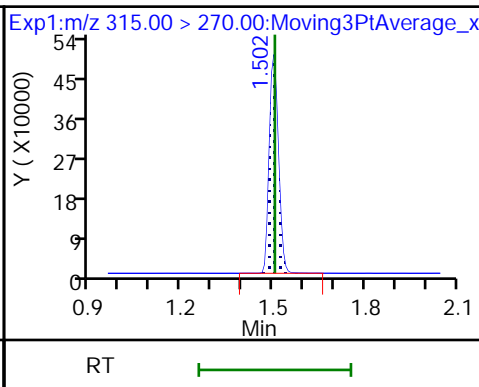
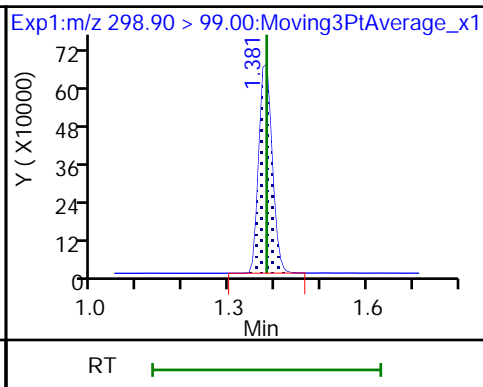
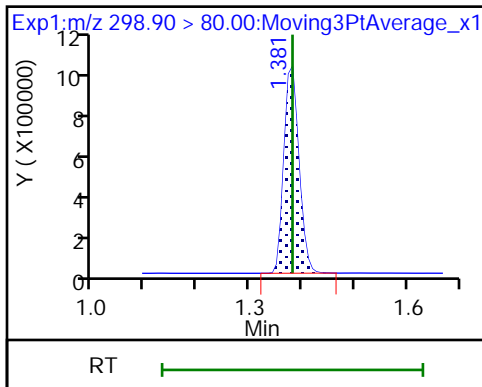
Amount Added: 1.00

Units: mL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

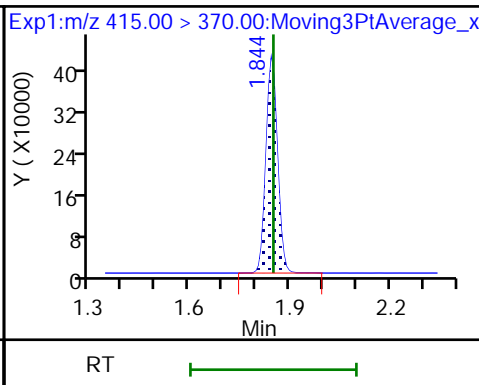
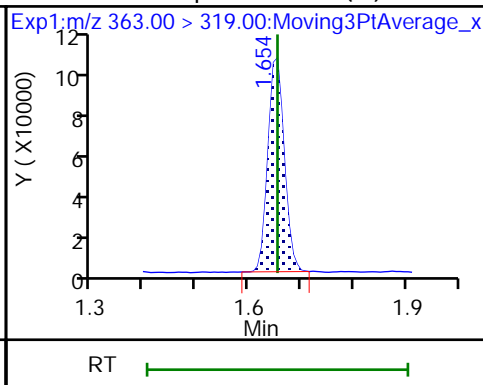
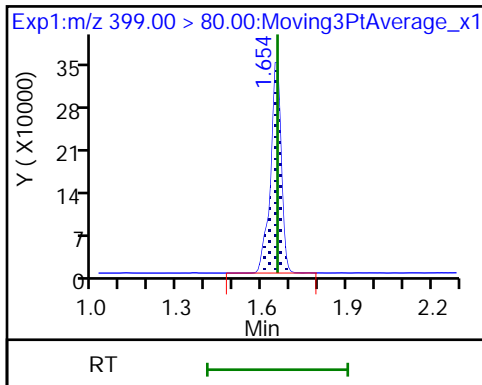
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid (M)

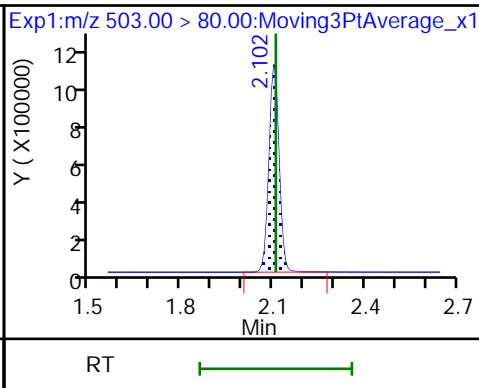
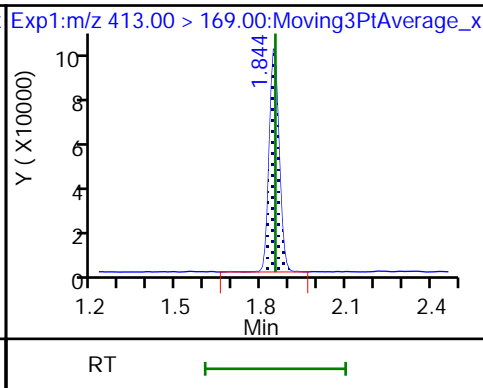
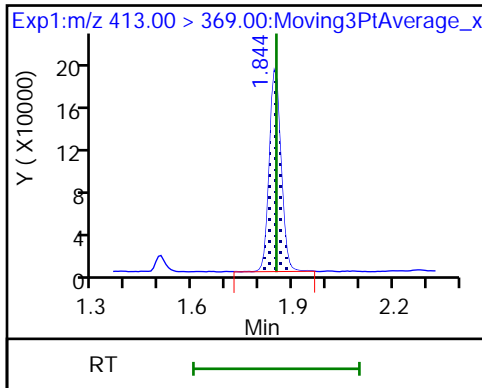
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

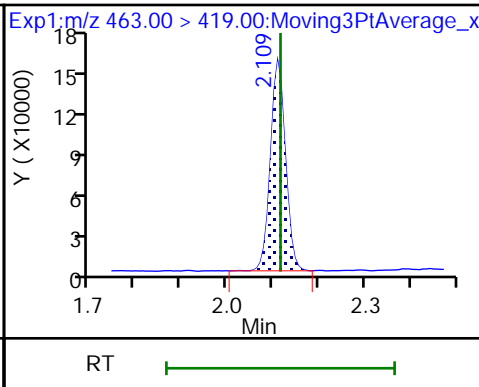
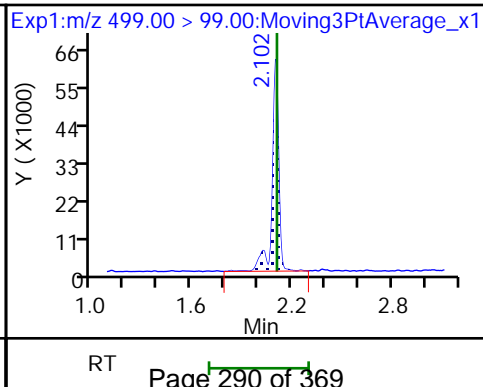
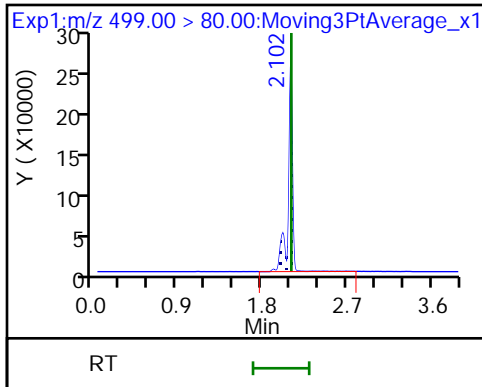
\* 7 13C4 PFOS



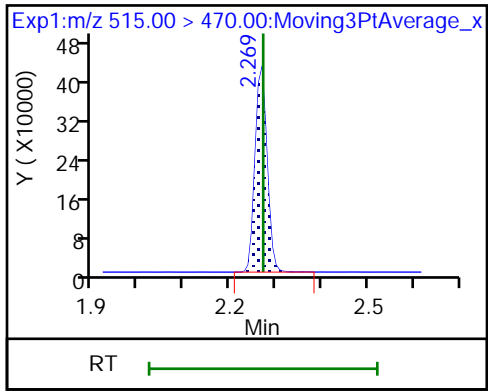
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

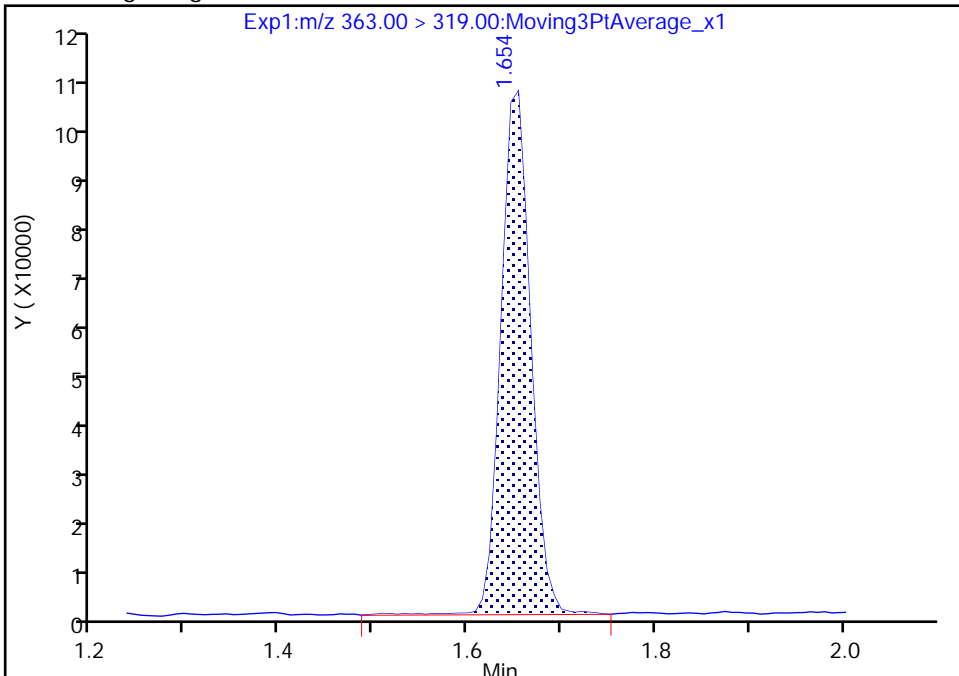
Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_010.d  
Injection Date: 15-Aug-2018 18:53:52 Instrument ID: A8\_N  
Lims ID: CCVL  
Client ID:  
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 9  
Injection Vol: 2.0 ul Dil. Factor: 1.0000  
Method: 537\_A8\_N Limit Group: LC 537 ICAL  
Column: Detector EXP1

4 Perfluoroheptanoic acid, CAS: 375-85-9

Signal: 1

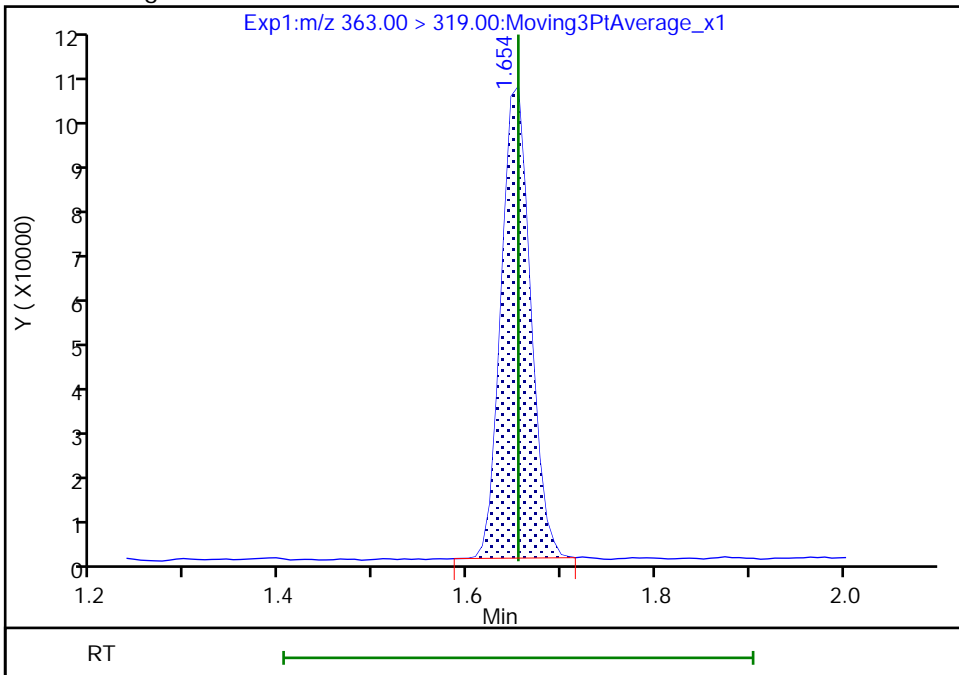
RT: 1.65  
Area: 229068  
Amount: 2.151895  
Amount Units: ng/ml

Processing Integration Results



RT: 1.65  
Area: 224502  
Amount: 2.109002  
Amount Units: ng/ml

Manual Integration Results



Reviewer: roycea, 15-Aug-2018 19:08:41  
Audit Action: Manually Integrated

Audit Reason: Baseline  
Page 292 of 369

FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: ICV 320-240166/11 Calibration Date: 08/15/2018 19:03  
 Instrument ID: A8\_N Calib Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/15/2018 18:44  
 Lab File ID: 2018.08.15\_537CURVE\_012.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.145	1.005		87.9	100	-12.2	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.058	0.9536		9.02	10.0	-9.8	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.656	1.530		18.6	20.2	-7.6	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.090	0.8802		16.3	20.2	-19.2	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.080	0.9603		17.9	20.2	-11.1	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8243	0.7757		19.0	20.2	-5.9	30.0
13C2 PFHxA	Ave	1.039	1.022		9.83	10.0	-1.7	30.0
13C2 PFDA	Ave	0.7921	0.7952		10.0	10.0	0.4	30.0

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_012.d  
 Lims ID: ICV  
 Client ID:  
 Sample Type: ICV  
 Inject. Date: 15-Aug-2018 19:03:12 ALS Bottle#: 7 Worklist Smp#: 11  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: ICV  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist:

Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 16-Aug-2018 08:40:40 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK001

First Level Reviewer: roycea Date: 15-Aug-2018 19:11:27

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.381	1.381	0.0	1.000	8951923	87.9		13197	
298.90 > 99.00	1.373	1.381	-0.008	0.995	6353811		1.41(0.00-0.00)	8112	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.502	1.505	-0.003	1.000	1044443	9.83		9288	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.646	1.654	-0.008	1.000	2744582	18.6		1806	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.646	1.654	-0.008	1.000	974881	9.02		176	
* 6 13C2-PFOA									
415.00 > 370.00	1.844	1.850	-0.006		1022273	10.0		7889	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.844	1.850	-0.006	1.000	1814661	16.3		244	
413.00 > 169.00	1.844	1.850	-0.006	1.000	963434		1.88(0.00-0.00)	2245	
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.108	-0.006		2551643	28.7		5068	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.102	2.109	-0.007	1.000	1723342	17.9		2659	
499.00 > 99.00	2.102	2.109	-0.007	1.000	346840		4.97(0.00-0.00)	526	
9 Perfluorononanoic acid									
463.00 > 419.00	2.109	2.116	-0.007	1.000	1598983	19.0		227	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.261	2.271	-0.010	1.000	812885	10.0		5447	



**Reagents:**

LC537-ICV\_00032

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_012.d

Injection Date: 15-Aug-2018 19:03:12

Instrument ID: A8\_N

Lims ID: ICV

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 7

Worklist Smp#: 11

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

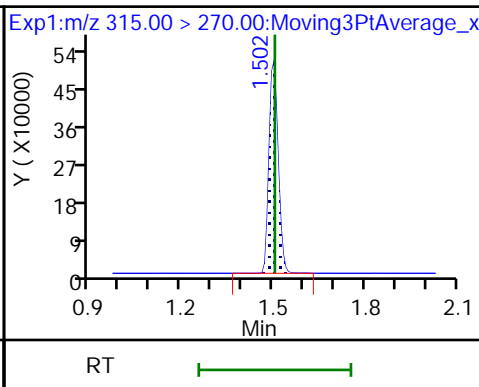
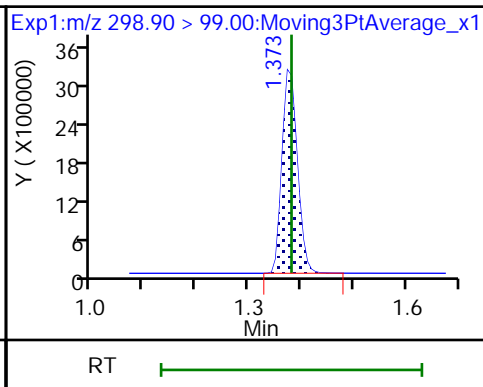
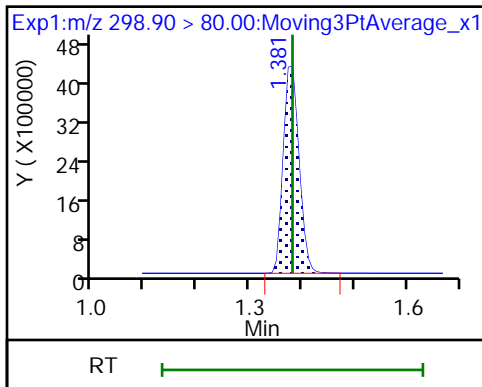
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

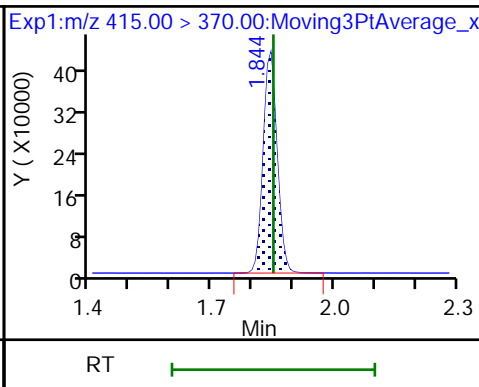
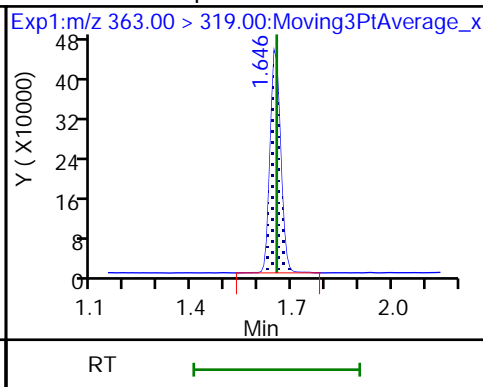
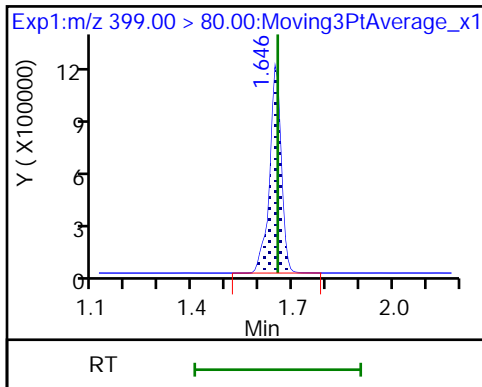
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

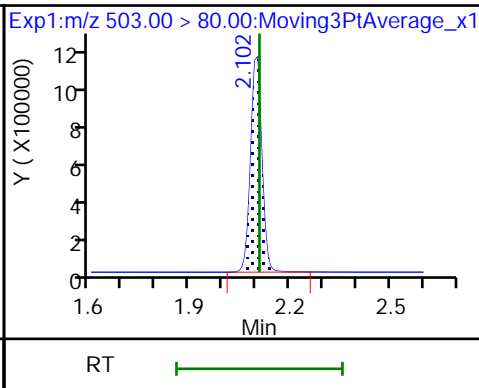
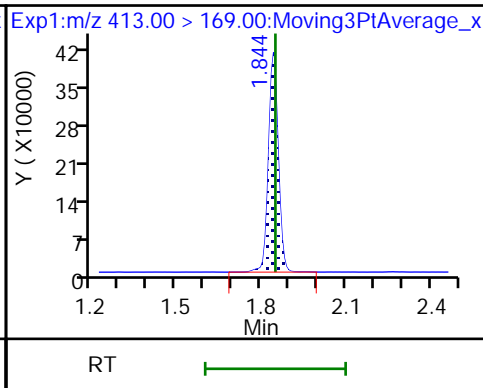
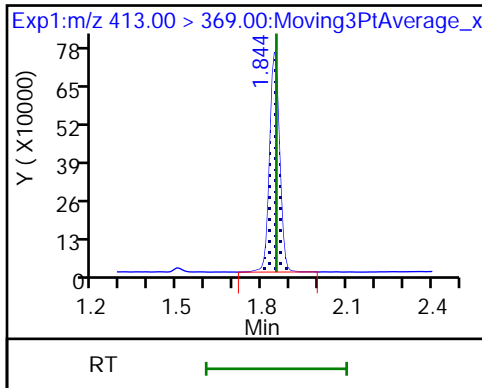
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

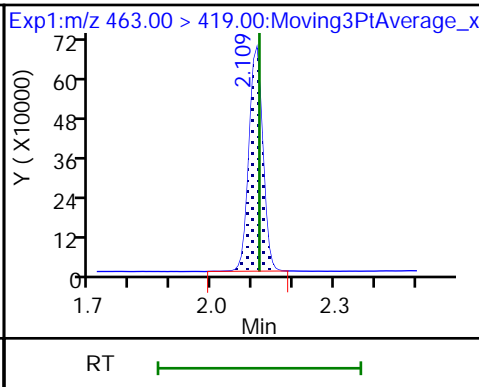
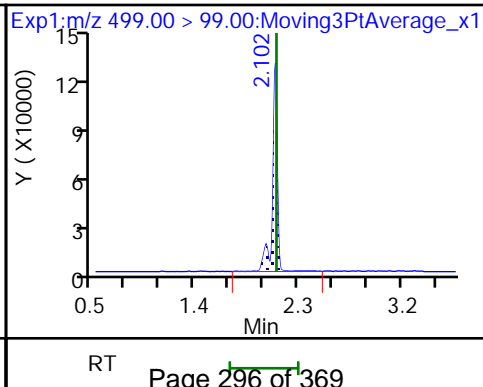
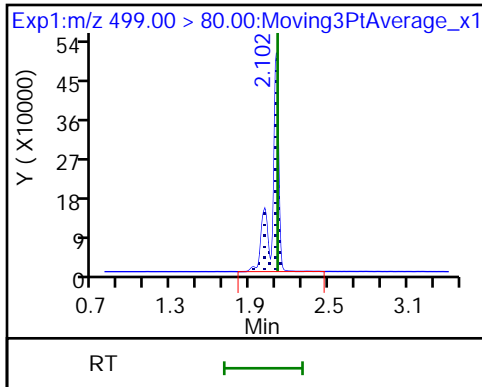
\* 7 13C4 PFOS



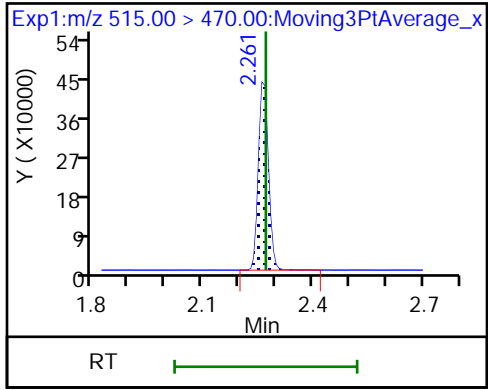
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCVL 320-242979/1 Calibration Date: 08/30/2018 02:44  
 Instrument ID: A8\_N Calib Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/15/2018 18:44  
 Lab File ID: 2018.08.29\_537B\_003.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.145	1.243		21.7	20.0	8.6	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.058	1.024		2.09	2.16	-3.2	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.656	1.597		6.48	6.72	-3.6	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.090	1.040		4.20	4.40	-4.6	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.080	1.054		8.57	8.79	-2.4	50.0
Perfluorononanoic acid (PFNA)	Ave	0.8243	0.7376		3.94	4.40	-10.5	50.0
13C2 PFHxA	Ave	1.039	1.065		10.2	10.0	2.5	30.0
13C2 PFDA	Ave	0.7921	0.9126		11.5	10.0	15.2	30.0

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63500.b\2018.08.29\_537B\_003.d  
 Lims ID: CCVL  
 Client ID:  
 Sample Type: CCVL  
 Inject. Date: 30-Aug-2018 02:44:28 ALS Bottle#: 2 Worklist Smp#: 1  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: CCVL  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63500.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 10:06:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.366	0.0	1.000	2470032	21.7		10433	
298.90 > 99.00	1.366	1.366	0.0	1.000	1664841		1.48(0.00-0.00)	4748	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.487	1.479	0.008	1.000	1213956	10.2		10411	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.639	1.631	0.008	1.000	1065902	6.48		783	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.639	1.631	0.008	1.000	252081	2.09		74.9	
* 6 13C2-PFOA									
415.00 > 370.00	1.836	1.813	0.023		1139590	10.0		8605	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.836	1.821	0.015	1.000	521451	4.20		82.4	
413.00 > 169.00	1.836	1.821	0.015	1.000	267751		1.95(0.00-0.00)	806	
* 7 13C4 PFOS									
503.00 > 80.00	2.094	2.071	0.023		2847783	28.7		7645	
9 Perfluorononanoic acid									
463.00 > 419.00	2.102	2.079	0.023	1.000	369851	3.94		64.8	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.094	2.109	-0.015	1.000	919591	8.57		1552	
499.00 > 99.00	2.094	2.109	-0.015	1.000	208082		4.42(0.00-0.00)	675	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.253	2.246	0.007	1.000	1039994	11.5		5611	

Reagents:

LC537-L2\_00022 Amount Added: 1.00 Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63500.b\2018.08.29\_537B\_003.d

Injection Date: 30-Aug-2018 02:44:28

Instrument ID: A8\_N

Lims ID: CCVL

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 1

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

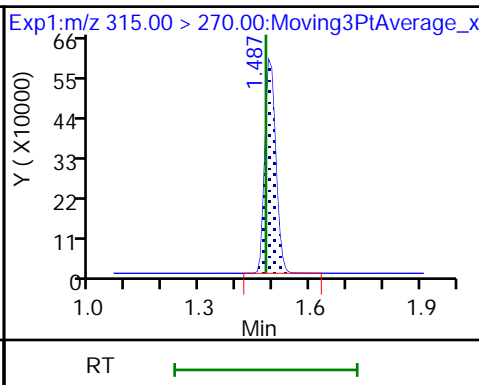
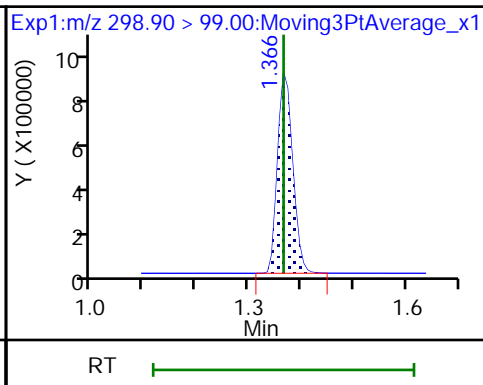
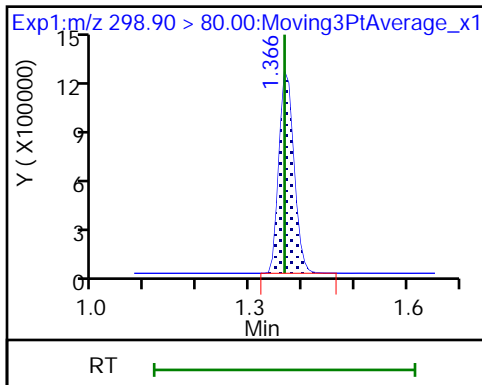
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

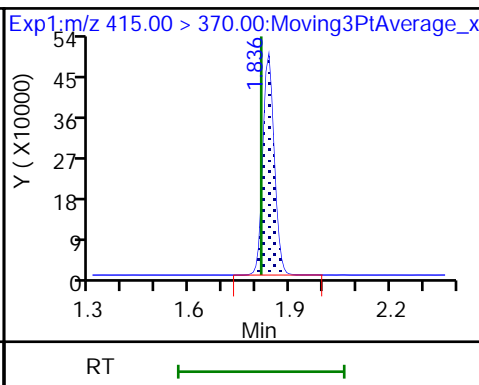
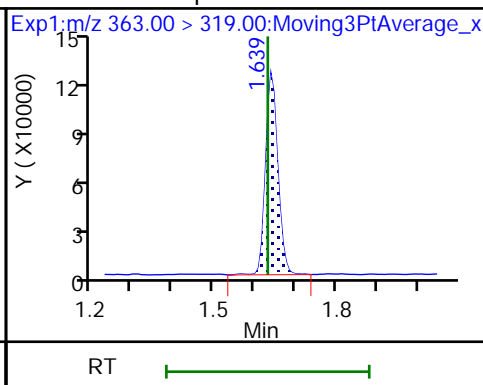
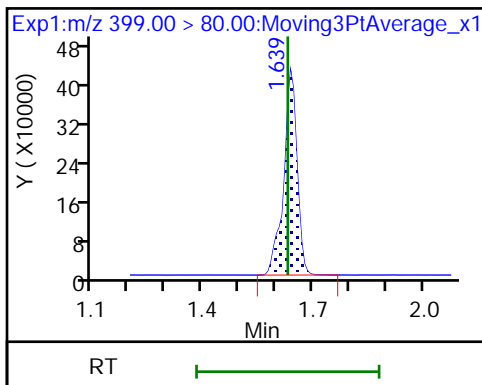
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

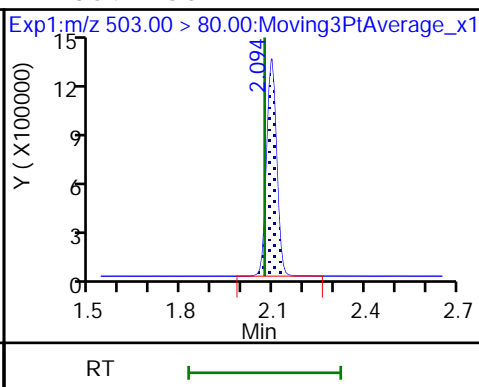
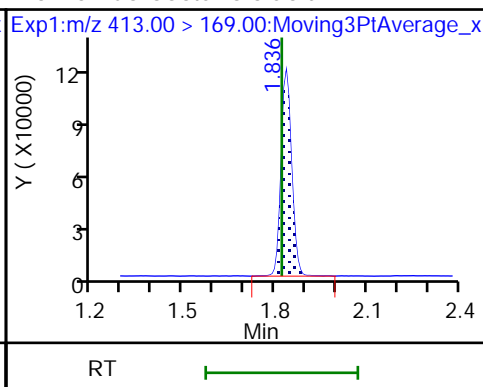
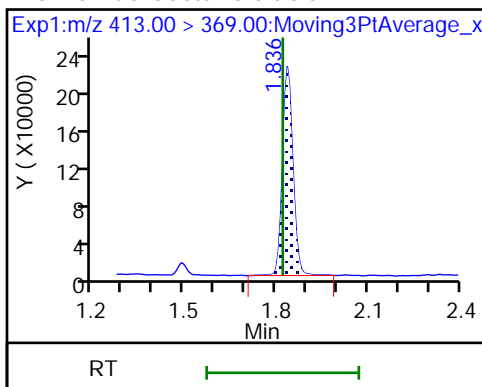
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

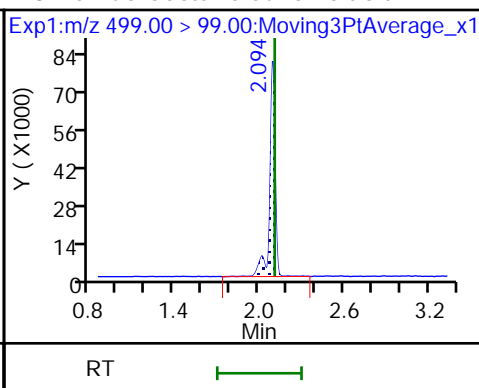
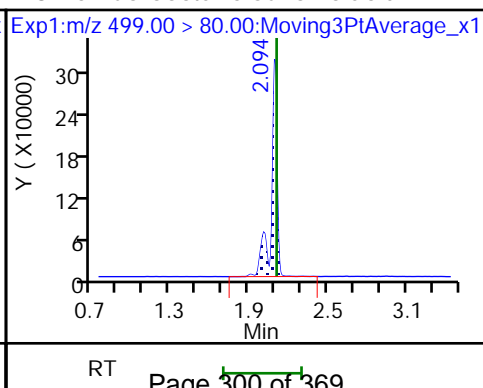
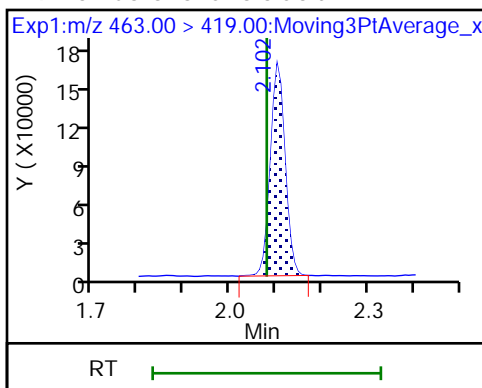
\* 7 13C4 PFOS



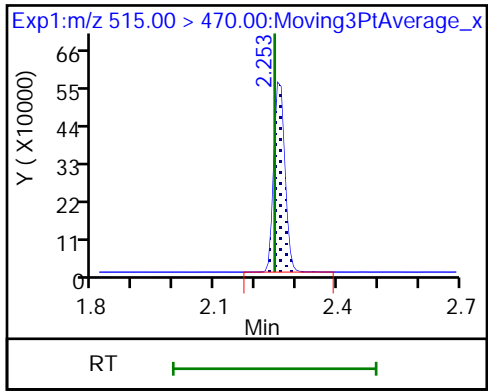
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCV 320-242992/18 Calibration Date: 08/30/2018 06:42  
 Instrument ID: A8\_N Calib Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/15/2018 18:44  
 Lab File ID: 2018.08.29\_537B\_054.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.145	1.248		49.1	45.0	9.0	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.058	1.135		5.21	4.86	7.3	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.656	1.706		15.6	15.1	3.0	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.090	1.076		9.78	9.90	-1.2	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.080	1.044		19.1	19.8	-3.4	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8243	0.8280		9.94	9.90	0.5	30.0
13C2 PFHxA	Ave	1.039	1.139		11.0	10.0	9.6	30.0
13C2 PFDA	Ave	0.7921	0.9459		11.9	10.0	19.4	30.0



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_054.d  
 Lims ID: CCV L3  
 Client ID:  
 Sample Type: CCVIS  
 Inject. Date: 30-Aug-2018 06:42:50 ALS Bottle#: 3 Worklist Smp#: 18  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: CCV L3  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 11:23:09 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.366	0.0	1.000	4600049	49.1		13987	
298.90 > 99.00	1.366	1.366	0.0	1.000	3114660		1.48(0.00-0.00)	7815	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.487	1.487	0.0	1.000	1003308	11.0		11295	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.631	1.631	0.0	1.000	2112721	15.6		1453	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.631	1.631	0.0	1.000	485679	5.21		127	
* 6 13C2-PFOA									
415.00 > 370.00	1.821	1.821	0.0		880773	10.0		6280	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.821	1.821	0.0	1.000	938305	9.78		152	
413.00 > 169.00	1.821	1.821	0.0	1.000	490193		1.91(0.00-0.00)	1777	
* 7 13C4 PFOS									
503.00 > 80.00	2.079	2.079	0.0		2347911	28.7		6124	
9 Perfluorononanoic acid									
463.00 > 419.00	2.086	2.086	0.0	1.000	722026	9.94		119	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.079	2.109	-0.030	1.000	1688998	19.1		3153	
499.00 > 99.00	2.079	2.109	-0.030	1.000	382080		4.42(0.00-0.00)	1200	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.246	0.0	1.000	833083	11.9		4891	

Reagents:

LC537-L3\_00025 Amount Added: 1.00 Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_054.d

Injection Date: 30-Aug-2018 06:42:50

Instrument ID: A8\_N

Lims ID: CCV L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 18

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

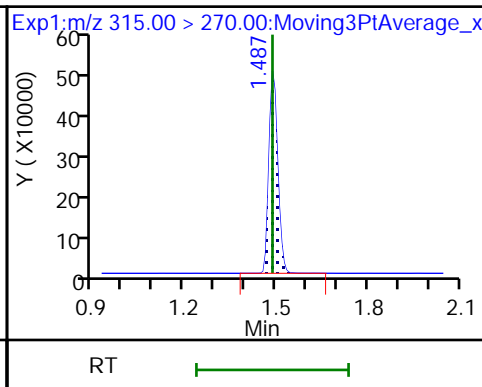
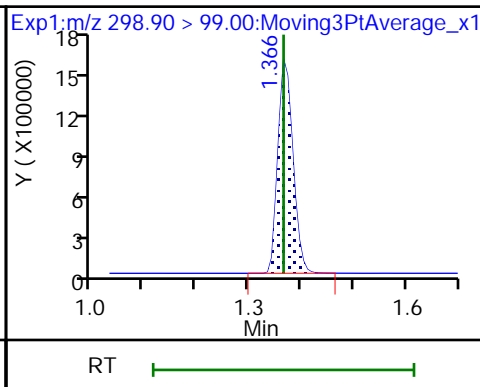
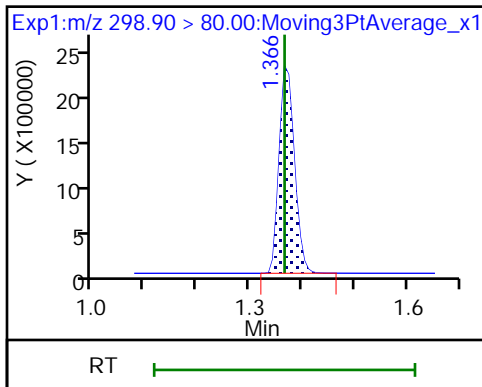
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

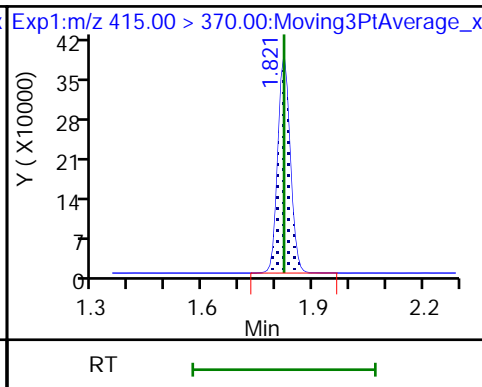
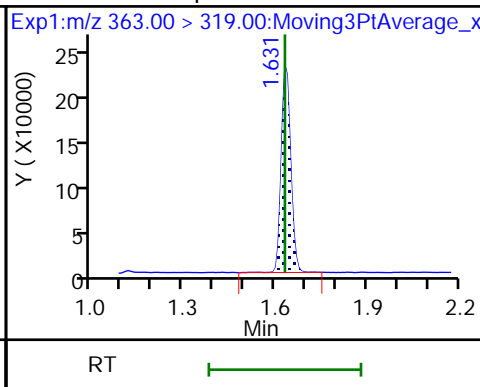
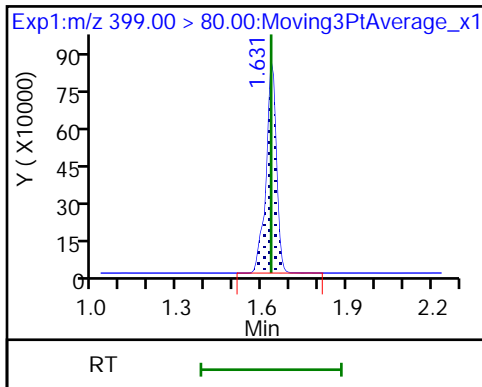
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

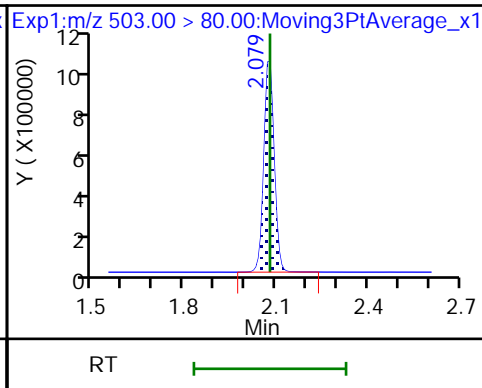
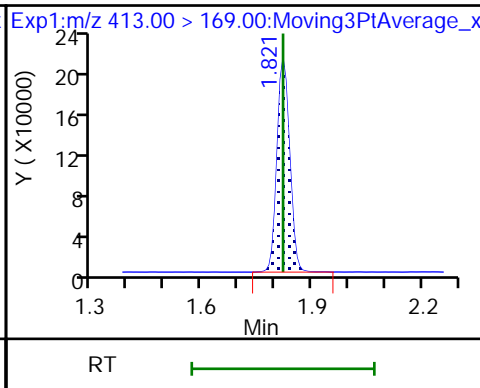
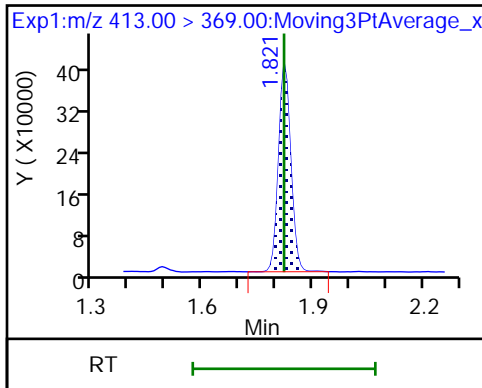
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

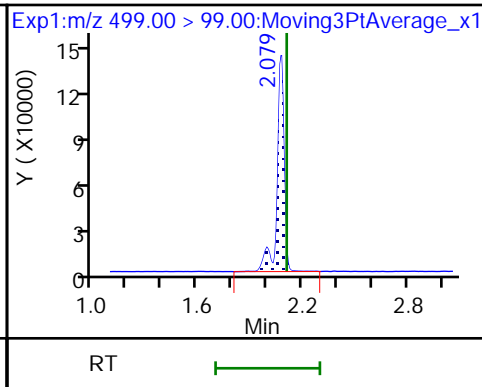
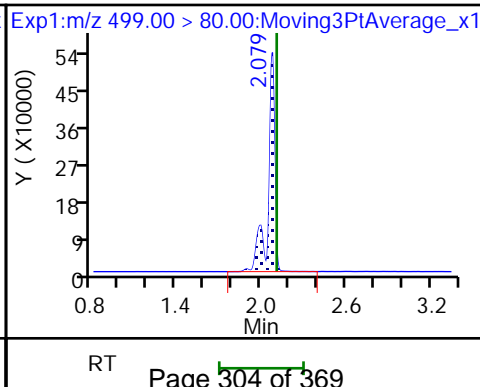
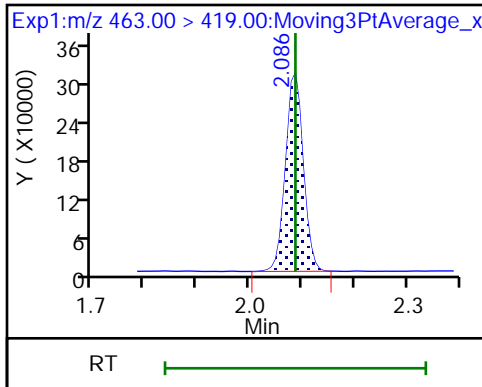
\* 7 13C4 PFOS



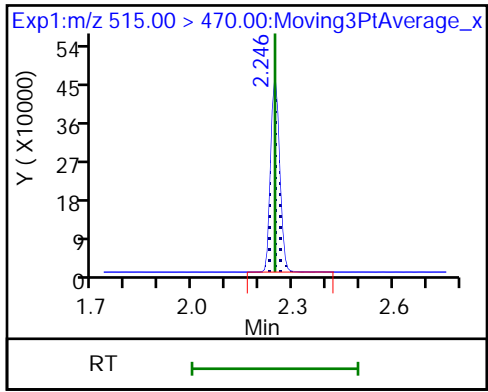
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCV 320-242992/30 Calibration Date: 08/30/2018 07:38  
 Instrument ID: A8\_N Calib Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/15/2018 18:44  
 Lab File ID: 2018.08.29\_537B\_066.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.145	1.112		131	135	-2.8	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.058	1.085		15.0	14.6	2.6	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.656	1.710		46.9	45.4	3.3	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.090	1.079		29.4	29.7	-1.0	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.080	1.080		59.3	59.3	0.0	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8243	0.8073		29.1	29.7	-2.1	30.0
13C2 PFHxA	Ave	1.039	1.127		10.8	10.0	8.4	30.0
13C2 PFDA	Ave	0.7921	0.9474		12.0	10.0	19.6	30.0

FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCV 320-242994/30 Calibration Date: 08/30/2018 07:38  
 Instrument ID: A8\_N Calib Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/15/2018 18:44  
 Lab File ID: 2018.08.29\_537B\_066.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.145	1.112		131	135	-2.8	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.058	1.085		15.0	14.6	2.6	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.656	1.710		46.9	45.4	3.3	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.090	1.079		29.4	29.7	-1.0	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.080	1.080		59.3	59.3	0.0	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8243	0.8073		29.1	29.7	-2.1	30.0
13C2 PFHxA	Ave	1.039	1.127		10.8	10.0	8.4	30.0
13C2 PFDA	Ave	0.7921	0.9474		12.0	10.0	19.6	30.0

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_066.d  
 Lims ID: CCV L5  
 Client ID:  
 Sample Type: CCVIS  
 Inject. Date: 30-Aug-2018 07:38:55 ALS Bottle#: 5 Worklist Smp#: 30  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: CCV L5  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:50:47 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.366	0.0	1.000	12751606	131.3		23426	
298.90 > 99.00	1.366	1.366	0.0	1.000	8981761		1.42(0.00-0.00)	16200	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.487	1.487	0.0	1.000	1038229	10.8		10618	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.631	1.631	0.0	1.000	6586151	46.9		4129	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.631	1.631	0.0	1.000	1457419	15.0		418	
* 6 13C2-PFOA									
415.00 > 370.00	1.813	1.813	0.0		921093	10.0		7450	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.821	1.821	0.0	1.000	2950948	29.4		473	
413.00 > 169.00	1.821	1.821	0.0	1.000	1567782		1.88(0.00-0.00)	4976	
* 7 13C4 PFOS									
503.00 > 80.00	2.071	2.071	0.0		2433863	28.7		6367	
9 Perfluorononanoic acid									
463.00 > 419.00	2.079	2.079	0.0	1.000	2208488	29.1		368	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.071	2.109	-0.038	1.000	5437221	59.3		8144	
499.00 > 99.00	2.071	2.109	-0.038	1.000	1231435		4.42(0.00-0.00)	3731	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.246	0.0	1.000	872665	12.0		5027	

Reagents:

LC537-L5\_00026 Amount Added: 1.00 Units: mL

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_066.d  
 Lims ID: CCV L5  
 Client ID:  
 Sample Type: CCVIS  
 Inject. Date: 30-Aug-2018 07:38:55 ALS Bottle#: 5 Worklist Smp#: 30  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: CCV L5  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:50:47 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.366	0.0	1.000	12751606	131.3		23426	
298.90 > 99.00	1.366	1.366	0.0	1.000	8981761		1.42(0.00-0.00)	16200	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.487	1.487	0.0	1.000	1038229	10.8		10618	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.631	1.631	0.0	1.000	6586151	46.9		4129	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.631	1.631	0.0	1.000	1457419	15.0		418	
* 6 13C2-PFOA									
415.00 > 370.00	1.813	1.813	0.0		921093	10.0		7450	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.821	1.821	0.0	1.000	2950948	29.4		473	
413.00 > 169.00	1.821	1.821	0.0	1.000	1567782		1.88(0.00-0.00)	4976	
* 7 13C4 PFOS									
503.00 > 80.00	2.071	2.071	0.0		2433863	28.7		6367	
9 Perfluorononanoic acid									
463.00 > 419.00	2.079	2.079	0.0	1.000	2208488	29.1		368	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.071	2.109	-0.038	1.000	5437221	59.3		8144	
499.00 > 99.00	2.071	2.109	-0.038	1.000	1231435		4.42(0.00-0.00)	3731	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.246	0.0	1.000	872665	12.0		5027	

Reagents:

LC537-L5\_00026 Amount Added: 1.00 Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_066.d

Injection Date: 30-Aug-2018 07:38:55

Instrument ID: A8\_N

Lims ID: CCV L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 30

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

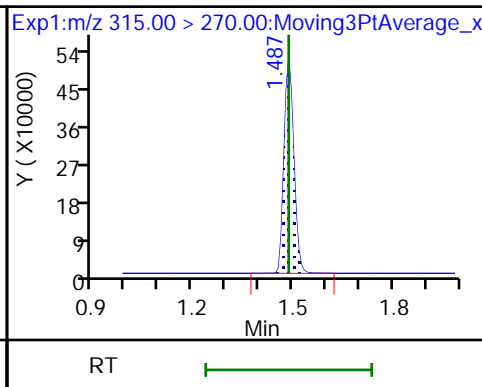
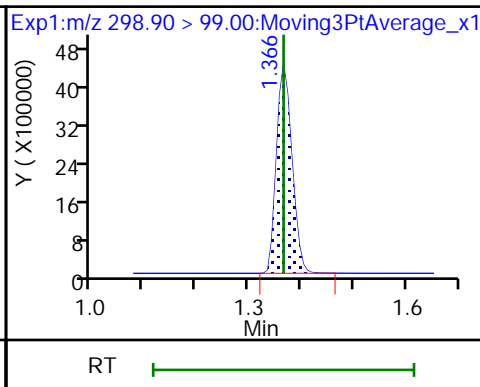
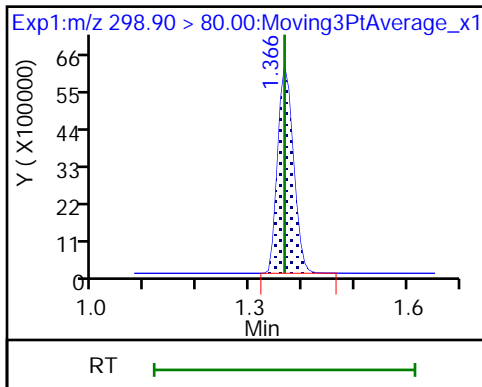
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

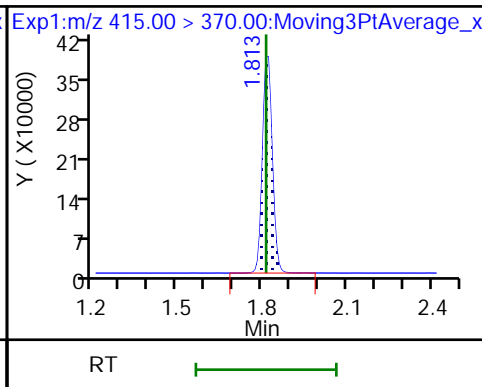
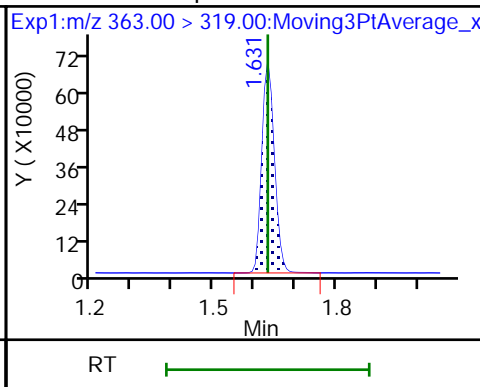
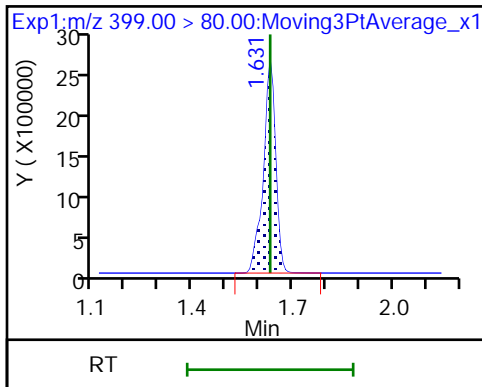
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

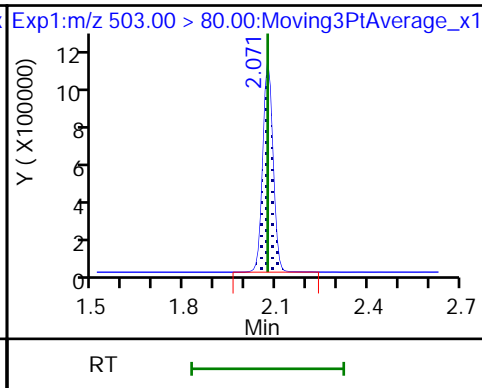
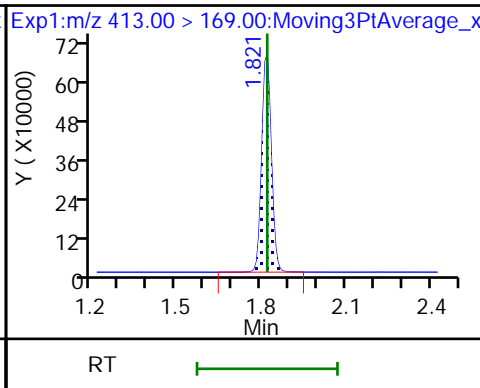
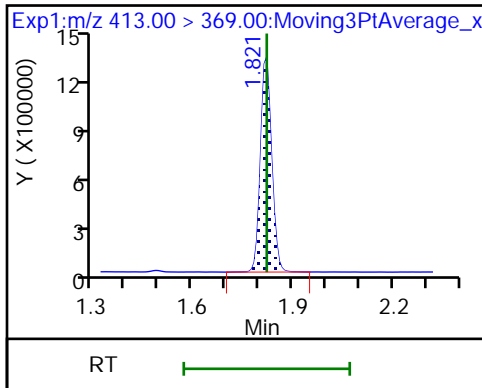
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

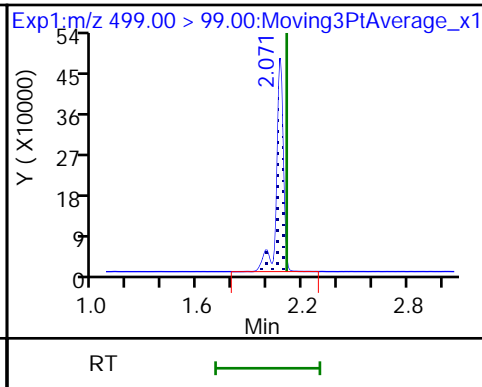
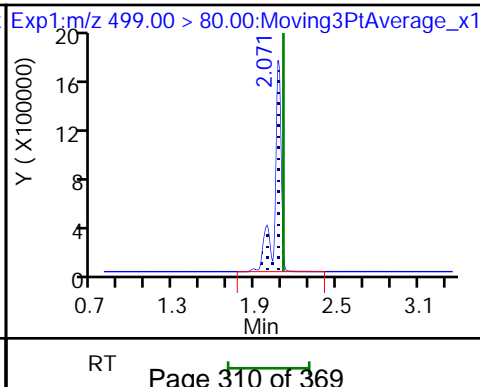
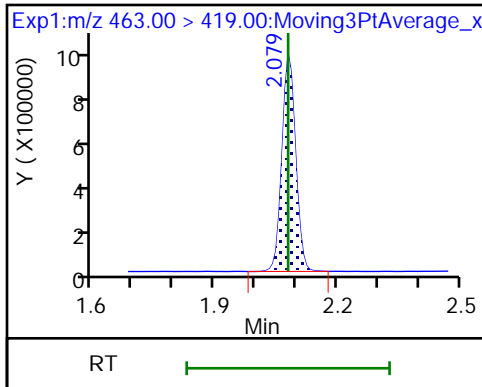
\* 7 13C4 PFOS



9 Perfluorononanoic acid

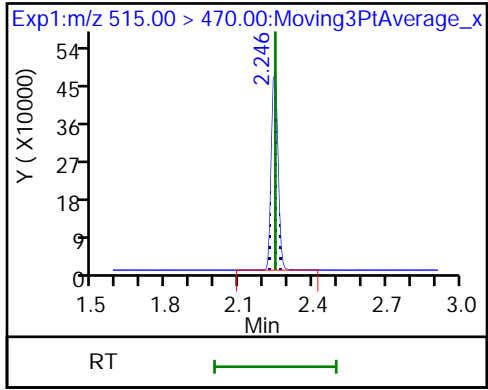
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid





\$ 10 13C2 PFDA



TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_066.d

Injection Date: 30-Aug-2018 07:38:55

Instrument ID: A8\_N

Lims ID: CCV L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 30

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

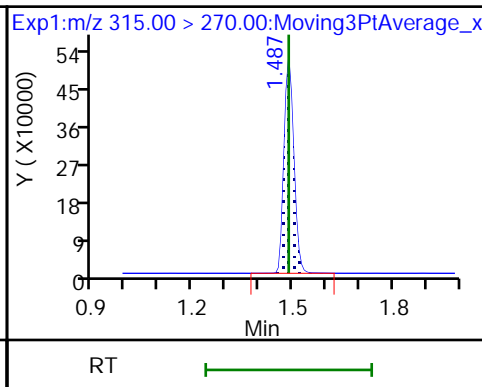
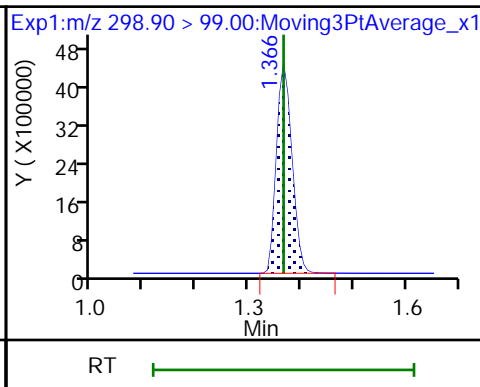
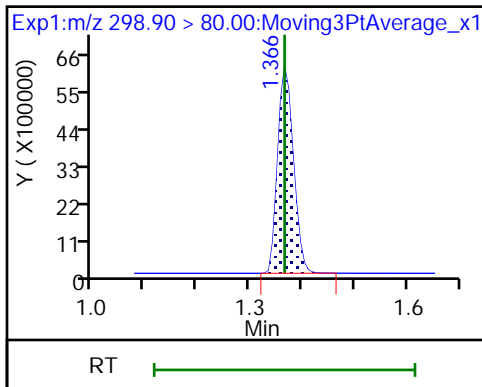
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

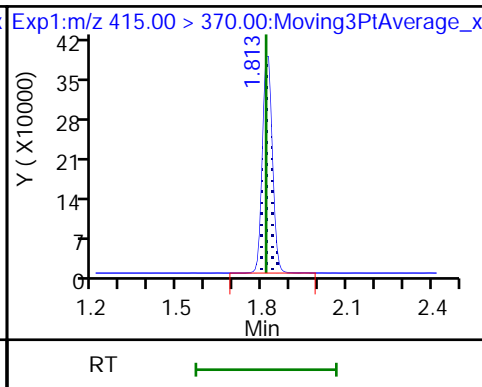
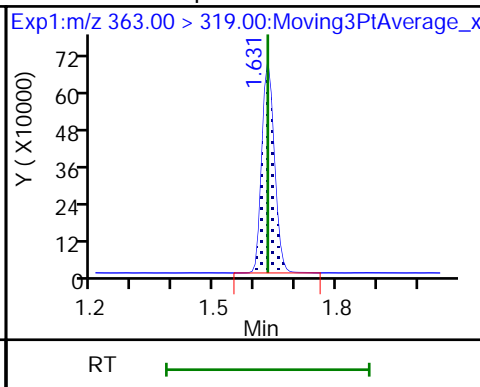
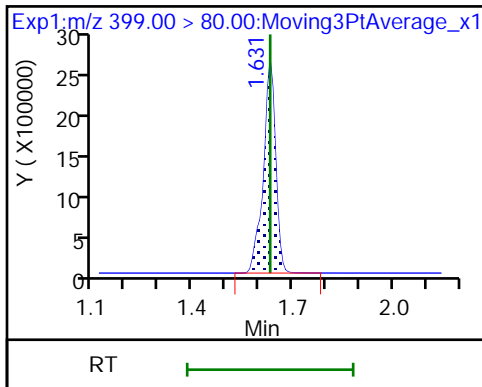
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

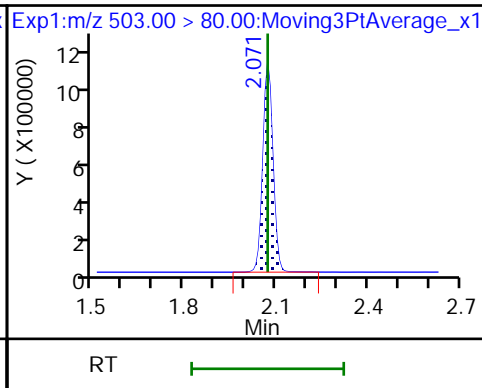
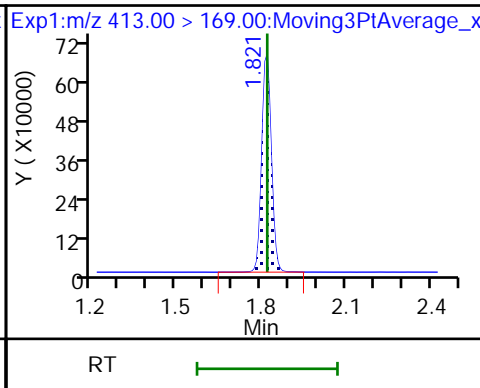
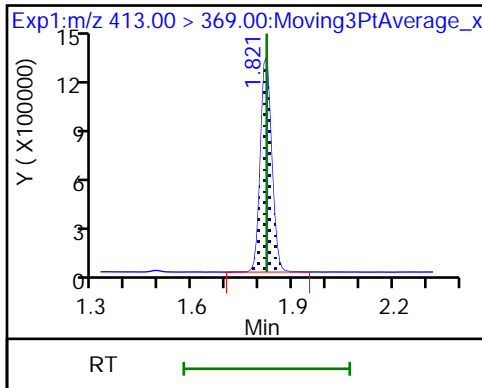
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

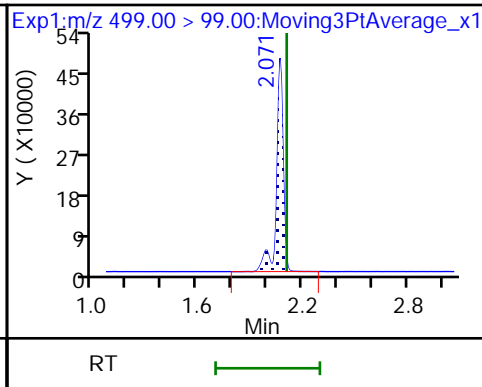
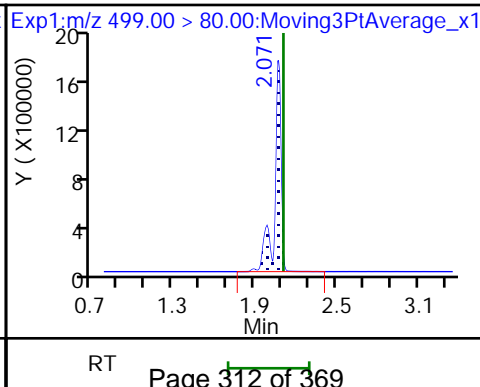
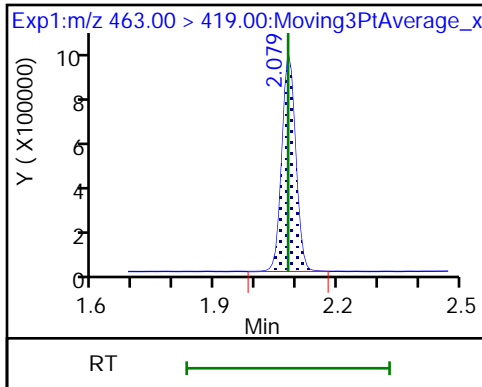
\* 7 13C4 PFOS



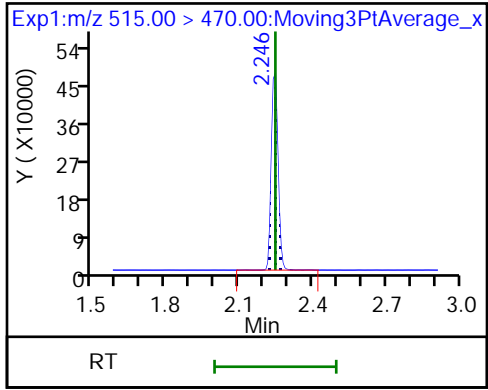
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCV 320-242994/38 Calibration Date: 08/30/2018 08:16  
 Instrument ID: A8\_N Calib Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/15/2018 18:44  
 Lab File ID: 2018.08.29\_537B\_074.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.145	1.261		49.6	45.0	10.1	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.058	1.118		5.14	4.86	5.7	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.656	1.746		15.9	15.1	5.4	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.090	1.098		9.98	9.90	0.8	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8243	0.8061		9.68	9.90	-2.2	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.080	1.095		20.0	19.8	1.3	30.0
13C2 PFHxA	Ave	1.039	1.141		11.0	10.0	9.8	30.0
13C2 PFDA	Ave	0.7921	0.9497		12.0	10.0	19.9	30.0

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_074.d  
 Lims ID: CCV L3  
 Client ID:  
 Sample Type: CCVIS  
 Inject. Date: 30-Aug-2018 08:16:19 ALS Bottle#: 3 Worklist Smp#: 38  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: CCV L3  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:50:52 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.366	0.0	1.000	4693703	49.6		14860	
298.90 > 99.00	1.366	1.366	0.0	1.000	3305606		1.42(0.00-0.00)	8200	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.487	1.487	0.0	1.000	1035743	11.0		10129	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.631	1.631	0.0	1.000	2183560	15.9		1509	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.631	1.631	0.0	1.000	493044	5.14		141	
* 6 13C2-PFOA									
415.00 > 370.00	1.821	1.821	0.0		907796	10.0		6379	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.821	1.821	0.0	1.000	986764	9.98		168	
413.00 > 169.00	1.821	1.821	0.0	1.000	494278		2.00(0.00-0.00)	1836	
* 7 13C4 PFOS									
503.00 > 80.00	2.071	2.071	0.0		2371241	28.7		6283	
9 Perfluorononanoic acid									
463.00 > 419.00	2.079	2.079	0.0	1.000	724409	9.68		113	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.079	2.109	-0.030	1.000	1789140	20.0		2975	
499.00 > 99.00	2.071	2.109	-0.038	0.996	397501		4.50(0.00-0.00)	1384	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.246	0.0	1.000	862148	12.0		5368	

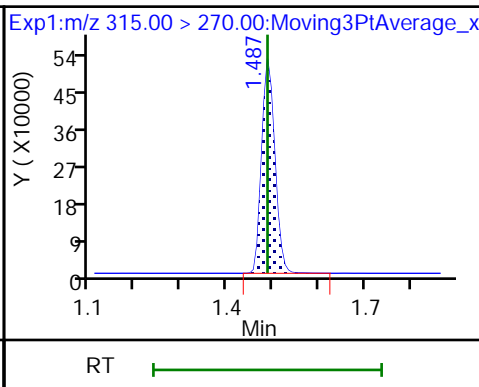
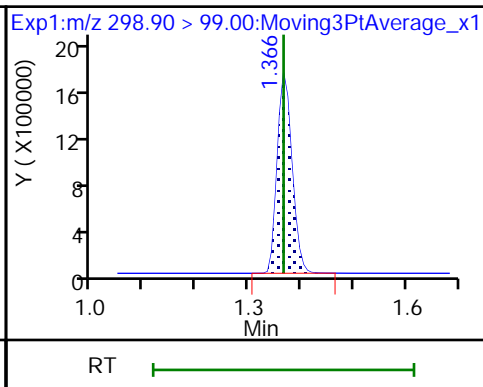
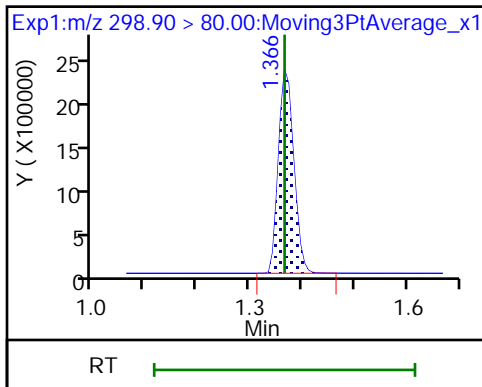
Reagents:

LC537-L3\_00025 Amount Added: 1.00 Units: mL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

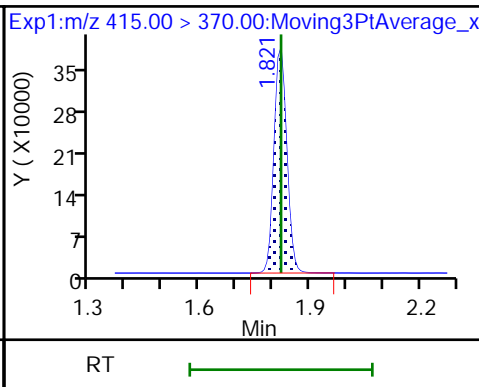
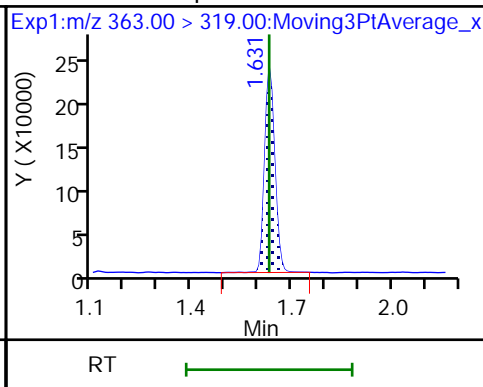
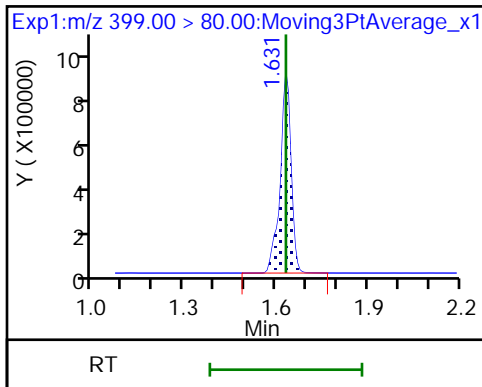
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

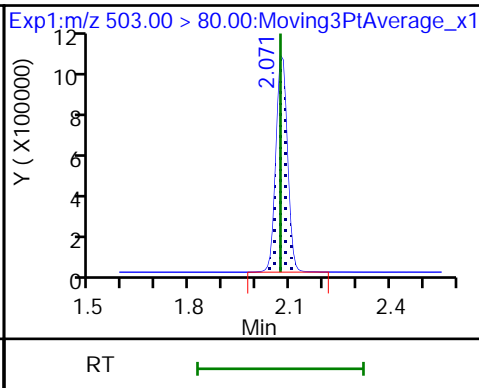
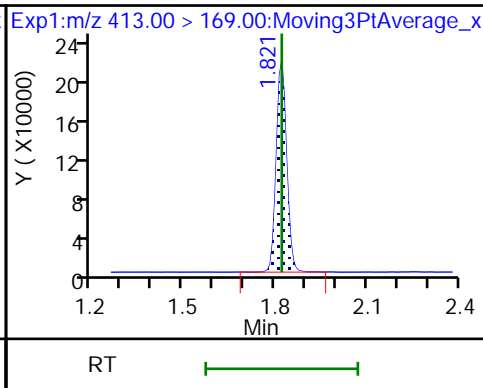
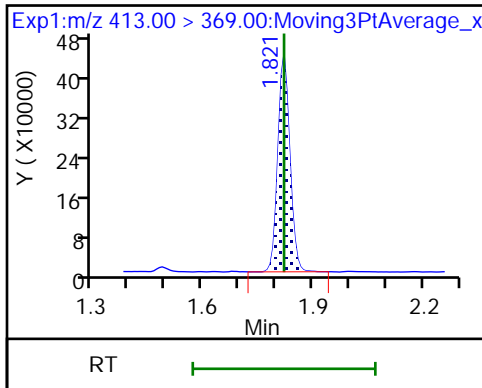
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

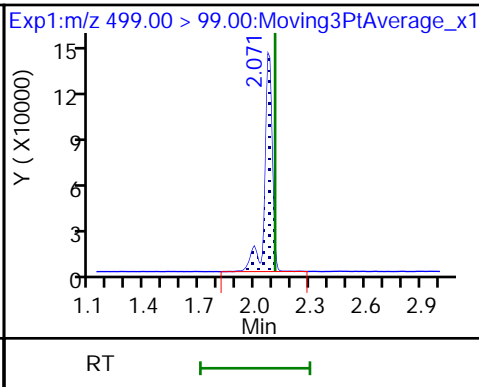
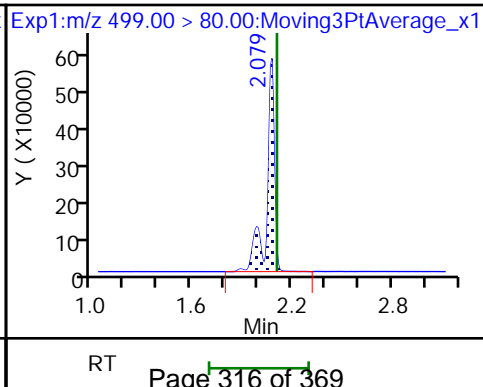
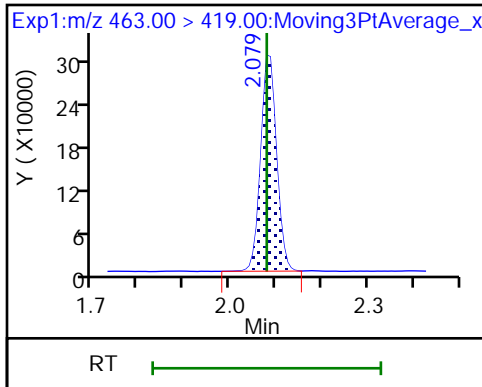
\* 7 13C4 PFOS



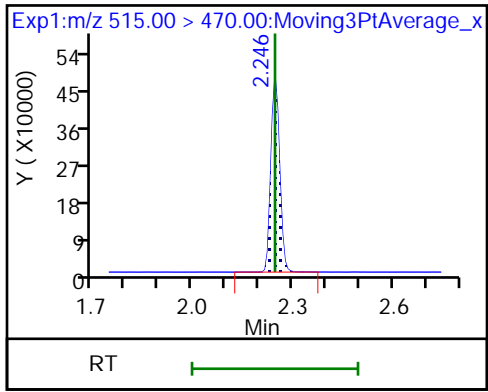
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCVL 320-243207/9 Calibration Date: 08/30/2018 16:52  
 Instrument ID: A8\_N Calib Start Date: 08/30/2018 16:19  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/30/2018 16:42  
 Lab File ID: 2018.08.30\_537ICALXX\_010.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.138	1.175		20.7	20.0	3.3	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.090	1.068		2.12	2.16	-2.0	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.707	1.650		6.50	6.72	-3.3	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.080	1.033		4.21	4.40	-4.4	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.072	1.040		8.52	8.79	-3.0	50.0
Perfluorononanoic acid (PFNA)	Ave	0.8116	0.7621		4.13	4.40	-6.1	50.0
13C2 PFHxA	Ave	1.137	1.089		9.57	10.0	-4.3	30.0
13C2 PFDA	Ave	0.9023	0.8856		9.81	10.0	-1.9	30.0



TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_010.d  
 Lims ID: CCVL  
 Client ID:  
 Sample Type: CCVL  
 Inject. Date: 30-Aug-2018 16:52:08 ALS Bottle#: 2 Worklist Smp#: 9  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: CCV L2  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 17:16:36 Calib Date: 30-Aug-2018 16:42:48  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 17:16:36

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.373	1.372	0.001	1.000	2017597	20.7		8090	
298.90 > 99.00	1.373	1.372	0.001	1.000	1394105		1.45(0.00-0.00)	3784	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.495	1.493	0.002	1.000	1046271	9.57		8745	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.639	1.639	0.0	1.000	221692	2.12		62.9	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.639	1.639	0.0	1.000	951702	6.50		650	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.828	1.827	0.001	1.000	436671	4.21		70.1	
413.00 > 169.00	1.828	1.827	0.001	1.000	235622		1.85(0.00-0.00)	786	
* 6 13C2-PFOA									
415.00 > 370.00	1.828	1.827	0.001		960926	10.0		7005	
* 7 13C4 PFOS									
503.00 > 80.00	2.079	2.083	-0.004		2460442	28.7		5772	
9 Perfluorononanoic acid									
463.00 > 419.00	2.094	2.093	0.001	1.000	322240	4.13		63.2	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.086	2.109	-0.023	1.000	783497	8.52		1378	
499.00 > 99.00	2.079	2.109	-0.030	0.996	174467		4.49(0.00-0.00)	680	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.253	2.253	0.0	1.000	850972	9.81		4746	

**Reagents:**

LC537-L2\_00022

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_010.d

Injection Date: 30-Aug-2018 16:52:08

Instrument ID: A8\_N

Lims ID: CCVL

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 9

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

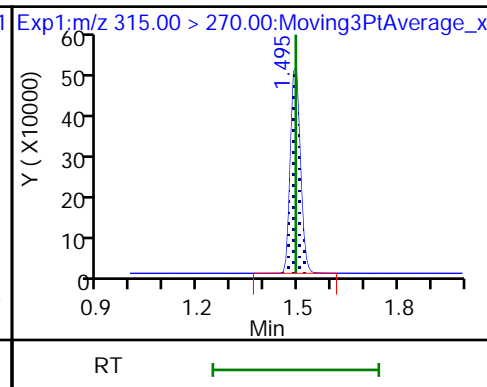
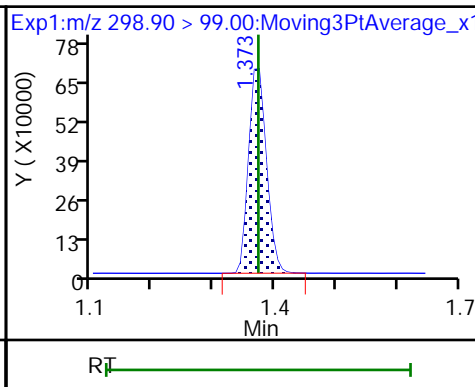
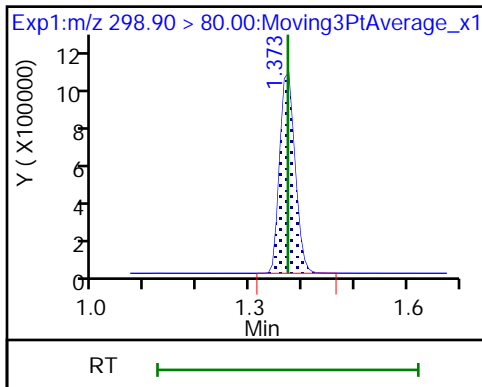
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

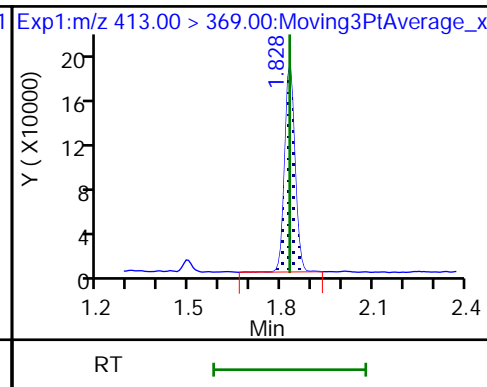
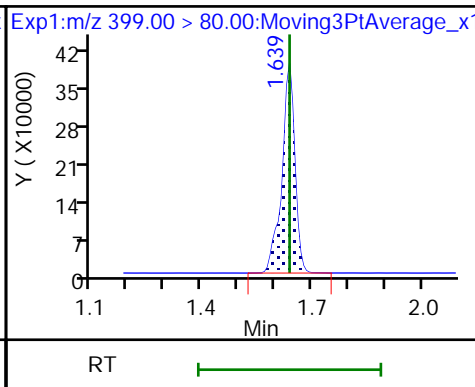
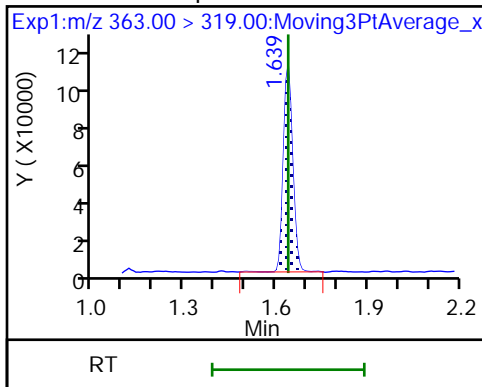
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

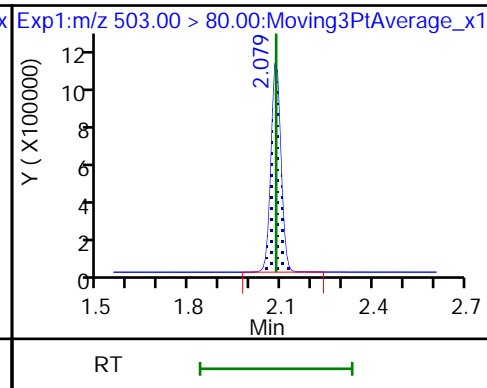
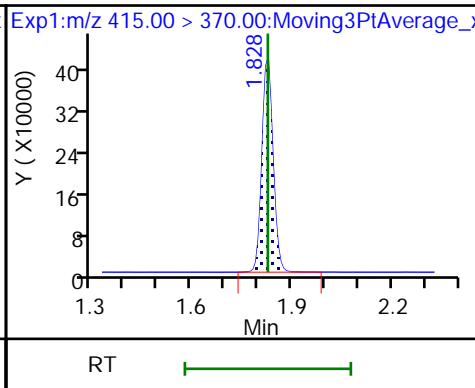
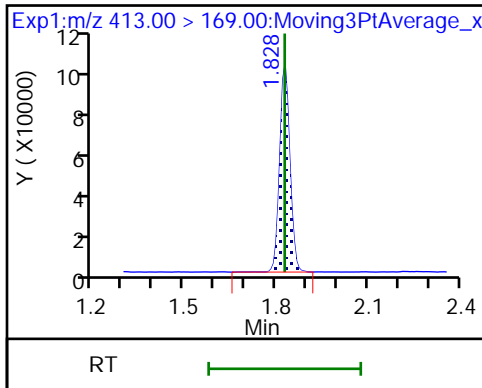
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

\* 6 13C2-PFOA

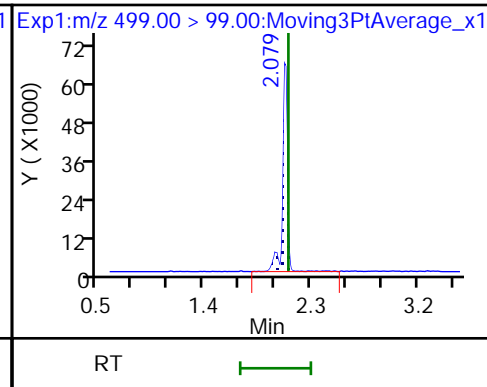
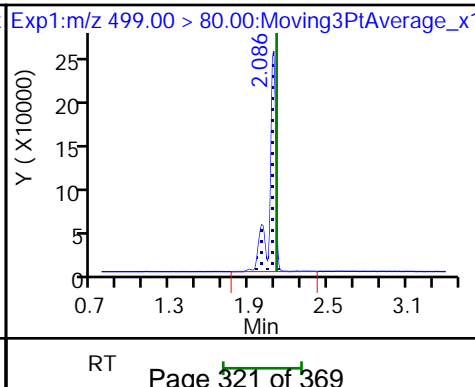
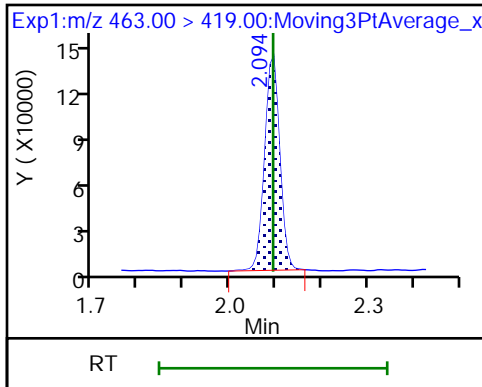
\* 7 13C4 PFOS



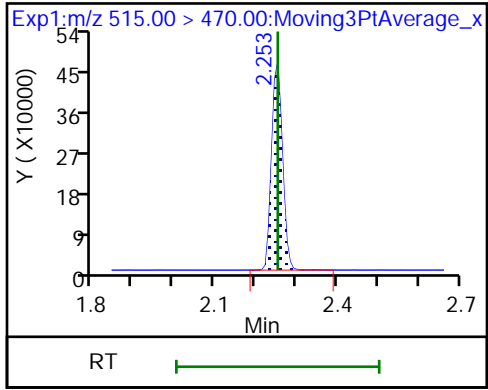
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: ICV 320-243207/11 Calibration Date: 08/30/2018 17:01  
 Instrument ID: A8\_N Calib Start Date: 08/30/2018 16:19  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/30/2018 16:42  
 Lab File ID: 2018.08.30\_537ICALXX\_012.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.138	1.148		89.2	88.4	0.9	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.090	1.042		9.56	10.0	-4.4	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.707	1.677		18.6	18.9	-1.7	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.080	1.073		19.9	20.0	-0.6	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.072	1.035		17.9	18.6	-3.5	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8116	0.8003		19.7	20.0	-1.4	30.0
13C2 PFHxA	Ave	1.137	1.135		9.98	10.0	-0.2	30.0
13C2 PFDA	Ave	0.9023	0.9123		10.1	10.0	1.1	30.0

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_012.d  
 Lims ID: ICV  
 Client ID:  
 Sample Type: ICV  
 Inject. Date: 30-Aug-2018 17:01:27 ALS Bottle#: 7 Worklist Smp#: 11  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: ICV  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist:

Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 17:17:04 Calib Date: 30-Aug-2018 16:42:48  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 17:16:11

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.373	1.372	0.001	1.000	7080596	89.2		19967	
298.90 > 99.00	1.373	1.372	0.001	1.000	5108571		1.39(0.00-0.00)	10975	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.495	1.493	0.002	1.000	895198	9.98		8225	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.639	1.639	0.0	1.000	821585	9.56		235	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.639	1.639	0.0	1.000	2213288	18.6		1683	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.828	1.827	0.001	1.000	1694618	19.9		267	
413.00 > 169.00	1.828	1.827	0.001	1.000	888319		1.91(0.00-0.00)	3010	
* 6 13C2-PFOA									
415.00 > 370.00	1.828	1.827	0.001		788747	10.0		7424	
* 7 13C4 PFOS									
503.00 > 80.00	2.079	2.083	-0.004		2000251	28.7		4724	
9 Perfluorononanoic acid									
463.00 > 419.00	2.094	2.093	0.001	1.000	1262526	19.7		256	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.079	2.109	-0.030	1.000	1339234	17.9		2471	
499.00 > 99.00	2.079	2.109	-0.030	1.000	298563		4.49(0.00-0.00)	1145	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.253	2.253	0.0	1.000	719548	10.1		3873	

**Reagents:**

LC537-ICV\_00033

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_012.d

Injection Date: 30-Aug-2018 17:01:27

Instrument ID: A8\_N

Lims ID: ICV

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 7

Worklist Smp#: 11

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

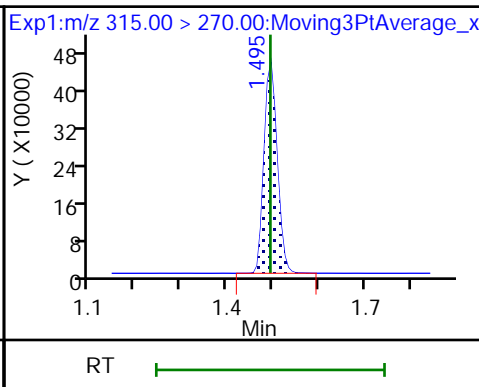
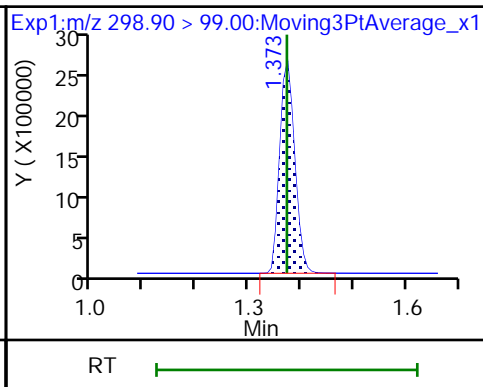
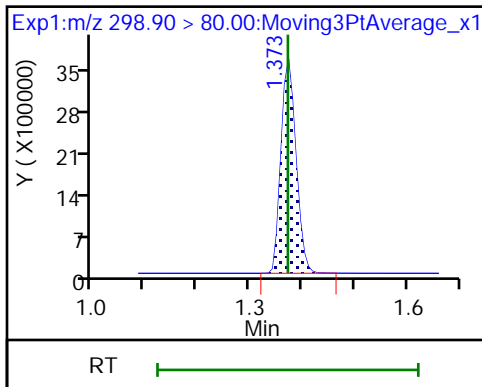
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

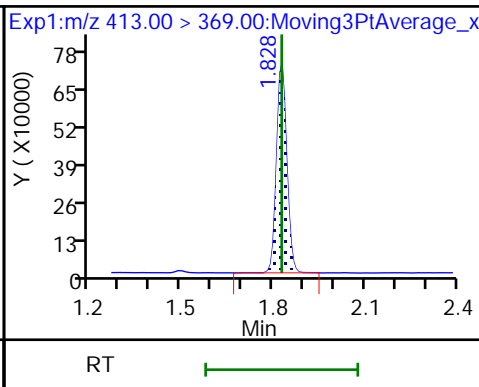
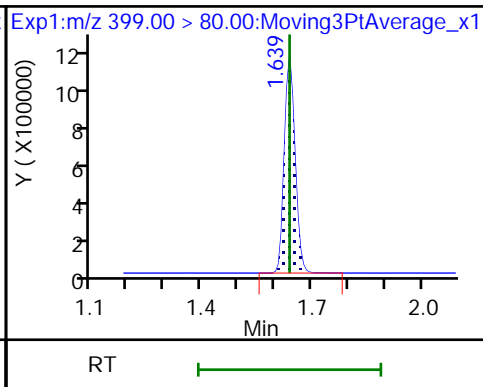
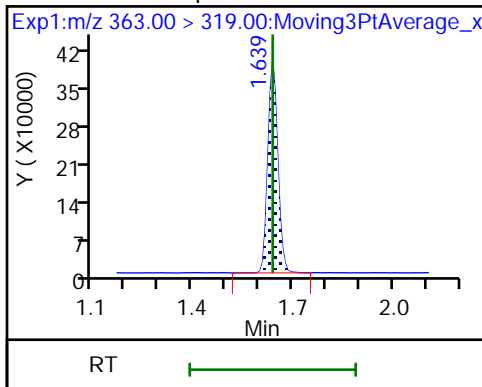
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

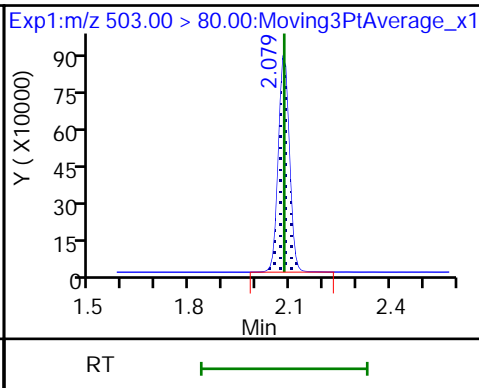
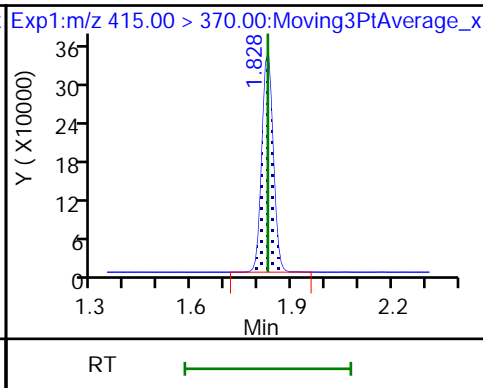
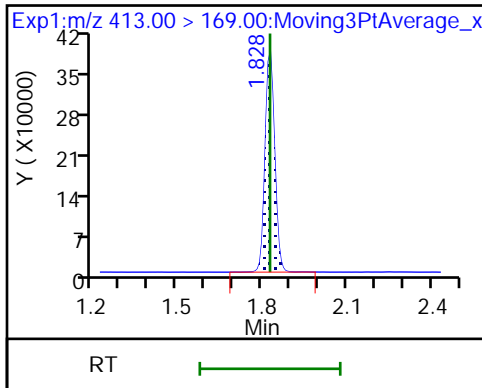
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

\* 6 13C2-PFOA

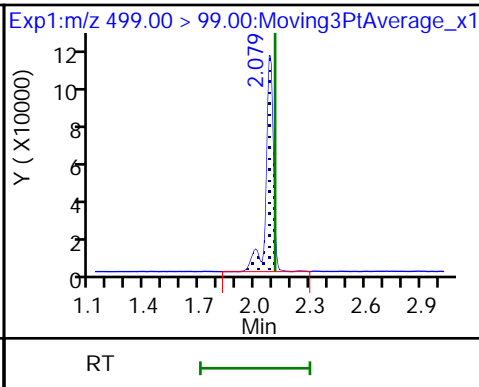
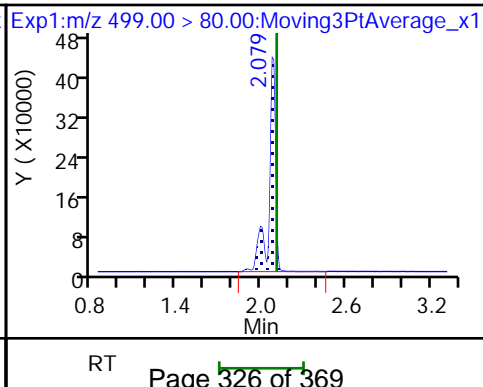
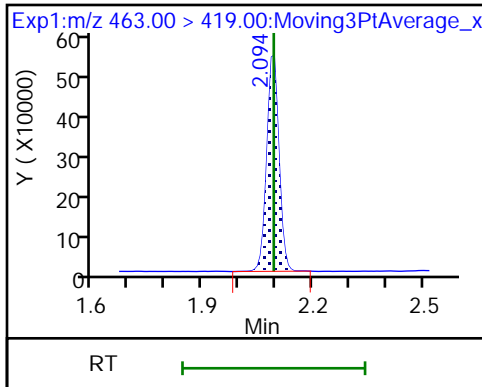
\* 7 13C4 PFOS



9 Perfluorononanoic acid

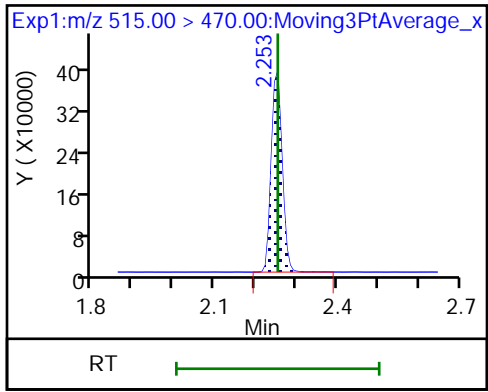
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid





\$ 10 13C2 PFDA



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCV 320-243340/59 Calibration Date: 08/31/2018 07:18  
 Instrument ID: A8\_N Calib Start Date: 08/30/2018 16:19  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/30/2018 16:42  
 Lab File ID: 2018.08.30\_537AA\_066.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.138	1.170		139	135	2.9	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.090	1.160		15.5	14.6	6.4	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.707	1.734		46.1	45.4	1.6	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.080	1.111		30.5	29.7	2.8	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.072	1.117		61.8	59.3	4.2	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8116	0.8061		29.5	29.7	-0.7	30.0
13C2 PFHxA	Ave	1.137	1.168		10.3	10.0	2.7	30.0
13C2 PFDA	Ave	0.9023	0.9552		10.6	10.0	5.9	30.0

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\2018.08.30\_537AA\_066.d  
 Lims ID: CCV L5  
 Client ID:  
 Sample Type: CCVIS  
 Inject. Date: 31-Aug-2018 07:18:02 ALS Bottle#: 5 Worklist Smp#: 59  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: CCV L5  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 31-Aug-2018 10:13:48 Calib Date: 30-Aug-2018 16:42:48  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK008

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.358	1.358	0.0	1.000	10522999	139.0		24626	
298.90 > 99.00	1.358	1.358	0.0	1.000	7447996		1.41(0.00-0.00)	18090	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.479	1.479	0.0	1.000	850121	10.3		10798	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.624	1.624	0.0	1.000	1230856	15.5		339	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.624	1.624	0.0	1.000	5236721	46.1		3226	
* 6 13C2-PFOA									
415.00 > 370.00	1.813	1.813	0.0		727647	10.0		6805	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.813	1.813	0.0	1.000	2400156	30.5		424	
413.00 > 169.00	1.813	1.813	0.0	1.000	1272272		1.89(0.00-0.00)	4460	
* 7 13C4 PFOS									
503.00 > 80.00	2.064	2.064	0.0		1908647	28.7		4636	
9 Perfluorononanoic acid									
463.00 > 419.00	2.071	2.071	0.0	1.000	1742014	29.5		327	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.064	2.109	-0.045	1.000	4406589	61.8		7135	
499.00 > 99.00	2.064	2.109	-0.045	1.000	952704		4.63(0.00-0.00)	3523	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.238	2.238	0.0	1.000	695038	10.6		3801	

Reagents:

LC537-L5\_00026 Amount Added: 1.00 Units: mL

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\2018.08.30\_537AA\_066.d

Injection Date: 31-Aug-2018 07:18:02

Instrument ID: A8\_N

Lims ID: CCV L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 59

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

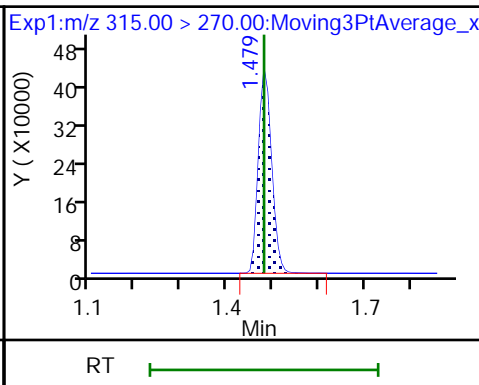
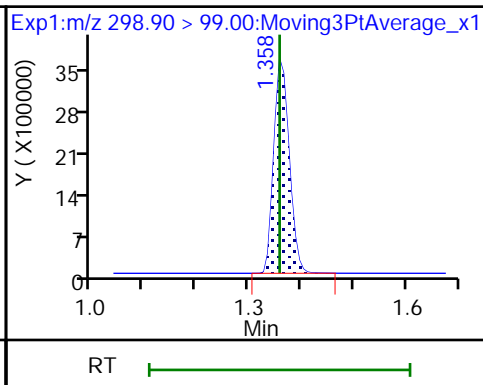
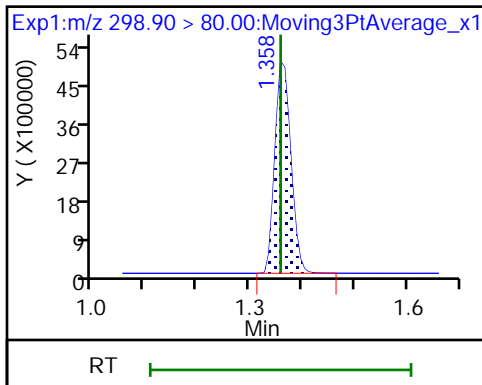
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

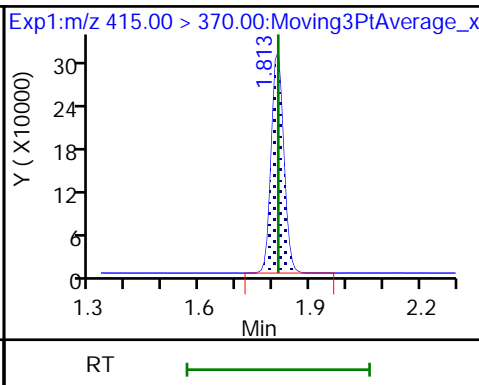
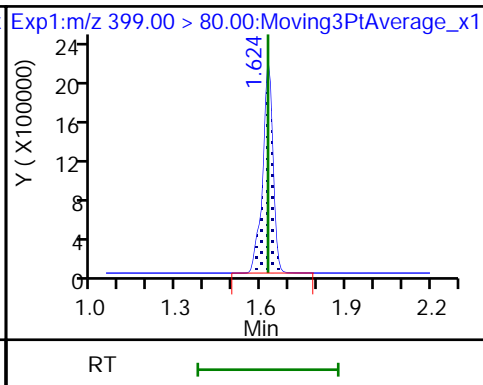
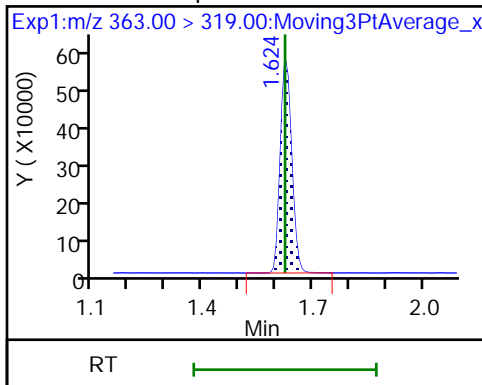
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

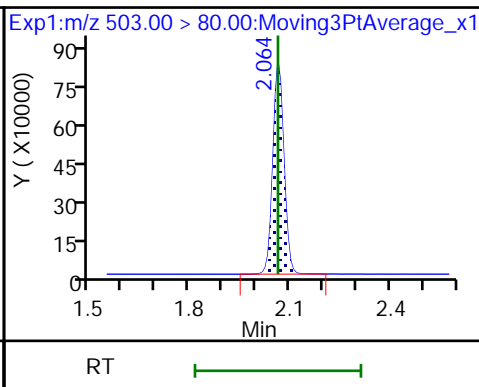
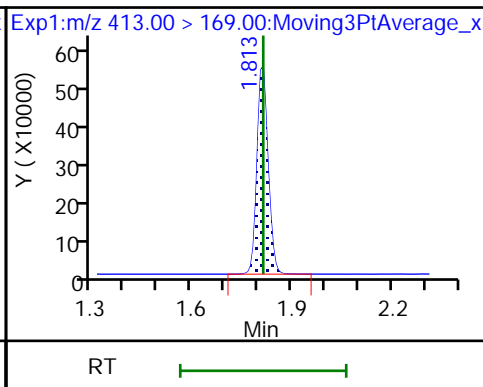
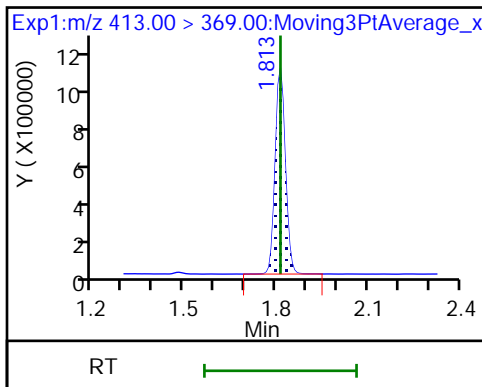
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

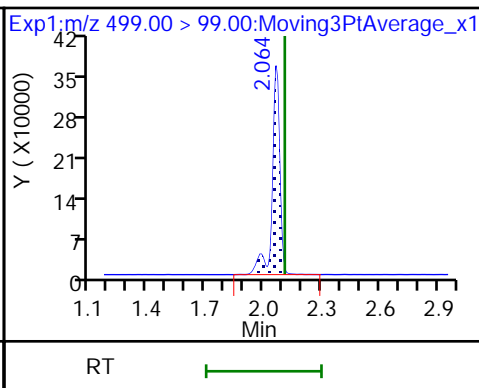
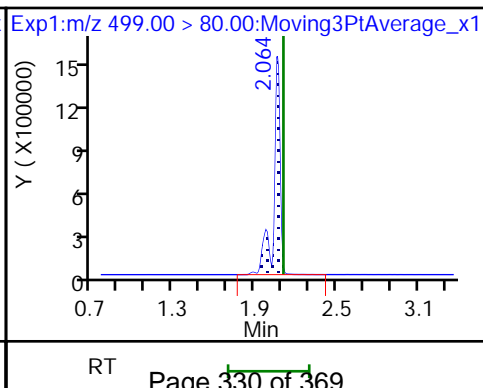
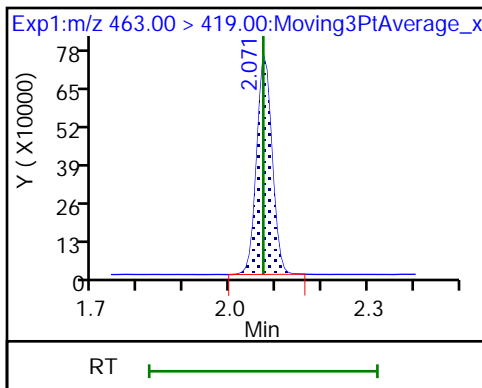
\* 7 13C4 PFOS



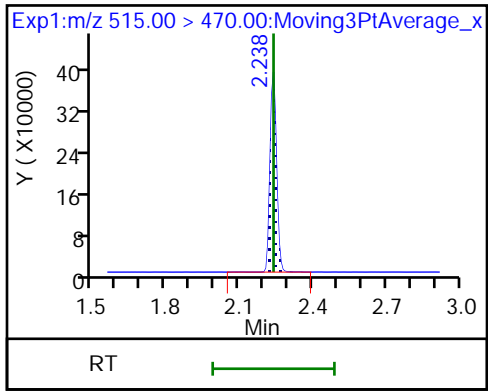
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCV 320-243340/64 Calibration Date: 08/31/2018 08:27  
 Instrument ID: A8\_N Calib Start Date: 08/30/2018 16:19  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/30/2018 16:42  
 Lab File ID: 2018.08.30\_537AAA\_071.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.138	1.224		48.4	45.0	7.6	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.090	1.119		4.99	4.86	2.6	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.707	1.628		14.4	15.1	-4.6	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.080	1.024		9.39	9.90	-5.2	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.072	1.044		19.2	19.8	-2.6	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8116	0.7902		9.64	9.90	-2.6	30.0
13C2 PFHxA	Ave	1.137	1.134		9.97	10.0	-0.3	30.0
13C2 PFDA	Ave	0.9023	0.8833		9.79	10.0	-2.1	30.0

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\2018.08.30\_537AAA\_071.d  
 Lims ID: CCV L3  
 Client ID:  
 Sample Type: CCVIS  
 Inject. Date: 31-Aug-2018 08:27:28 ALS Bottle#: 3 Worklist Smp#: 64  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: CCV L3  
 Misc. Info.: Plate: 1 Rack: 1  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Sublist: chrom-537\_A8\_N\*sub9  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 31-Aug-2018 10:13:53 Calib Date: 30-Aug-2018 16:42:48  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8\_N\20180830-63556.b\2018.08.30\_537ICALXX\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK008

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.366	0.0	1.000	4090345	48.4		15714	
298.90 > 99.00	1.366	1.366	0.0	1.000	2821182		1.45(0.00-0.00)	8860	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.487	1.487	0.0	1.000	922904	9.97		10138	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.631	1.631	0.0	1.000	442670	4.99		130	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.631	1.631	0.0	1.000	1827219	14.4		1315	
* 6 13C2-PFOA									
415.00 > 370.00	1.821	1.821	0.0		813997	10.0		6719	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.821	1.821	0.0	1.000	825390	9.39		132	
413.00 > 169.00	1.821	1.821	0.0	1.000	444987		1.85(0.00-0.00)	1756	
* 7 13C4 PFOS									
503.00 > 80.00	2.079	2.079	0.0		2128142	28.7		5420	
9 Perfluorononanoic acid									
463.00 > 419.00	2.086	2.086	0.0	1.000	636747	9.64		120	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.079	2.109	-0.030	1.000	1530668	19.2		2737	
499.00 > 99.00	2.079	2.109	-0.030	1.000	335333		4.56(0.00-0.00)	1313	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.246	0.0	1.000	719003	9.79		4052	

Reagents:

LC537-L3\_00025 Amount Added: 1.00 Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180830-63574.b\2018.08.30\_537AAA\_071.d

Injection Date: 31-Aug-2018 08:27:28

Instrument ID: A8\_N

Lims ID: CCV L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 64

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

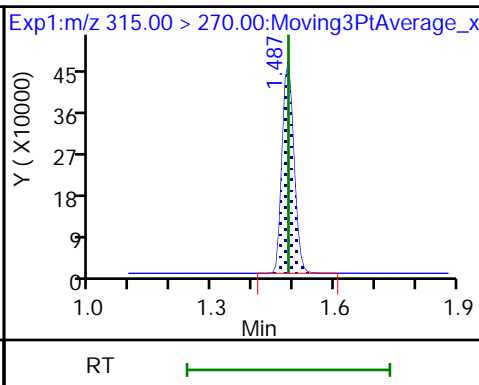
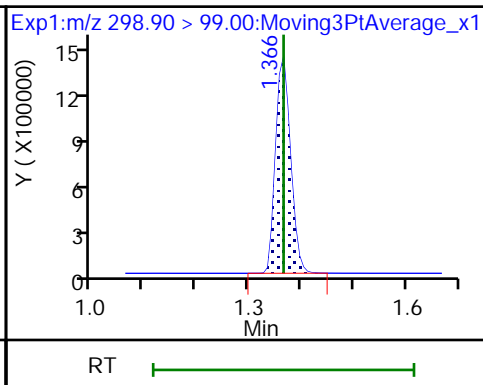
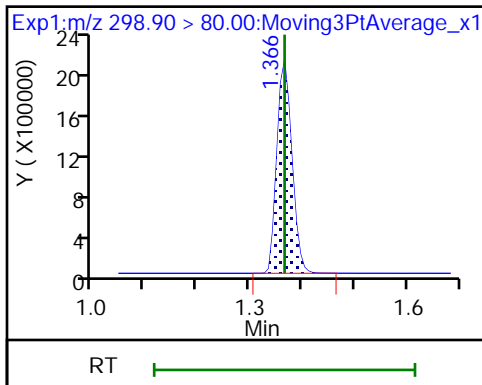
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

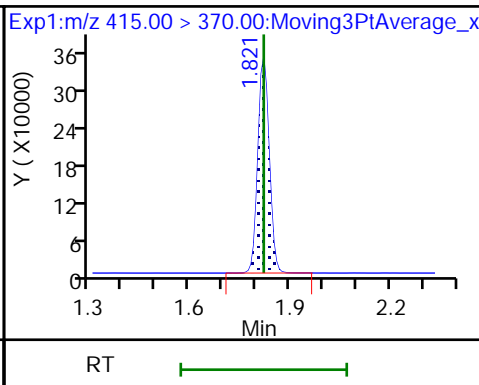
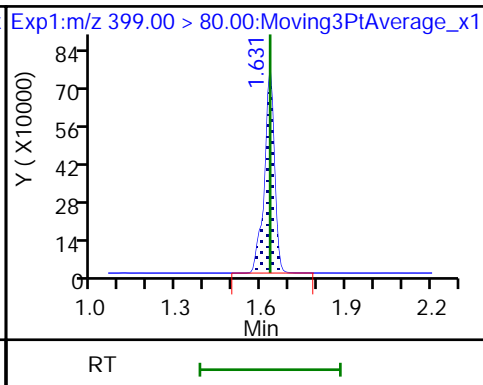
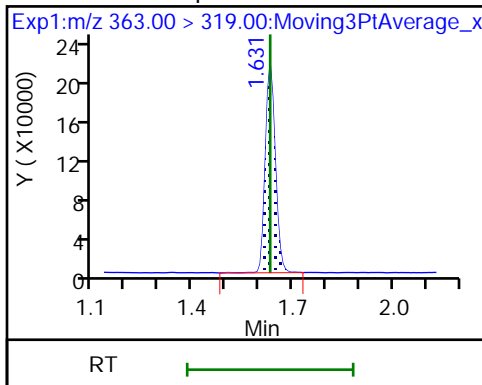
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

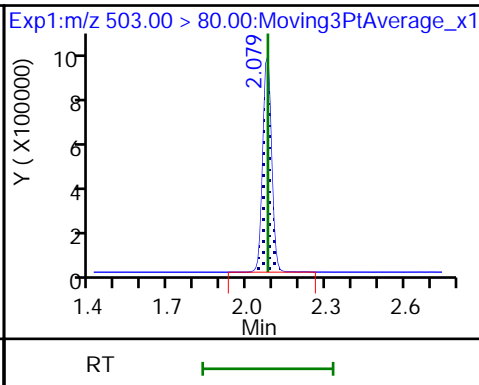
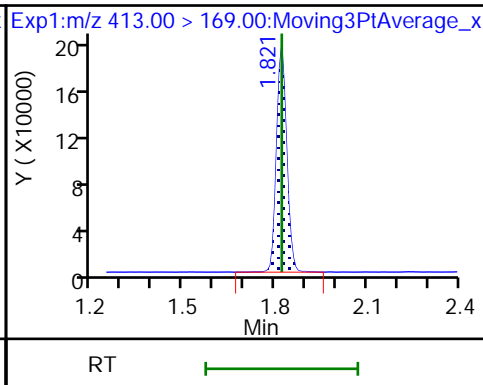
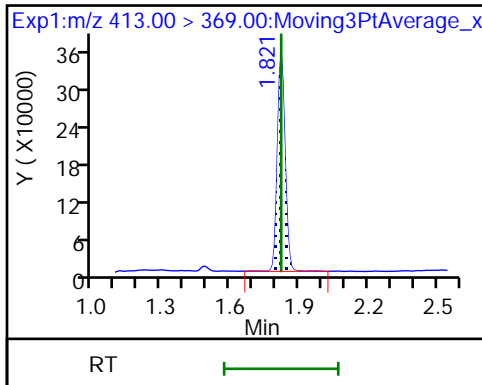
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

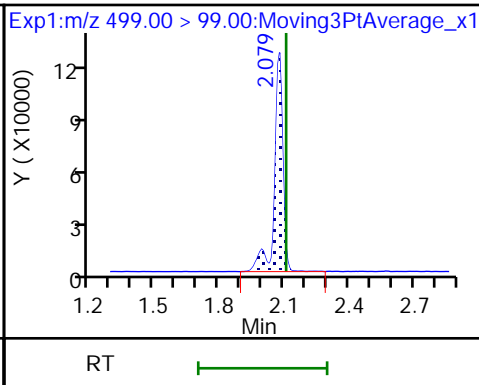
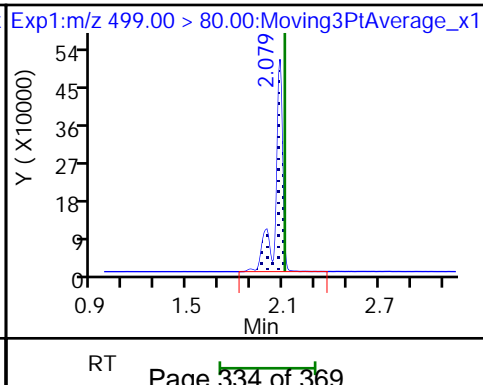
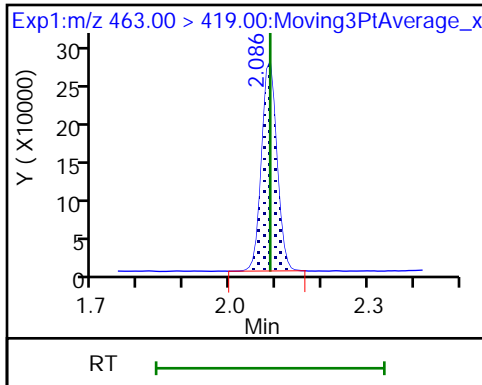
\* 7 13C4 PFOS



9 Perfluorononanoic acid

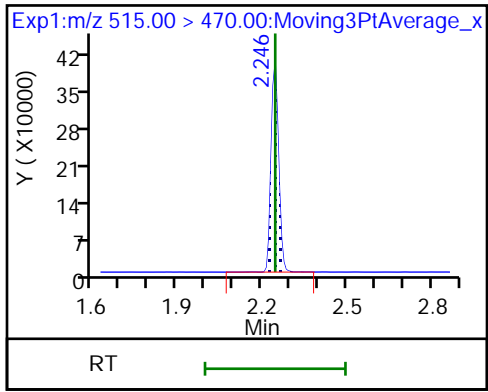
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid





\$ 10 13C2 PFDA



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: \_\_\_\_\_ Lab Sample ID: MB 320-242479/1-A  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_056.d  
 Analysis Method: 537 Date Collected: \_\_\_\_\_  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 250 (mL) Date Analyzed: 08/30/2018 06:52  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	16	U	40	16	6.8
335-67-1	Perfluorooctanoic acid (PFOA)	8.0	U	20	8.0	2.8
375-95-1	Perfluorononanoic acid (PFNA)	20	U	24	20	8.0
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.0	U	10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36	U	90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	98		70-130
STL00996	13C2 PFDA	101		70-130

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_056.d  
 Lims ID: MB 320-242479/1-A  
 Client ID:  
 Sample Type: MB  
 Inject. Date: 30-Aug-2018 06:52:11 ALS Bottle#: 37 Worklist Smp#: 20  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: mb 320-242479/1-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d

Column 1 : Det: EXP1  
 Process Host: XAWRK020

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
\$ 2 13C2 PFHxA	315.00 > 270.00	1.479	1.487	-0.008	1.000	1181749	9.77	11541	
* 6 13C2-PFOA	415.00 > 370.00	1.806	1.821	-0.015		1164023	10.0	8008	
* 7 13C4 PFOS	503.00 > 80.00	2.064	2.079	-0.015		2966015	28.7	7007	
\$ 10 13C2 PFDA	515.00 > 470.00	2.238	2.246	-0.008	1.000	934326	10.1	5197	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_056.d

Injection Date: 30-Aug-2018 06:52:11

Instrument ID: A8\_N

Lims ID: MB 320-242479/1-A

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 37

Worklist Smp#: 20

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

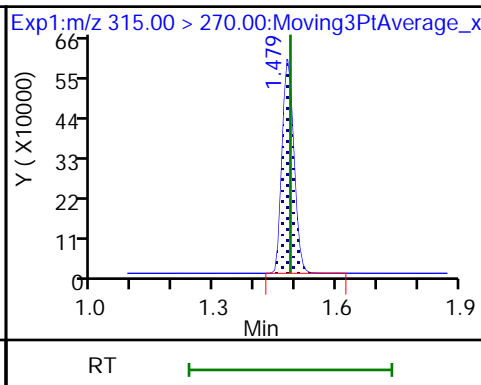
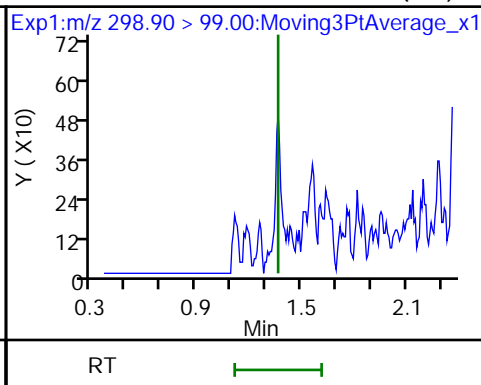
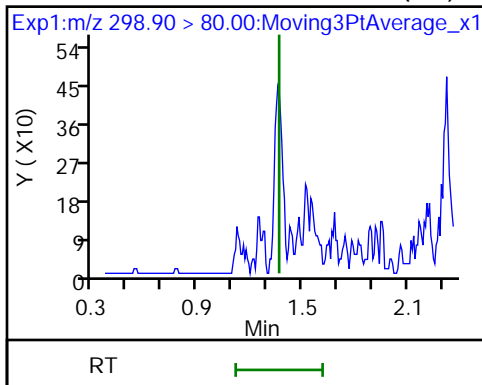
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid (ND)

1 Perfluorobutanesulfonic acid (ND)

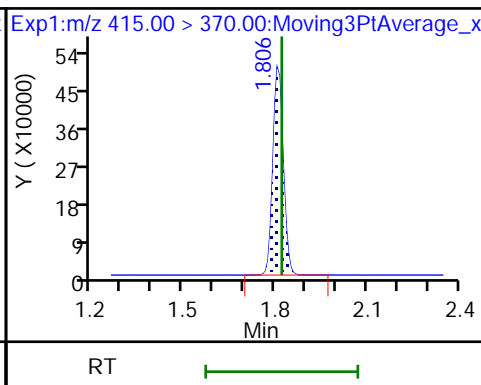
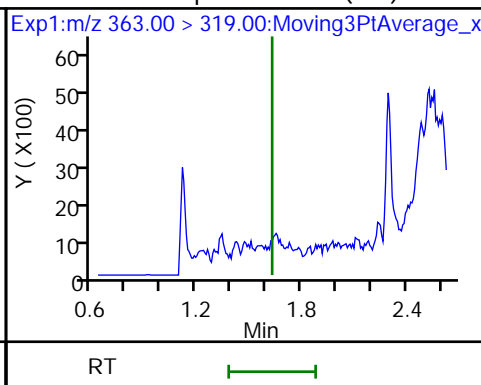
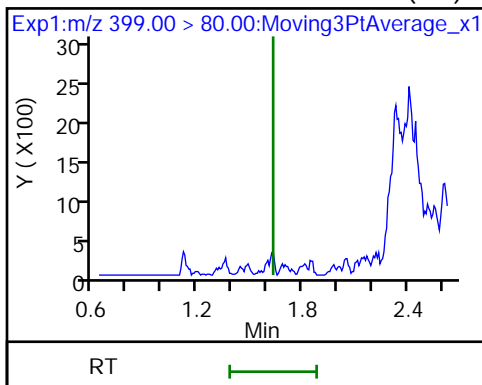
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid (ND)

4 Perfluoroheptanoic acid (ND)

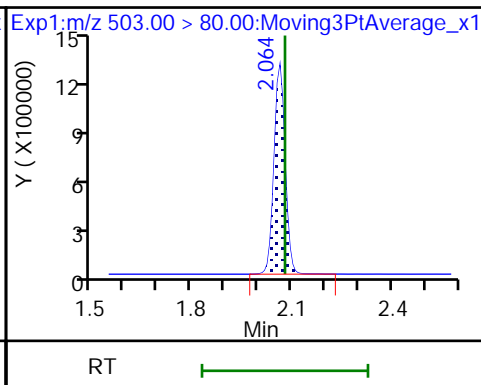
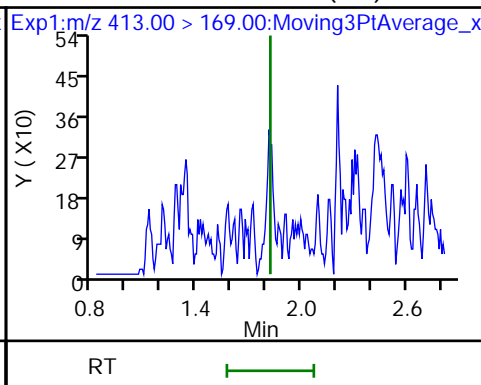
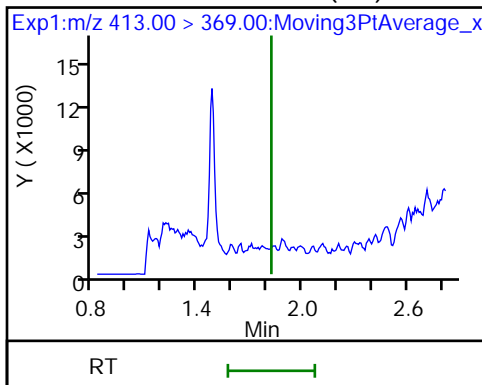
\* 6 13C2-PFOA



5 Perfluorooctanoic acid (ND)

5 Perfluorooctanoic acid (ND)

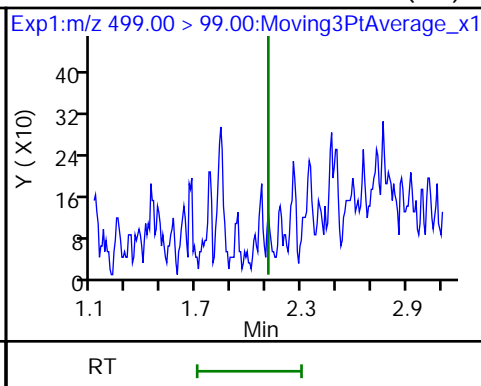
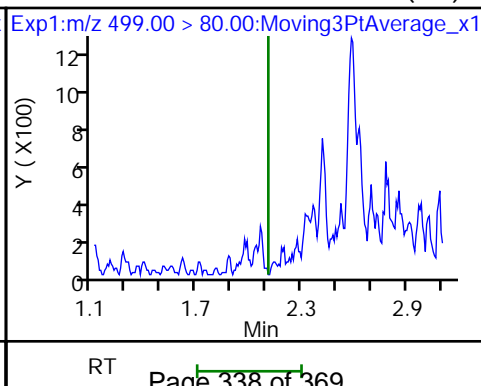
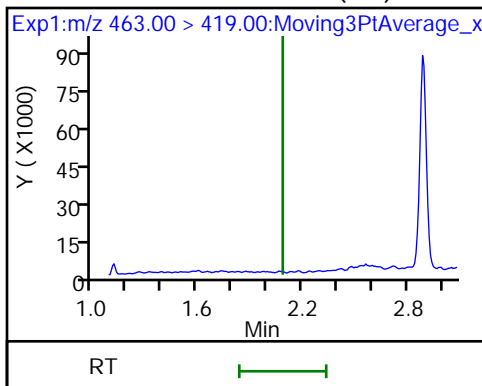
\* 7 13C4 PFOS



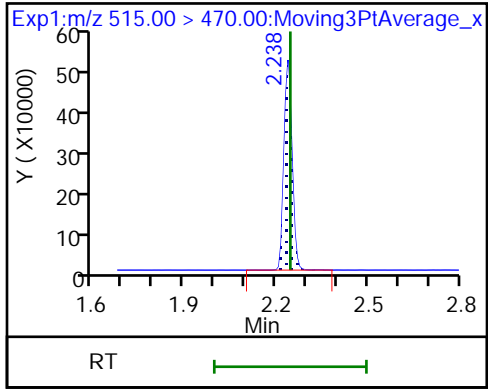
9 Perfluorononanoic acid (ND)

8 Perfluorooctane sulfonic acid (ND)

8 Perfluorooctane sulfonic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_056.d  
 Lims ID: MB 320-242479/1-A  
 Client ID:  
 Sample Type: MB  
 Inject. Date: 30-Aug-2018 06:52:11 ALS Bottle#: 37 Worklist Smp#: 20  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: mb 320-242479/1-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.77	97.67
\$ 10 13C2 PFDA	10.0	10.1	101.33

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: \_\_\_\_\_ Lab Sample ID: LCS 320-242479/2-A  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_057.d  
 Analysis Method: 537 Date Collected: \_\_\_\_\_  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 250 (mL) Date Analyzed: 08/30/2018 06:56  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	216		40	16	6.8
335-67-1	Perfluorooctanoic acid (PFOA)	106		20	8.0	2.8
375-95-1	Perfluorononanoic acid (PFNA)	100		24	20	8.0
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	172		30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	56.1		10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	448		90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	104		70-130
STL00996	13C2 PFDA	107		70-130

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_057.d  
 Lims ID: LCS 320-242479/2-A  
 Client ID:  
 Sample Type: LCS  
 Inject. Date: 30-Aug-2018 06:56:51 ALS Bottle#: 38 Worklist Smp#: 21  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: lcs 320-242479/2-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:45:35

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.358	1.366	-0.008	1.000	13672985	111.9		23729	
298.90 > 99.00	1.358	1.366	-0.008	1.000	9827779		1.39(0.00-0.00)	16033	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.479	1.487	-0.008	1.000	1269608	10.4		13141	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.624	1.631	-0.007	1.000	7593806	43.0		5588	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.624	1.631	-0.007	1.000	1744257	14.0		493	
* 6 13C2-PFOA									
415.00 > 370.00	1.806	1.821	-0.015		1177090	10.0		10028	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.806	1.821	-0.015	1.000	3408314	26.6		543	
413.00 > 169.00	1.806	1.821	-0.015	1.000	1766761		1.93(0.00-0.00)	5796	
* 7 13C4 PFOS									
503.00 > 80.00	2.064	2.079	-0.015		3060823	28.7		6743	
9 Perfluorononanoic acid									
463.00 > 419.00	2.071	2.086	-0.015	1.000	2434257	25.1		228	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.064	2.109	-0.045	1.000	6225874	54.0		7609	
499.00 > 99.00	2.064	2.109	-0.045	1.000	1357501		4.59(0.00-0.00)	3784	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.238	2.246	-0.008	1.000	1001548	10.7		6273	



TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_057.d

Injection Date: 30-Aug-2018 06:56:51

Instrument ID: A8\_N

Lims ID: LCS 320-242479/2-A

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 38

Worklist Smp#: 21

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

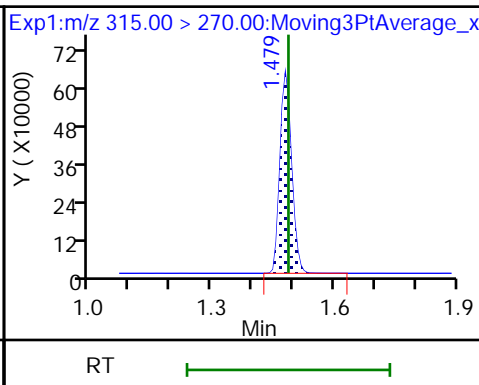
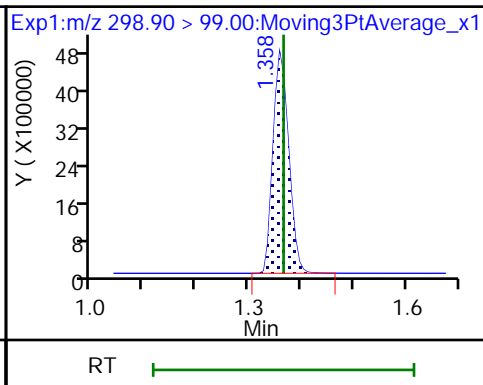
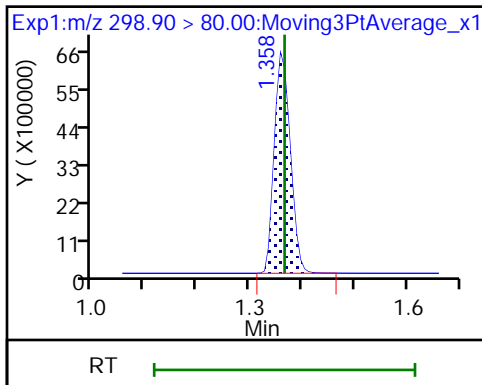
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

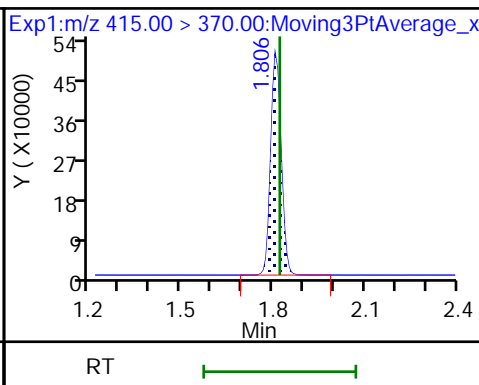
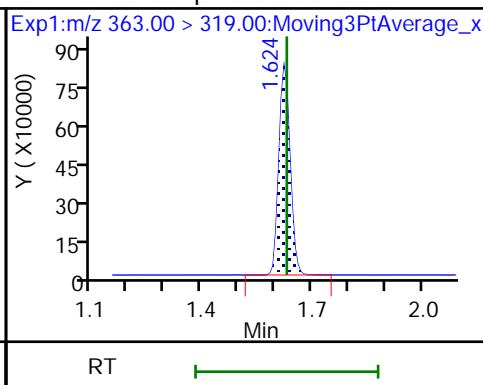
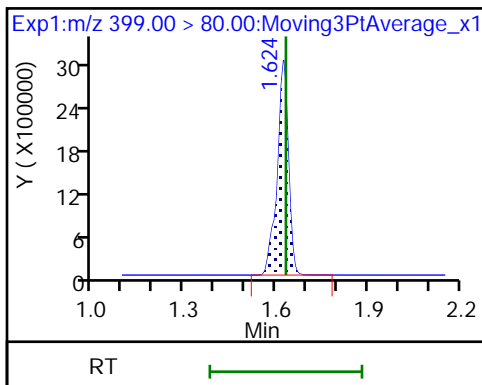
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

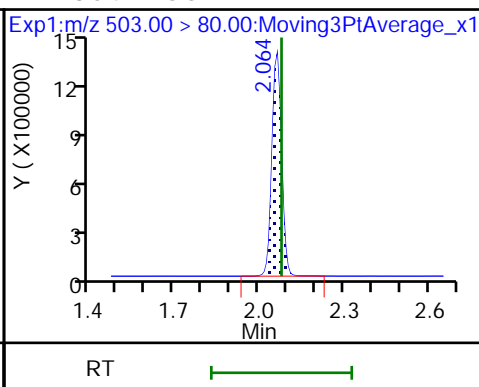
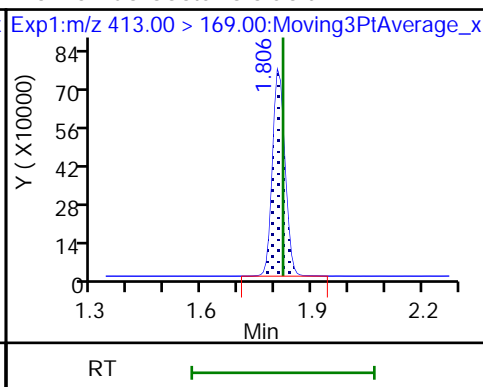
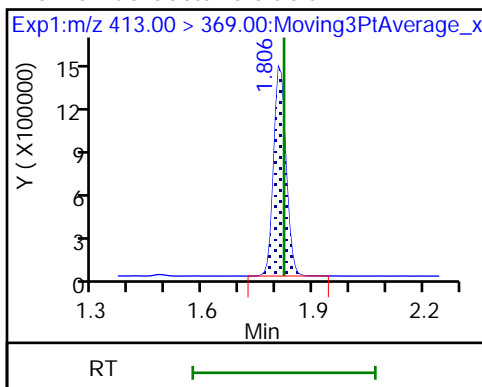
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

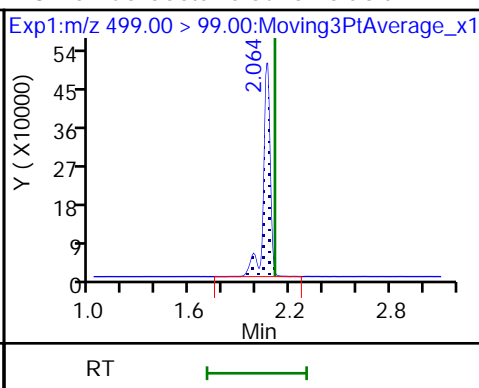
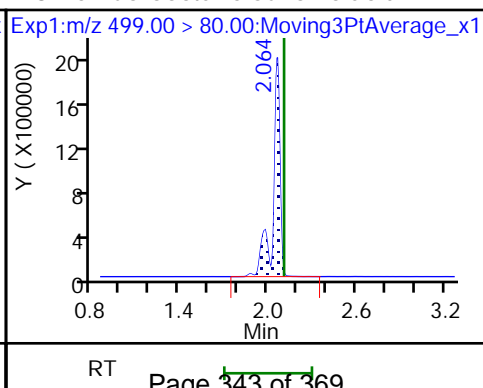
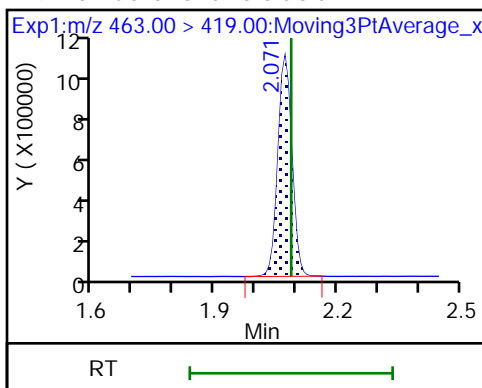
\* 7 13C4 PFOS



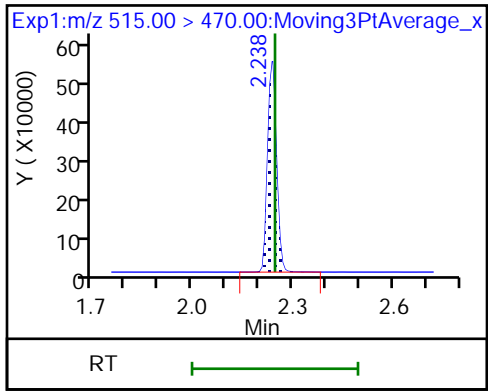
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_057.d  
 Lims ID: LCS 320-242479/2-A  
 Client ID:  
 Sample Type: LCS  
 Inject. Date: 30-Aug-2018 06:56:51 ALS Bottle#: 38 Worklist Smp#: 21  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: lcs 320-242479/2-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:45:35

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	10.4	103.77
\$ 10 13C2 PFDA	10.0	10.7	107.42

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-228 MS Lab Sample ID: 320-42363-1 MS  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_059.d  
 Analysis Method: 537 Date Collected: 08/21/2018 09:10  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 276.3(mL) Date Analyzed: 08/30/2018 07:06  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	257		36	14	6.2
335-67-1	Perfluorooctanoic acid (PFOA)	125	M	18	7.2	2.5
375-95-1	Perfluorononanoic acid (PFNA)	106		22	18	7.2
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	191		27	11	5.0
375-85-9	Perfluoroheptanoic acid (PFHpA)	58.8		9.0	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	513		81	33	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	106		70-130
STL00996	13C2 PFDA	115		70-130

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_059.d  
 Lims ID: 320-42363-A-1-B MS  
 Client ID: NAWC-082118-RW-228  
 Sample Type: MS  
 Inject. Date: 30-Aug-2018 07:06:13 ALS Bottle#: 40 Worklist Smp#: 23  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-1-b ms  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:47:00

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.366	0.0	1.000	16628729	141.8		12216	
298.90 > 99.00	1.366	1.366	0.0	1.000	11617063		1.43(0.00-0.00)	15237	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.479	1.487	-0.008	1.000	1340852	10.6		10952	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.631	1.631	0.0	1.000	8971152	52.9		2863	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.631	1.631	0.0	1.000	2101690	16.3		320	
* 6 13C2-PFOA									
415.00 > 370.00	1.813	1.821	-0.008		1222421	10.0		8509	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.813	1.821	-0.008	1.000	4607161	34.6		550	M
413.00 > 169.00	1.813	1.821	-0.008	1.000	2496219		1.85(0.00-0.00)	6782	M
* 7 13C4 PFOS									
503.00 > 80.00	2.071	2.079	-0.008		2937520	28.7		2636	
9 Perfluorononanoic acid									
463.00 > 419.00	2.079	2.086	-0.007	1.000	2942406	29.2		239	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.071	2.109	-0.038	1.000	7849065	70.9		4351	
499.00 > 99.00	2.071	2.109	-0.038	1.000	1708294		4.59(0.00-0.00)	2842	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.238	2.246	-0.008	1.000	1110032	11.5		6892	

## QC Flag Legend

Review Flags

M - Manually Integrated

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_059.d

Injection Date: 30-Aug-2018 07:06:13

Instrument ID: A8\_N

Lims ID: 320-42363-A-1-B MS

Client ID: NAWC-082118-RW-228

Operator ID: SACINSTLCMS01

ALS Bottle#: 40

Worklist Smp#: 23

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

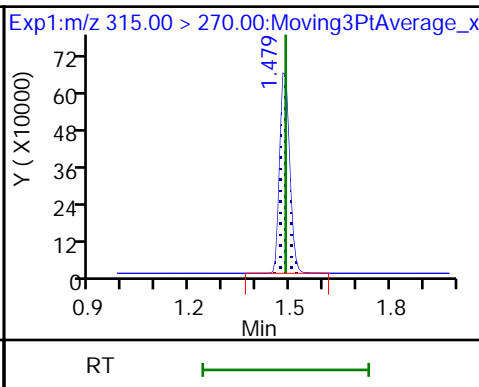
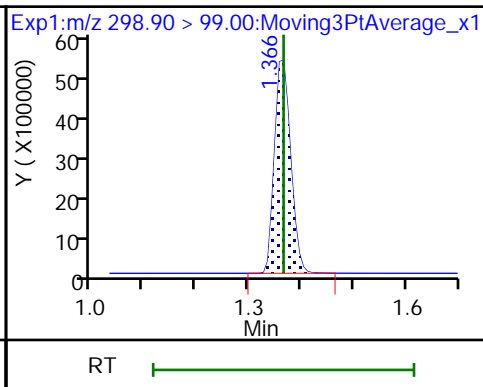
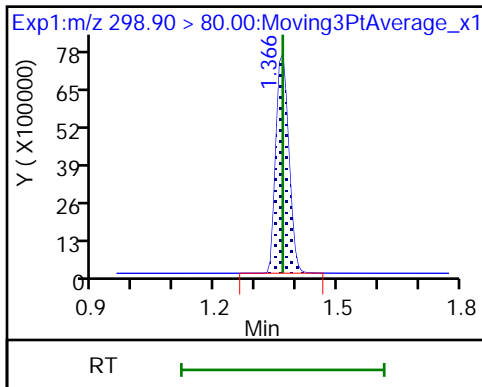
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

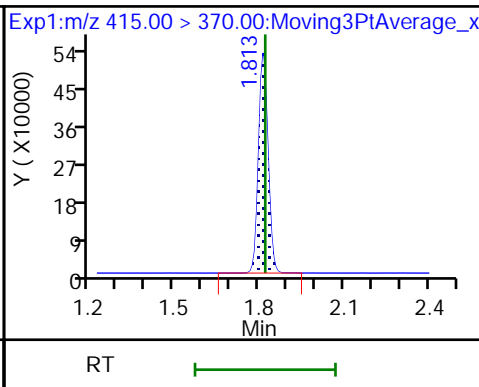
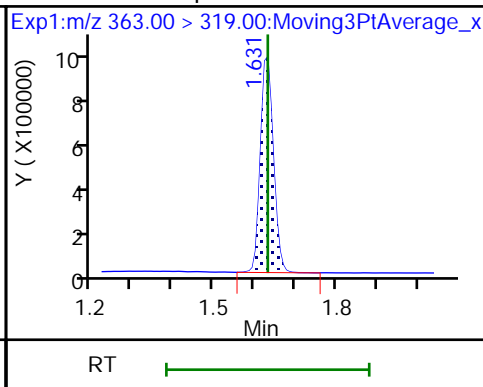
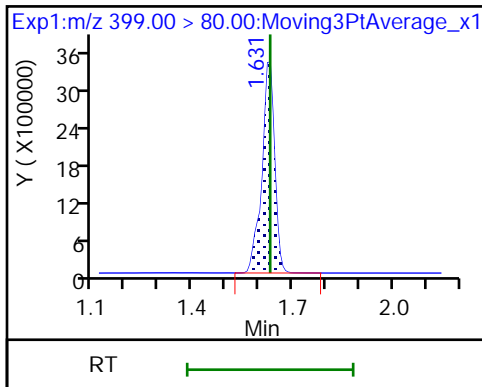
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

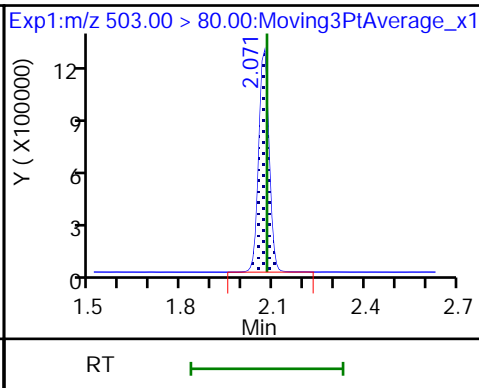
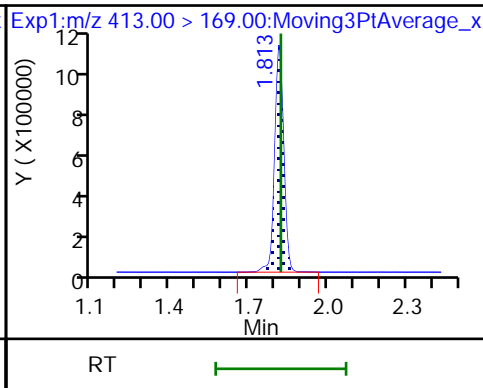
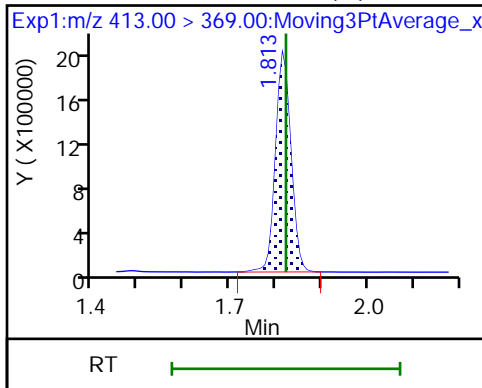
\* 6 13C2-PFOA



5 Perfluorooctanoic acid (M)

5 Perfluorooctanoic acid

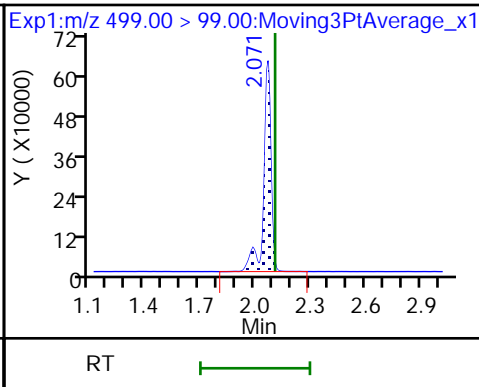
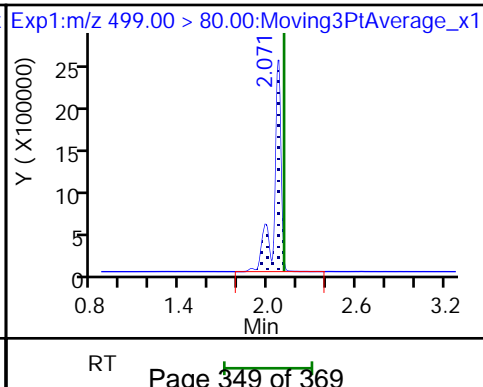
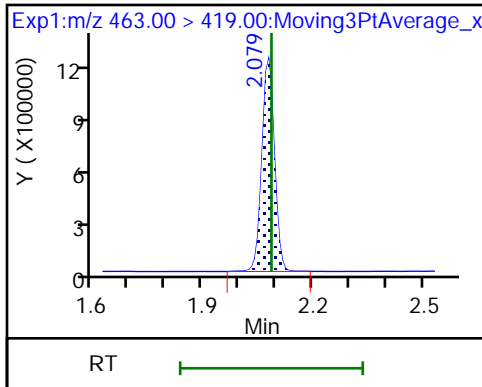
\* 7 13C4 PFOS



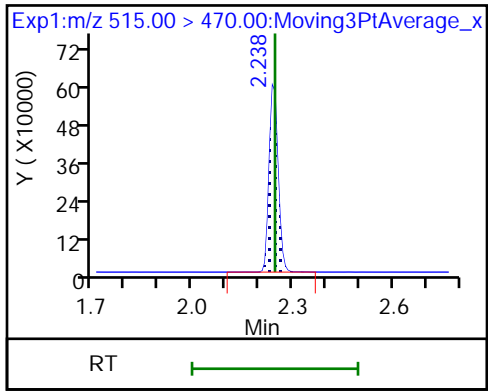
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA





TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_059.d  
 Lims ID: 320-42363-A-1-B MS  
 Client ID: NAWC-082118-RW-228  
 Sample Type: MS  
 Inject. Date: 30-Aug-2018 07:06:13 ALS Bottle#: 40 Worklist Smp#: 23  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-1-b ms  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:47:00

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	10.6	105.53
\$ 10 13C2 PFDA	10.0	11.5	114.64

TestAmerica Sacramento

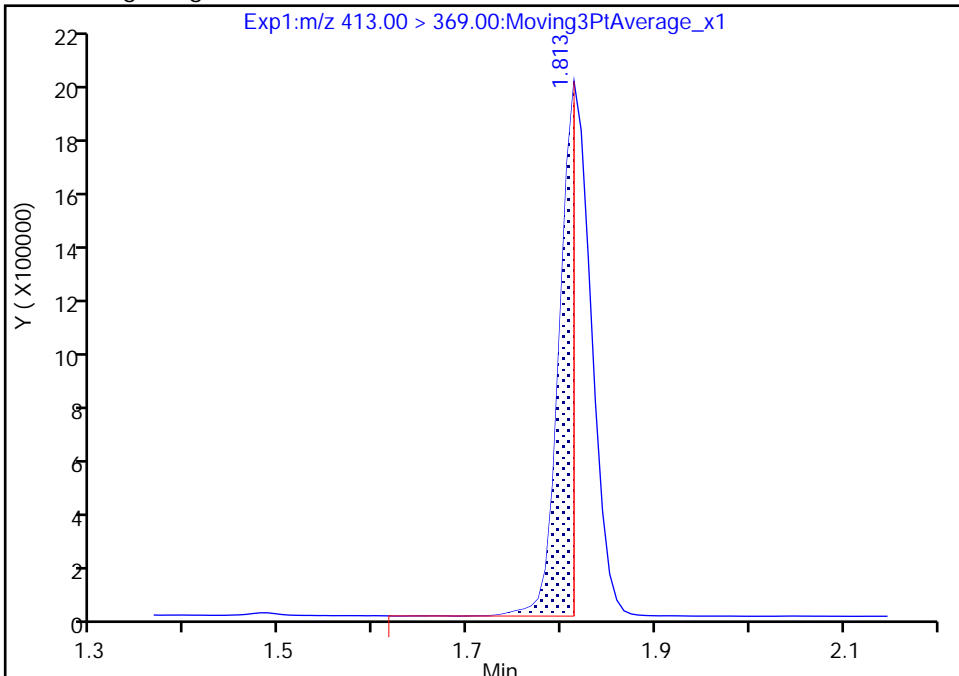
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Injection Date: 30-Aug-2018 07:06:13 Instrument ID: A8\_N  
Lims ID: 320-42363-A-1-B MS  
Client ID: NAWC-082118-RW-228  
Operator ID: SACINSTLCMS01 ALS Bottle#: 40 Worklist Smp#: 23  
Injection Vol: 2.0 ul Dil. Factor: 1.0000  
Method: 537\_A8\_N Limit Group: LC 537 ICAL  
Column: Detector EXP1

5 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

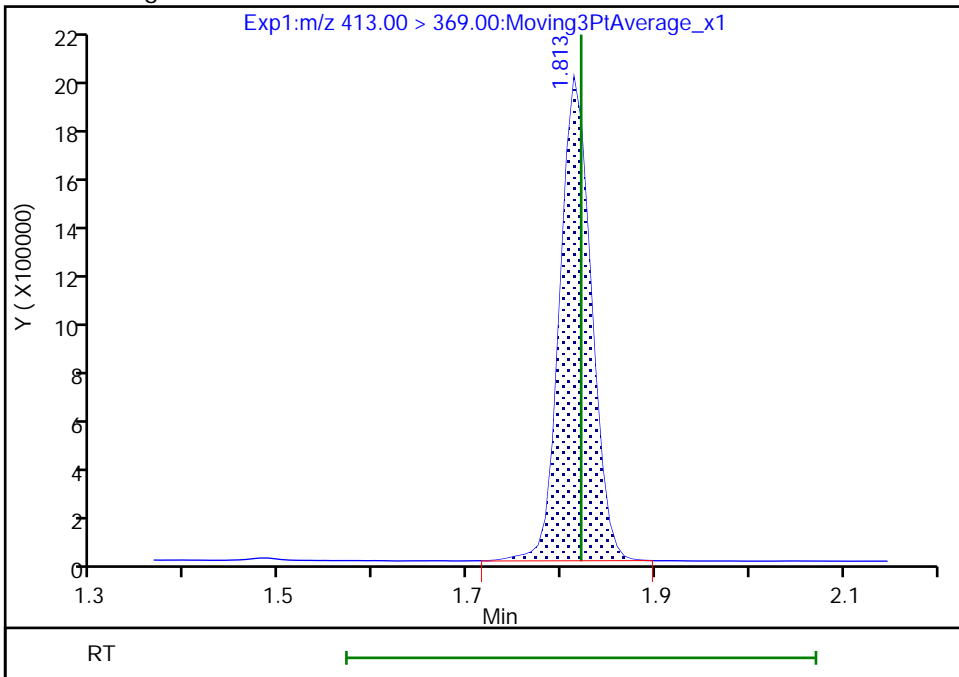
RT: 1.81  
Area: 2086314  
Amount: 15.664375  
Amount Units: ng/ml

Processing Integration Results



RT: 1.81  
Area: 4607161  
Amount: 34.591293  
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 30-Aug-2018 15:46:46  
Audit Action: Manually Integrated

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-228 MSD Lab Sample ID: 320-42363-1 MSD  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_060.d  
 Analysis Method: 537 Date Collected: 08/21/2018 09:10  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 283.3(mL) Date Analyzed: 08/30/2018 07:10  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	183	J1	35	14	6.0
335-67-1	Perfluorooctanoic acid (PFOA)	89.4	J1	18	7.1	2.5
375-95-1	Perfluorononanoic acid (PFNA)	78.0		21	18	7.1
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	137	J1	26	11	4.9
375-85-9	Perfluoroheptanoic acid (PFHpA)	44.7		8.8	3.5	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	407		79	32	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	77		70-130
STL00996	13C2 PFDA	86		70-130

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_060.d  
 Lims ID: 320-42363-A-1-C MSD  
 Client ID: NAWC-082118-RW-228  
 Sample Type: MSD  
 Inject. Date: 30-Aug-2018 07:10:53 ALS Bottle#: 41 Worklist Smp#: 24  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-1-c msd  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:47:31

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.366	0.0	1.000	12528964	115.3		12228	
298.90 > 99.00	1.366	1.366	0.0	1.000	8689970		1.44(0.00-0.00)	13919	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.487	1.487	0.0	1.000	898515	7.75		8586	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.631	1.631	0.0	1.000	6109880	38.9		2605	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.631	1.631	0.0	1.000	1494148	12.7		283	
* 6 13C2-PFOA									
415.00 > 370.00	1.813	1.821	-0.008		1115775	10.0		8368	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.813	1.821	-0.008	1.000	3078952	25.3		408	
413.00 > 169.00	1.813	1.821	-0.008	1.000	1648761		1.87(0.00-0.00)	4429	
* 7 13C4 PFOS									
503.00 > 80.00	2.071	2.079	-0.008		2722744	28.7		3023	
9 Perfluorononanoic acid									
463.00 > 419.00	2.079	2.086	-0.007	1.000	2033574	22.1		175	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.071	2.109	-0.038	1.000	5328602	52.0		3520	
499.00 > 99.00	2.071	2.109	-0.038	1.000	1124425		4.74(0.00-0.00)	2051	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.246	0.0	1.000	757125	8.57		4280	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_060.d

Injection Date: 30-Aug-2018 07:10:53

Instrument ID: A8\_N

Lims ID: 320-42363-A-1-C MSD

Client ID: NAWC-082118-RW-228

Operator ID: SACINSTLCMS01

ALS Bottle#: 41

Worklist Smp#: 24

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

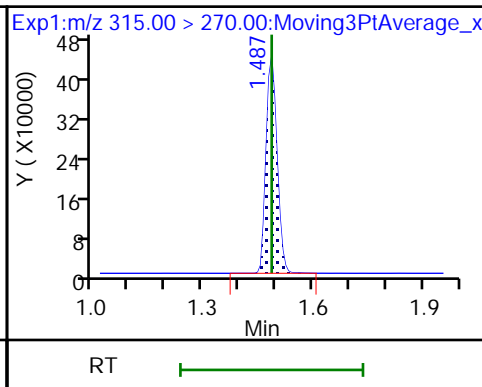
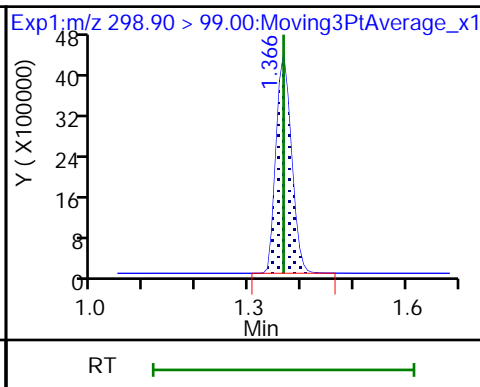
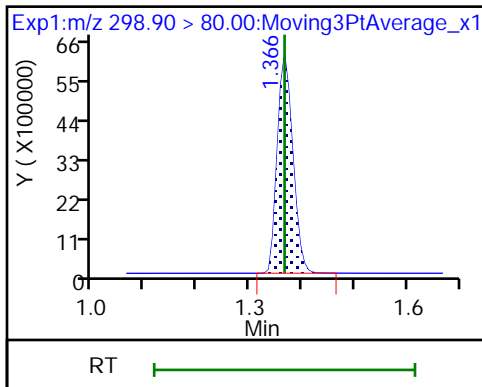
Method: 537\_A8\_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

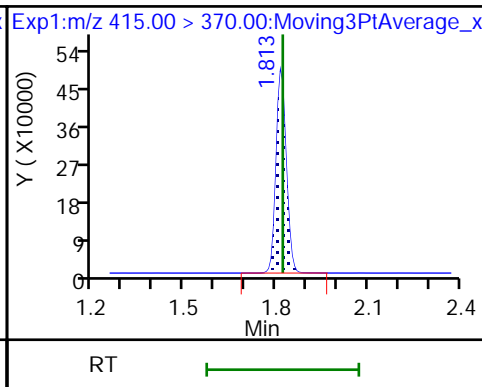
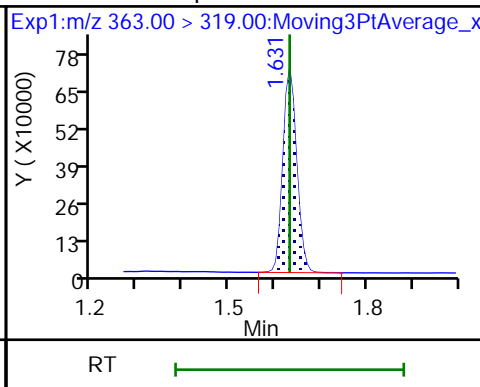
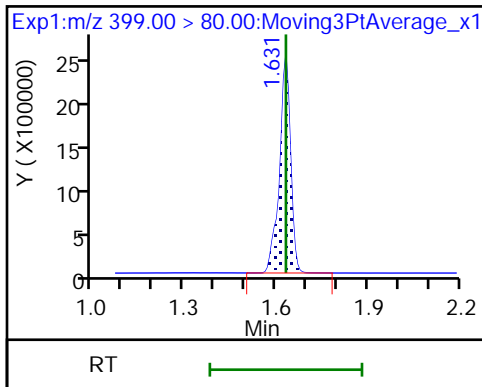
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

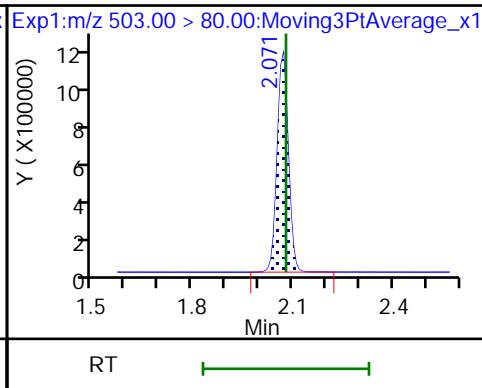
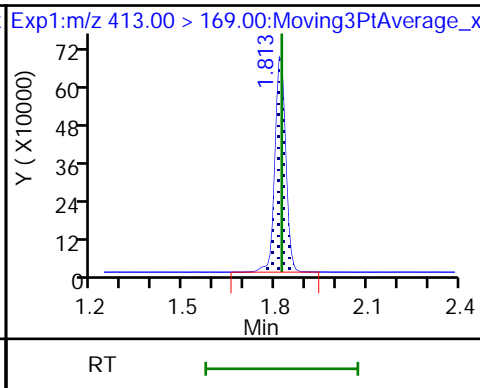
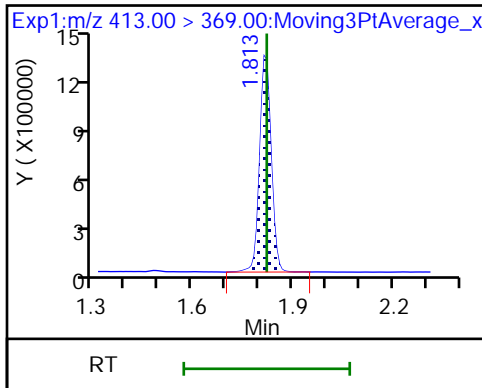
\* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

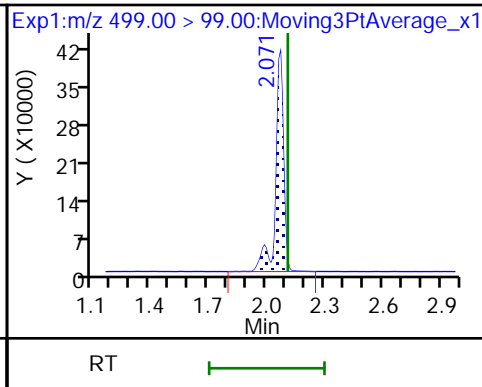
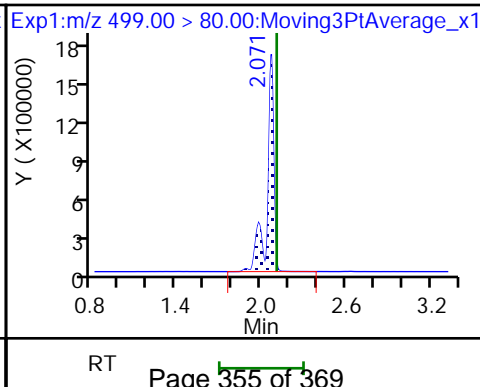
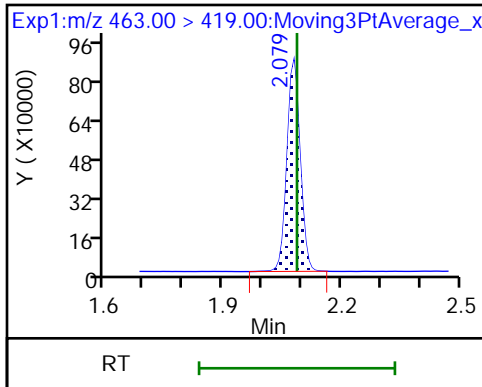
\* 7 13C4 PFOS



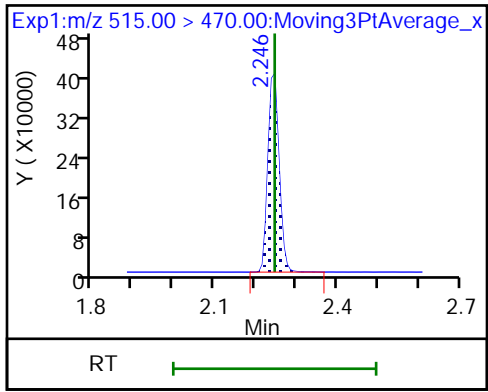
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento  
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_060.d  
 Lims ID: 320-42363-A-1-C MSD  
 Client ID: NAWC-082118-RW-228  
 Sample Type: MSD  
 Inject. Date: 30-Aug-2018 07:10:53 ALS Bottle#: 41 Worklist Smp#: 24  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-1-c msd  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:47:31

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	7.75	77.48
\$ 10 13C2 PFDA	10.0	8.57	85.66

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Start Date: 08/15/2018 18:21

Analysis Batch Number: 240166 End Date: 08/15/2018 19:03

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-240166/2		08/15/2018 18:21	1	2018.08.15_537C URVE 003.d	GeminiC18 3x100 3(mm)
IC 320-240166/3		08/15/2018 18:25	1	2018.08.15_537C URVE 004.d	GeminiC18 3x100 3(mm)
IC 320-240166/4		08/15/2018 18:30	1	2018.08.15_537C URVE 005.d	GeminiC18 3x100 3(mm)
IC 320-240166/5 ICISAV		08/15/2018 18:35	1	2018.08.15_537C URVE 006.d	GeminiC18 3x100 3(mm)
IC 320-240166/6		08/15/2018 18:39	1	2018.08.15_537C URVE 007.d	GeminiC18 3x100 3(mm)
IC 320-240166/7		08/15/2018 18:44	1	2018.08.15_537C URVE 008.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/15/2018 18:49	1		GeminiC18 3x100 3(mm)
CCVL 320-240166/9		08/15/2018 18:53	1	2018.08.15_537C URVE 010.d	GeminiC18 3x100 3(mm)
ICB 320-240166/10		08/15/2018 18:58	1		GeminiC18 3x100 3(mm)
ICV 320-240166/11		08/15/2018 19:03	1	2018.08.15_537C URVE 012.d	GeminiC18 3x100 3(mm)



LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Start Date: 08/30/2018 02:44

Analysis Batch Number: 242979 End Date: 08/30/2018 03:21

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-242979/1		08/30/2018 02:44	1	2018.08.29_537B 003.d	GeminiC18 3x100 3(mm)
CCV 320-242979/9 CCVIS		08/30/2018 03:21	1		GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Start Date: 08/30/2018 06:42

Analysis Batch Number: 242992 End Date: 08/30/2018 07:38

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-242992/18 CCVIS		08/30/2018 06:42	1	2018.08.29_537B 054.d	GeminiC18 3x100 3(mm)
MB 320-242479/1-A		08/30/2018 06:52	1	2018.08.29_537B 056.d	GeminiC18 3x100 3(mm)
LCS 320-242479/2-A		08/30/2018 06:56	1	2018.08.29_537B 057.d	GeminiC18 3x100 3(mm)
320-42363-1		08/30/2018 07:01	1	2018.08.29_537B 058.d	GeminiC18 3x100 3(mm)
320-42363-1 MS		08/30/2018 07:06	1	2018.08.29_537B 059.d	GeminiC18 3x100 3(mm)
320-42363-1 MSD		08/30/2018 07:10	1	2018.08.29_537B 060.d	GeminiC18 3x100 3(mm)
320-42363-2		08/30/2018 07:15	1	2018.08.29_537B 061.d	GeminiC18 3x100 3(mm)
320-42363-3		08/30/2018 07:20	1	2018.08.29_537B 062.d	GeminiC18 3x100 3(mm)
320-42363-4		08/30/2018 07:24	1	2018.08.29_537B 063.d	GeminiC18 3x100 3(mm)
320-42363-5		08/30/2018 07:29	1	2018.08.29_537B 064.d	GeminiC18 3x100 3(mm)
320-42363-6		08/30/2018 07:34	1	2018.08.29_537B 065.d	GeminiC18 3x100 3(mm)
CCV 320-242992/30 CCVIS		08/30/2018 07:38	1	2018.08.29_537B 066.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Start Date: 08/30/2018 07:38

Analysis Batch Number: 242994 End Date: 08/30/2018 08:16

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-242994/30 CCVIS		08/30/2018 07:38	1	2018.08.29_537B 066.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/30/2018 07:48	1		GeminiC18 3x100 3(mm)
320-42363-8		08/30/2018 07:52	1	2018.08.29_537B 069.d	GeminiC18 3x100 3(mm)
320-42363-9		08/30/2018 07:57	1	2018.08.29_537B 070.d	GeminiC18 3x100 3(mm)
320-42363-10		08/30/2018 08:02	1	2018.08.29_537B 071.d	GeminiC18 3x100 3(mm)
320-42363-11		08/30/2018 08:06	1	2018.08.29_537B 072.d	GeminiC18 3x100 3(mm)
320-42363-12		08/30/2018 08:11	1	2018.08.29_537B 073.d	GeminiC18 3x100 3(mm)
CCV 320-242994/38 CCVIS		08/30/2018 08:16	1	2018.08.29_537B 074.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Start Date: 08/30/2018 16:19

Analysis Batch Number: 243207 End Date: 08/30/2018 17:01

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-243207/2		08/30/2018 16:19	1	2018.08.30_537I CALXX 003.d	GeminiC18 3x100 3(mm)
IC 320-243207/3		08/30/2018 16:24	1	2018.08.30_537I CALXX 004.d	GeminiC18 3x100 3(mm)
IC 320-243207/4		08/30/2018 16:28	1	2018.08.30_537I CALXX 005.d	GeminiC18 3x100 3(mm)
IC 320-243207/5 ICISAV		08/30/2018 16:33	1	2018.08.30_537I CALXX 006.d	GeminiC18 3x100 3(mm)
IC 320-243207/6		08/30/2018 16:38	1	2018.08.30_537I CALXX 007.d	GeminiC18 3x100 3(mm)
IC 320-243207/7		08/30/2018 16:42	1	2018.08.30_537I CALXX 008.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/30/2018 16:47	1		GeminiC18 3x100 3(mm)
CCVL 320-243207/9		08/30/2018 16:52	1	2018.08.30_537I CALXX 010.d	GeminiC18 3x100 3(mm)
ICB 320-243207/10		08/30/2018 16:56	1		GeminiC18 3x100 3(mm)
ICV 320-243207/11		08/30/2018 17:01	1	2018.08.30_537I CALXX 012.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Start Date: 08/31/2018 07:18

Analysis Batch Number: 243340 End Date: 08/31/2018 08:27

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-243340/59 CCVIS		08/31/2018 07:18	1	2018.08.30_537A A 066.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/31/2018 08:13	1		GeminiC18 3x100 3(mm)
320-42363-5 RA		08/31/2018 08:18	1	2018.08.30_537A AA 069.d	GeminiC18 3x100 3(mm)
320-42363-7		08/31/2018 08:22	1	2018.08.30_537A AA 070.d	GeminiC18 3x100 3(mm)
CCV 320-243340/64 CCVIS		08/31/2018 08:27	1	2018.08.30_537A AA 071.d	GeminiC18 3x100 3(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Batch Number: 242479 Batch Start Date: 08/28/18 06:42 Batch Analyst: Arauz, Horacio J

Batch Method: 537 Batch End Date: 08/28/18 22:10

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-HSP 00029
MB 320-242479/1		537, 537				250 mL	1.00 mL	7.0 SU	
LCS 320-242479/2		537, 537				250 mL	1.00 mL	7.0 SU	100 uL
320-42363-A-1	NAWC-082118-RW-228	537, 537	T	306.20 g	28.46 g	277.7 mL	1.00 mL	7.0 SU	
320-42363-A-1	NAWC-082118-RW-228	537, 537	T	304.81 g	28.54 g	276.3 mL	1.00 mL	7.0 SU	100 uL
320-42363-A-1	NAWC-082118-RW-228	537, 537	T	312.06 g	28.72 g	283.3 mL	1.00 mL	7.0 SU	100 uL
320-42363-A-2	NAWC-082118-FRB-228	537, 537	T	296.16 g	27.95 g	268.2 mL	1.00 mL	7.0 SU	
320-42363-A-3	NAWC-082118-RW-175	537, 537	T	309.50 g	29.22 g	280.3 mL	1.00 mL	7.0 SU	
320-42363-A-4	NAWC-082118-FRB-175	537, 537	T	302.07 g	27.85 g	274.2 mL	1.00 mL	7.0 SU	
320-42363-A-5	NAWC-082118-RW-098	537, 537	T	319.02 g	28.43 g	290.6 mL	1.00 mL	7.0 SU	
320-42363-A-6	NAWC-082118-FRB-098	537, 537	T	284.85 g	27.95 g	256.9 mL	1.00 mL	7.0 SU	
320-42363-A-7	WGNA-082118-RW-0488	537, 537	T	310.18 g	28.20 g	282 mL	1.00 mL	7.0 SU	
320-42363-A-8	WGNA-082118-FRB-0488	537, 537	T	300.40 g	28.62 g	271.8 mL	1.00 mL	7.0 SU	
320-42363-A-9	NAWC-082118-RW-265	537, 537	T	308.47 g	28.16 g	280.3 mL	1.00 mL	7.0 SU	
320-42363-A-10	NAWC-082118-FRB-265	537, 537	T	304.47 g	27.79 g	276.7 mL	1.00 mL	7.0 SU	
320-42363-A-11	WGNA-082118-RW-3556	537, 537	T	291.93 g	28.10 g	263.8 mL	1.00 mL	7.0 SU	
320-42363-A-12	WGNA-082118-FRB-3556	537, 537	T	302.71 g	27.81 g	274.9 mL	1.00 mL	7.0 SU	

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-IS 00081	LC537-SU 00078	AnalysisComment			
MB 320-242479/1		537, 537		100 uL	100 uL	Chlorine ND			
LCS 320-242479/2		537, 537		100 uL	100 uL	Chlorine ND			
320-42363-A-1	NAWC-082118-RW-228	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-1	NAWC-082118-RW-228	537, 537	T	100 uL	100 uL	Chlorine ND			

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Batch Number: 242479 Batch Start Date: 08/28/18 06:42 Batch Analyst: Arauz, Horacio J

Batch Method: 537 Batch End Date: 08/28/18 22:10

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-IS 00081	LC537-SU 00078	AnalysisComment			
320-42363-A-1 MSD	NAWC-082118-RW-2 28	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-2	NAWC-082118-FRB- 228	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-3	NAWC-082118-RW-1 75	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-4	NAWC-082118-FRB- 175	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-5	NAWC-082118-RW-0 98	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-6	NAWC-082118-FRB- 098	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-7	WGNA-082118-RW-0 488	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-8	WGNA-082118-FRB- 0488	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-9	NAWC-082118-RW-2 65	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-10	NAWC-082118-FRB- 265	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-11	WGNA-082118-RW-3 556	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-12	WGNA-082118-FRB- 3556	537, 537	T	100 uL	100 uL	Chlorine ND			

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Batch Number: 242479 Batch Start Date: 08/28/18 06:42 Batch Analyst: Arauz, Horacio J

Batch Method: 537 Batch End Date: 08/28/18 22:10

Batch Notes	
Analyst ID - Aliquot Step	JER
Batch Comment	Client labels match TA label, HJA 08/28/18
Analyst ID - Concentration	HJA/VPM
Analyst ID - Final Volume Step	JER
Internal Standard ID#	1346107
Manifold ID	1, 3
Methanol ID	1343777
pH Indicator ID	0818
Pipette ID	Q34709G
Analyst ID - IS Reagent Drop	JER
Analyst ID - IS Reagent Drop Witness	GXL
Analyst ID - SU Reagent Drop	HJA
Analyst ID - SU Reagent Drop Witness	KJP
Analyst ID - TA Reagent Drop	HJA
Analyst ID - TA Reagent Drop Witness	KJP
SPE Cartridge Lot ID	6390138-02
Trizma ID	SLBR5241V
Reagent Water ID	8-27-18

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.



# Shipping and Receiving Documents

**TestAmerica Sacramento**  
 880 Riverside Parkway  
 West Sacramento, CA 95605-1500  
 phone 916.373.5600 fax 303.467.7248

**Chain of Custody Record**

**TestAmerica**  
 THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program:  DW  NPDES  RCRA  Other:

Project Manager: Andy Fiebowitz  
 Site Contact: Mary Kay Bond  
 Date: 8/21/2018  
 Carrier: FedEx

TetraTech  
 234 Mall Boulevard Suite 260  
 King of Prussia, PA 19406  
 610-382-2924  
 610-491-9688  
 Project Name: WEO4  
 Site: WEO4  
 P O # 1132358 (through EarthToxics)

Client Contact  
 Tel/Fax: 610.382.2920  
 Lab Contact: Dave Alltucker  
 EPA 537 UCMR3

Analysis Turnaround Time  
 CALENDAR DAYS  WORKING DAYS  
 TAT (if different from Below 21  
 2 weeks  
 1 week  
 2 days  
 1 day

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Sample Specific Notes:
NAWC-082118-RW-228	8/21/2018	09:10	G	DW	6	N	Y	MS/MSD
NAWC-082118-FRB-228	8/21/2018	09:05	G	DW	2	N	Y	Field Reagent Blank
NAWC-082118-RW-175	8/21/2018	10:10	G	DW	2	N	Y	Field Reagent Blank
NAWC-082118-FRB-175	8/21/2018	10:05	G	DW	2	N	Y	Field Reagent Blank
NAWC-082118-RW-098	8/21/2018	10:40	G	DW	2	N	Y	Field Reagent Blank
NAWC-082118-FRB-098	8/21/2018	10:35	G	DW	2	N	Y	Field Reagent Blank
WGNA-082118-RW-0488	8/21/2018	11:40	G	DW	2	N	Y	Field Reagent Blank
WGNA-082118-FRB-0488	8/21/2018	11:35	G	DW	2	N	Y	Field Reagent Blank
NAWC-082118-RW-265	8/21/2018	12:10	G	DW	2	N	Y	Field Reagent Blank
NAWC-082118-FRB-265	8/21/2018	12:05	G	DW	2	N	Y	Field Reagent Blank
WGNA-082118-RW-3556	8/21/2018	12:40	G	DW	2	N	Y	Field Reagent Blank
WGNA-082118-FRB-3556	8/21/2018	12:35	G	DW	2	N	Y	Field Reagent Blank
320-423663 Chain of Custody								
6								

Preservation Used: 1=Ice, 2=HCl; 3=H2SO4; 4=HNO3; 5=NaOH; 6=Other: Trizma  
 Possible Hazard Identification: Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.  
 Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  
 Return to Client  Disposal by Lab  Archive for \_\_\_\_\_ Months

Fed Ex Tracking: 7730 2171 8081

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Cooler Temp. (°C): Obs'd: 3.1 Corrd: 3.1 Therm ID No.: AK-3  
 Received by: *Mary Kay Bond* Company: *MA-Sac* Date/Time: 8/22/18 930  
 Received by: \_\_\_\_\_ Company: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Relinquished by: \_\_\_\_\_ Company: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Relinquished by: \_\_\_\_\_ Company: \_\_\_\_\_ Date/Time: \_\_\_\_\_

# Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 320-42363-1

**Login Number: 42363**  
**List Number: 1**  
**Creator: Gooch, Mayce**

**List Source: TestAmerica Sacramento**

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	seal
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

"NAWC-082118-RW-228","537","RES","320-42363-1","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","11","ng/L","J J1","6.1","DL","","TRG","","","36","LOQ","YES","-99","","277.7","1.00","14",""  
"NAWC-082118-RW-228","537","RES","320-42363-1","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","12","ng/L","J J1","2.5","DL","","TRG","","","18","LOQ","YES","-99","","277.7","1.00","7.2",""  
"NAWC-082118-RW-228","537","RES","320-42363-1","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","11","ng/L","U J1","5.0","DL","","TRG","","","27","LOQ","YES","-99","","277.7","1.00","11",""  
"NAWC-082118-RW-228","537","RES","320-42363-1","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","31","ng/L","J","14","DL","","TRG","","","81","LOQ","YES","-99","","277.7","1.00","32",""  
"NAWC-082118-RW-228","537","RES","320-42363-1","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","4.0","ng/L","J","1.7","DL","","TRG","","","9.0","LOQ","YES","-99","","277.7","1.00","3.6",""  
"NAWC-082118-RW-228","537","RES","320-42363-1","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","18","ng/L","U","7.2","DL","","TRG","","","22","LOQ","YES","-99","","277.7","1.00","18",""  
"NAWC-082118-RW-228","537","RES","320-42363-1","TALSAC","STL00993","13C2  
PFHxA","33","ng/L","","-99","DL","","SURR","91","","-99","LOQ","YES","36.0","","277.7","1.00","0",""  
"NAWC-082118-RW-228","537","RES","320-42363-1","TALSAC","STL00996","13C2  
PFDA","35","ng/L","","-99","DL","","SURR","97","","-99","LOQ","YES","36.0","","277.7","1.00","0",""  
"NAWC-082118-FRB-265","537","RES","320-42363-10","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","14","ng/L","U","6.1","DL","","TRG","","","36","LOQ","YES","-99","","276.7","1.00","14",""  
"NAWC-082118-FRB-265","537","RES","320-42363-10","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","7.2","ng/L","U","2.5","DL","","TRG","","","18","LOQ","YES","-99","","276.7","1.00","7.2",""  
"NAWC-082118-FRB-265","537","RES","320-42363-10","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","11","ng/L","U","5.0","DL","","TRG","","","27","LOQ","YES","-99","","276.7","1.00","11",""  
"NAWC-082118-FRB-265","537","RES","320-42363-10","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","33","ng/L","U","15","DL","","TRG","","","81","LOQ","YES","-99","","276.7","1.00","33",""  
"NAWC-082118-FRB-265","537","RES","320-42363-10","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","3.6","ng/L","U","1.7","DL","","TRG","","","9.0","LOQ","YES","-99","","276.7","1.00","3.6",""  
"NAWC-082118-FRB-265","537","RES","320-42363-10","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","18","ng/L","U","7.2","DL","","TRG","","","22","LOQ","YES","-99","","276.7","1.00","18",""  
"NAWC-082118-FRB-265","537","RES","320-42363-10","TALSAC","STL00993","13C2  
PFHxA","35","ng/L","","-99","DL","","SURR","98","","-99","LOQ","YES","36.1","","276.7","1.00","0",""  
"NAWC-082118-FRB-265","537","RES","320-42363-10","TALSAC","STL00996","13C2  
PFDA","38","ng/L","","-99","DL","","SURR","106","","-99","LOQ","YES","36.1","","276.7","1.00","0",""  
"WGNA-082118-RW-3556","537","RES","320-42363-11","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","13","ng/L","J","6.4","DL","","TRG","","","38","LOQ","YES","-99","","263.8","1.00","15",""  
"WGNA-082118-RW-3556","537","RES","320-42363-11","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","14","ng/L","J","2.7","DL","","TRG","","","19","LOQ","YES","-99","","263.8","1.00","7.6",""  
"WGNA-082118-RW-3556","537","RES","320-42363-11","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","11","ng/L","U","5.2","DL","","TRG","","","28","LOQ","YES","-99","","263.8","1.00","11",""  
"WGNA-082118-RW-3556","537","RES","320-42363-11","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","34","ng/L","U","15","DL","","TRG","","","85","LOQ","YES","-99","","263.8","1.00","34",""  
"WGNA-082118-RW-3556","537","RES","320-42363-11","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","4.6","ng/L","J","1.8","DL","","TRG","","","9.5","LOQ","YES","-99","","263.8","1.00","3.8",""  
"WGNA-082118-RW-3556","537","RES","320-42363-11","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","19","ng/L","U","7.6","DL","","TRG","","","23","LOQ","YES","-99","","263.8","1.00","19",""  
"WGNA-082118-RW-3556","537","RES","320-42363-11","TALSAC","STL00993","13C2  
PFHxA","36","ng/L","","-99","DL","","SURR","94","","-99","LOQ","YES","37.9","","263.8","1.00","0",""  
"WGNA-082118-RW-3556","537","RES","320-42363-11","TALSAC","STL00996","13C2  
PFDA","38","ng/L","","-99","DL","","SURR","101","","-99","LOQ","YES","37.9","","263.8","1.00","0",""  
"WGNA-082118-FRB-3556","537","RES","320-42363-12","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","15","ng/L","U","6.2","DL","","TRG","","","36","LOQ","YES","-99","","274.9","1.00","15",""  
"WGNA-082118-FRB-3556","537","RES","320-42363-12","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","7.3","ng/L","U","2.5","DL","","TRG","","","18","LOQ","YES","-99","","274.9","1.00","7.3",""  
"WGNA-082118-FRB-3556","537","RES","320-42363-12","TALSAC","355-46-4","Perfluorohexanesulfonic acid

(PFHxS),"11","ng/L","U","5.0","DL","","TRG","","","27","LOQ","YES",-99","","274.9","1.00","11","","  
"WGNA-082118-FRB-3556","537","RES","320-42363-12","TALSAC","375-73-5","Perfluorobutanesulfonic acid  
(PFBS)","33","ng/L","U","15","DL","","TRG","","","82","LOQ","YES",-99","","274.9","1.00","33","","  
"WGNA-082118-FRB-3556","537","RES","320-42363-12","TALSAC","375-85-9","Perfluoroheptanoic acid  
(PFHpA)","3.6","ng/L","U","1.7","DL","","TRG","","","9.1","LOQ","YES",-99","","274.9","1.00","3.6","","  
"WGNA-082118-FRB-3556","537","RES","320-42363-12","TALSAC","375-95-1","Perfluorononanoic acid  
(PFNA)","18","ng/L","U","7.3","DL","","TRG","","","22","LOQ","YES",-99","","274.9","1.00","18","","  
"WGNA-082118-FRB-3556","537","RES","320-42363-12","TALSAC","STL00993","13C2  
PFHxA","35","ng/L","","-99","DL","","SURR","97","","-99","LOQ","YES","36.4","","274.9","1.00","0","","  
"WGNA-082118-FRB-3556","537","RES","320-42363-12","TALSAC","STL00996","13C2  
PFDA","39","ng/L","","-99","DL","","SURR","107","","-99","LOQ","YES","36.4","","274.9","1.00","0","","  
"NAWC-082118-RW-228MS","537","RES","320-42363-1MS","TALSAC","1763-23-1","Perfluorooctanesulfonic acid  
(PFOS)","257","ng/L","","6.2","DL","","SPK","124","","36","LOQ","YES","199","NAWC-082118-RW-  
228","276.3","1.00","14","","  
"NAWC-082118-RW-228MS","537","RES","320-42363-1MS","TALSAC","335-67-1","Perfluorooctanoic acid  
(PFOA)","125","ng/L","M","2.5","DL","","SPK","113","","18","LOQ","YES","99.5","NAWC-082118-RW-  
228","276.3","1.00","7.2","","  
"NAWC-082118-RW-228MS","537","RES","320-42363-1MS","TALSAC","355-46-4","Perfluorohexanesulfonic acid  
(PFHxS)","191","ng/L","","5.0","DL","","SPK","126","","27","LOQ","YES","152","NAWC-082118-RW-  
228","276.3","1.00","11","","  
"NAWC-082118-RW-228MS","537","RES","320-42363-1MS","TALSAC","375-73-5","Perfluorobutanesulfonic acid  
(PFBS)","513","ng/L","","15","DL","","SPK","107","","81","LOQ","YES","453","NAWC-082118-RW-  
228","276.3","1.00","33","","  
"NAWC-082118-RW-228MS","537","RES","320-42363-1MS","TALSAC","375-85-9","Perfluoroheptanoic acid  
(PFHpA)","58.8","ng/L","","1.7","DL","","SPK","112","","9.0","LOQ","YES","48.9","NAWC-082118-RW-  
228","276.3","1.00","3.6","","  
"NAWC-082118-RW-228MS","537","RES","320-42363-1MS","TALSAC","375-95-1","Perfluorononanoic acid  
(PFNA)","106","ng/L","","7.2","DL","","SPK","106","","22","LOQ","YES","99.5","NAWC-082118-RW-  
228","276.3","1.00","18","","  
"NAWC-082118-RW-228MS","537","RES","320-42363-1MS","TALSAC","STL00993","13C2  
PFHxA","38.2","ng/L","","-99","DL","","SURR","106","","-99","LOQ","YES","36.2","NAWC-082118-RW-  
228","276.3","1.00","0","","  
"NAWC-082118-RW-228MS","537","RES","320-42363-1MS","TALSAC","STL00996","13C2  
PFDA","41.5","ng/L","","-99","DL","","SURR","115","","-99","LOQ","YES","36.2","NAWC-082118-RW-  
228","276.3","1.00","0","","  
"NAWC-082118-RW-228MSD","537","RES","320-42363-1MSD","TALSAC","1763-23-1","Perfluorooctanesulfonic  
acid (PFOS)","183","ng/L","J1","6.0","DL","","SPK","89","33","35","LOQ","YES","194","NAWC-082118-RW-  
228","283.3","1.00","14","","  
"NAWC-082118-RW-228MSD","537","RES","320-42363-1MSD","TALSAC","335-67-1","Perfluorooctanoic acid  
(PFOA)","89.4","ng/L","J1","2.5","DL","","SPK","79","33","18","LOQ","YES","97.1","NAWC-082118-RW-  
228","283.3","1.00","7.1","","  
"NAWC-082118-RW-228MSD","537","RES","320-42363-1MSD","TALSAC","355-46-4","Perfluorohexanesulfonic  
acid (PFHxS)","137","ng/L","J1","4.9","DL","","SPK","92","33","26","LOQ","YES","148","NAWC-082118-RW-  
228","283.3","1.00","11","","  
"NAWC-082118-RW-228MSD","537","RES","320-42363-1MSD","TALSAC","375-73-5","Perfluorobutanesulfonic  
acid (PFBS)","407","ng/L","","14","DL","","SPK","86","23","79","LOQ","YES","442","NAWC-082118-RW-  
228","283.3","1.00","32","","  
"NAWC-082118-RW-228MSD","537","RES","320-42363-1MSD","TALSAC","375-85-9","Perfluoroheptanoic acid  
(PFHpA)","44.7","ng/L","","1.7","DL","","SPK","85","27","8.8","LOQ","YES","47.7","NAWC-082118-RW-  
228","283.3","1.00","3.5","","  
"NAWC-082118-RW-228MSD","537","RES","320-42363-1MSD","TALSAC","375-95-1","Perfluorononanoic acid  
(PFNA)","78.0","ng/L","","7.1","DL","","SPK","80","30","21","LOQ","YES","97.1","NAWC-082118-RW-  
228","283.3","1.00","18","","  
"NAWC-082118-RW-228MSD","537","RES","320-42363-1MSD","TALSAC","STL00993","13C2

PFHxA", "27.3", "ng/L", "", "-99", "DL", "", "SURR", "77", "", "-99", "LOQ", "YES", "35.3", "NAWC-082118-RW-228", "283.3", "1.00", "0", ""

"NAWC-082118-RW-228MSD", "537", "RES", "320-42363-1MSD", "TALSAC", "STL00996", "13C2  
PFDA", "30.2", "ng/L", "", "-99", "DL", "", "SURR", "86", "", "-99", "LOQ", "YES", "35.3", "NAWC-082118-RW-228", "283.3", "1.00", "0", ""

"NAWC-082118-FRB-228", "537", "RES", "320-42363-2", "TALSAC", "1763-23-1", "Perfluorooctanesulfonic acid (PFOS)", "15", "ng/L", "U", "6.3", "DL", "", "TRG", "", "", "37", "LOQ", "YES", "-99", "", "268.2", "1.00", "15", ""

"NAWC-082118-FRB-228", "537", "RES", "320-42363-2", "TALSAC", "335-67-1", "Perfluorooctanoic acid (PFOA)", "7.5", "ng/L", "U", "2.6", "DL", "", "TRG", "", "", "19", "LOQ", "YES", "-99", "", "268.2", "1.00", "7.5", ""

"NAWC-082118-FRB-228", "537", "RES", "320-42363-2", "TALSAC", "355-46-4", "Perfluorohexanesulfonic acid (PFHxS)", "11", "ng/L", "U", "5.1", "DL", "", "TRG", "", "", "28", "LOQ", "YES", "-99", "", "268.2", "1.00", "11", ""

"NAWC-082118-FRB-228", "537", "RES", "320-42363-2", "TALSAC", "375-73-5", "Perfluorobutanesulfonic acid (PFBS)", "34", "ng/L", "U", "15", "DL", "", "TRG", "", "", "84", "LOQ", "YES", "-99", "", "268.2", "1.00", "34", ""

"NAWC-082118-FRB-228", "537", "RES", "320-42363-2", "TALSAC", "375-85-9", "Perfluoroheptanoic acid (PFHpA)", "3.7", "ng/L", "U", "1.8", "DL", "", "TRG", "", "", "9.3", "LOQ", "YES", "-99", "", "268.2", "1.00", "3.7", ""

"NAWC-082118-FRB-228", "537", "RES", "320-42363-2", "TALSAC", "375-95-1", "Perfluorononanoic acid (PFNA)", "19", "ng/L", "U", "7.5", "DL", "", "TRG", "", "", "22", "LOQ", "YES", "-99", "", "268.2", "1.00", "19", ""

"NAWC-082118-FRB-228", "537", "RES", "320-42363-2", "TALSAC", "STL00993", "13C2  
PFHxA", "36", "ng/L", "", "-99", "DL", "", "SURR", "97", "", "-99", "LOQ", "YES", "37.3", "", "268.2", "1.00", "0", ""

"NAWC-082118-FRB-228", "537", "RES", "320-42363-2", "TALSAC", "STL00996", "13C2  
PFDA", "38", "ng/L", "", "-99", "DL", "", "SURR", "103", "", "-99", "LOQ", "YES", "37.3", "", "268.2", "1.00", "0", ""

"NAWC-082118-RW-175", "537", "RES", "320-42363-3", "TALSAC", "1763-23-1", "Perfluorooctanesulfonic acid (PFOS)", "65", "ng/L", "", "6.1", "DL", "", "TRG", "", "", "36", "LOQ", "YES", "-99", "", "280.3", "1.00", "14", ""

"NAWC-082118-RW-175", "537", "RES", "320-42363-3", "TALSAC", "335-67-1", "Perfluorooctanoic acid (PFOA)", "12", "ng/L", "J", "2.5", "DL", "", "TRG", "", "", "18", "LOQ", "YES", "-99", "", "280.3", "1.00", "7.1", ""

"NAWC-082118-RW-175", "537", "RES", "320-42363-3", "TALSAC", "355-46-4", "Perfluorohexanesulfonic acid (PFHxS)", "40", "ng/L", "", "4.9", "DL", "", "TRG", "", "", "27", "LOQ", "YES", "-99", "", "280.3", "1.00", "11", ""

"NAWC-082118-RW-175", "537", "RES", "320-42363-3", "TALSAC", "375-73-5", "Perfluorobutanesulfonic acid (PFBS)", "32", "ng/L", "U", "14", "DL", "", "TRG", "", "", "80", "LOQ", "YES", "-99", "", "280.3", "1.00", "32", ""

"NAWC-082118-RW-175", "537", "RES", "320-42363-3", "TALSAC", "375-85-9", "Perfluoroheptanoic acid (PFHpA)", "5.1", "ng/L", "J", "1.7", "DL", "", "TRG", "", "", "8.9", "LOQ", "YES", "-99", "", "280.3", "1.00", "3.6", ""

"NAWC-082118-RW-175", "537", "RES", "320-42363-3", "TALSAC", "375-95-1", "Perfluorononanoic acid (PFNA)", "18", "ng/L", "U", "7.1", "DL", "", "TRG", "", "", "21", "LOQ", "YES", "-99", "", "280.3", "1.00", "18", ""

"NAWC-082118-RW-175", "537", "RES", "320-42363-3", "TALSAC", "STL00993", "13C2  
PFHxA", "34", "ng/L", "", "-99", "DL", "", "SURR", "95", "", "-99", "LOQ", "YES", "35.7", "", "280.3", "1.00", "0", ""

"NAWC-082118-RW-175", "537", "RES", "320-42363-3", "TALSAC", "STL00996", "13C2  
PFDA", "36", "ng/L", "", "-99", "DL", "", "SURR", "102", "", "-99", "LOQ", "YES", "35.7", "", "280.3", "1.00", "0", ""

"NAWC-082118-FRB-175", "537", "RES", "320-42363-4", "TALSAC", "1763-23-1", "Perfluorooctanesulfonic acid (PFOS)", "15", "ng/L", "U", "6.2", "DL", "", "TRG", "", "", "36", "LOQ", "YES", "-99", "", "274.2", "1.00", "15", ""

"NAWC-082118-FRB-175", "537", "RES", "320-42363-4", "TALSAC", "335-67-1", "Perfluorooctanoic acid (PFOA)", "7.3", "ng/L", "U", "2.6", "DL", "", "TRG", "", "", "18", "LOQ", "YES", "-99", "", "274.2", "1.00", "7.3", ""

"NAWC-082118-FRB-175", "537", "RES", "320-42363-4", "TALSAC", "355-46-4", "Perfluorohexanesulfonic acid (PFHxS)", "11", "ng/L", "U", "5.0", "DL", "", "TRG", "", "", "27", "LOQ", "YES", "-99", "", "274.2", "1.00", "11", ""

"NAWC-082118-FRB-175", "537", "RES", "320-42363-4", "TALSAC", "375-73-5", "Perfluorobutanesulfonic acid (PFBS)", "33", "ng/L", "U", "15", "DL", "", "TRG", "", "", "82", "LOQ", "YES", "-99", "", "274.2", "1.00", "33", ""

"NAWC-082118-FRB-175", "537", "RES", "320-42363-4", "TALSAC", "375-85-9", "Perfluoroheptanoic acid (PFHpA)", "3.6", "ng/L", "U", "1.7", "DL", "", "TRG", "", "", "9.1", "LOQ", "YES", "-99", "", "274.2", "1.00", "3.6", ""

"NAWC-082118-FRB-175", "537", "RES", "320-42363-4", "TALSAC", "375-95-1", "Perfluorononanoic acid (PFNA)", "18", "ng/L", "U", "7.3", "DL", "", "TRG", "", "", "22", "LOQ", "YES", "-99", "", "274.2", "1.00", "18", ""

"NAWC-082118-FRB-175", "537", "RES", "320-42363-4", "TALSAC", "STL00993", "13C2  
PFHxA", "35", "ng/L", "", "-99", "DL", "", "SURR", "96", "", "-99", "LOQ", "YES", "36.5", "", "274.2", "1.00", "0", ""

"NAWC-082118-FRB-175", "537", "RES", "320-42363-4", "TALSAC", "STL00996", "13C2  
PFDA", "37", "ng/L", "", "-99", "DL", "", "SURR", "102", "", "-99", "LOQ", "YES", "36.5", "", "274.2", "1.00", "0", ""

"NAWC-082118-RW-098", "537", "RE", "320-42363-5", "TALSAC", "1763-23-1", "Perfluorooctanesulfonic acid

(PFOS),"11","ng/L","J","5.8","DL","","TRG","","","34","LOQ","NO",-99","","290.6","1.00","14","","NAWC-082118-RW-098","537","RE","320-42363-5","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA),"11","ng/L","J","2.4","DL","","TRG","","","17","LOQ","NO",-99","","290.6","1.00","6.9","","NAWC-082118-RW-098","537","RE","320-42363-5","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS),"10","ng/L","U","4.7","DL","","TRG","","","26","LOQ","NO",-99","","290.6","1.00","10","","NAWC-082118-RW-098","537","RE","320-42363-5","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS),"31","ng/L","U","14","DL","","TRG","","","77","LOQ","NO",-99","","290.6","1.00","31","","NAWC-082118-RW-098","537","RE","320-42363-5","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA),"3.4","ng/L","J","1.6","DL","","TRG","","","8.6","LOQ","NO",-99","","290.6","1.00","3.4","","NAWC-082118-RW-098","537","RE","320-42363-5","TALSAC","375-95-1","Perfluorononanoic acid (PFNA),"17","ng/L","U","6.9","DL","","TRG","","","21","LOQ","NO",-99","","290.6","1.00","17","","NAWC-082118-RW-098","537","RE","320-42363-5","TALSAC","STL00993","13C2 PFHxA","30","ng/L","","-99","DL","","SURR","88","","-99","LOQ","YES","34.4","","290.6","1.00","0","","NAWC-082118-RW-098","537","RE","320-42363-5","TALSAC","STL00996","13C2 PFDA","31","ng/L","","-99","DL","","SURR","89","","-99","LOQ","YES","34.4","","290.6","1.00","0","","NAWC-082118-RW-098","537","RES","320-42363-5","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS),"11","ng/L","J","5.8","DL","","TRG","","","34","LOQ","YES",-99","","290.6","1.00","14","","NAWC-082118-RW-098","537","RES","320-42363-5","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA),"11","ng/L","J","2.4","DL","","TRG","","","17","LOQ","YES",-99","","290.6","1.00","6.9","","NAWC-082118-RW-098","537","RES","320-42363-5","TALSAC","355-46-4","Perfluorohexanesulfonic acid 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(PFOA),"30","ng/L","","2.5","DL","","TRG","","","18","LOQ","YES",-99","","282","1.00","7.1","","WGNA-082118-RW-0488","537","RES","320-42363-7","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS),"20","ng/L","J","4.9","DL","","TRG","","","27","LOQ","YES",-99","","282","1.00","11","","WGNA-082118-RW-0488","537","RES","320-42363-7","TALSAC","375-73-5","Perfluorobutanesulfonic acid

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**TO:** A. FREBOWITZ **DATE:** OCTOBER 10, 2018  
**FROM:** TERRI L. SOLOMON **COPIES:** DV FILE  
**SUBJECT:** ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS)  
NAS JRB WILLOW GROVE  
SAMPLE DELIVERY GROUP (SDG) 320-42363-1

**SAMPLES:** 6/Field Reagent Blank (FRB)  
NAWC-082118-FRB-098 NAWC-082118-FRB-175  
NAWC-082118-FRB-228 NAWC-082118-FRB-265  
WGNA-082118-FRB-0488 WGNA-082118-FRB-3556  
  
6/Drinking Water  
NAWC-082118-RW-098 NAWC-082118-RW-175  
NAWC-082118-RW-228 NAWC-082118-RW-265  
WGNA-082118-RW-0488 WGNA-082118-RW-3556

Overview

The sample set for NAS JRB Willow Grove, SDG 320-42363-1, consisted of six (6) drinking water samples and six (6) FRB samples. All samples were analyzed for select perfluorinated alkyl acids including pentadecafluorooctanoic acid (PFOA), perfluorobutane sulfonic acid (PFBS), perfluoroheptanoic acid (PFHpA), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA) and perfluorooctane sulfonic acid (PFOS). No field duplicate pairs were included in this SDG.

The samples were collected by Tetra Tech on August 21, 2018 and analyzed by Test America-Sacramento. All sample analyses were conducted in accordance with EPA Method 537 version 1.1 analytical and reporting protocols.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, mass calibration, mass spectral acquisition rate, tune check, instrument sensitivity check, initial/continuing calibrations, ion transitions, laboratory method/FRBs, surrogate spike recoveries, laboratory control sample results, injected internal standard areas and recoveries, matrix spike / matrix spike duplicate results, chromatographic resolution, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

**Major**

None.

**Minor**

Detected results reported below the limit of quantitation (LOQ) but above the detection limit (DL) were qualified as estimated (J).

The matrix spike / matrix spike duplicate (MS/MSD) relative percent differences (RPDs) for PFOS, PFOA and PFHxS were greater than the 30% quality control limit for sample NAWC-082118-RW-228. The detected results reported for PFOS and PFOA were qualified as estimated (J). No validation actions were required for the nondetected result for PFHxS.

The sample injected internal standard continuing calibration area for NAWC-082118-RW-228 for 13C2-PFOA was greater than the 140% quality control limit. The injected internal standard areas were within the initial calibration quality control limits. The detected results reported for PFHpA and PFOA in the affected sample were qualified as estimated (J).

TO: A. FREBOWITZ  
SDG: 320-42363-1

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The sample injected internal standard area for 13C2-PFOA in NAWC-082118-RW-098 was greater than the 140% quality control limit. The laboratory reanalyzed the sample and the internal standard areas for 13C2-PFOA and 13C4-PFOS were greater than the 140% quality control limit. The injected internal standard areas were within the initial calibration quality control limits. The original analysis was used for validation. The detected results reported for PFHpA and PFOA in the affected sample were qualified as estimated (J).

### **Notes**

It is stated in the case narrative that the following sample IDs were listed as WGNA-081418-DUP-45 and WGNA-081418-DUP-46 on the sample bottles and listed as WGNA-080718-DUP-45 and WGNA-080718-DUP-46 on the chain of custody. The sampling date for all samples is 08/14/2018. The validator amended the sample IDs to match the sample bottles and the sampling date provided on the chain of custody. The sample IDs are reported as WGNA-081418-DUP-45 and WGNA-081418-DUP-46.

Samples with detections and their associated FRBs are summarized below. No detected results were present in the FRBs.

<b><u>Sample</u></b>	<b><u>Associated FRB</u></b>
NAWC-082118-RW-098	NAWC-082118-FRB-098
NAWC-082118-RW-175	NAWC-082118-FRB-175
NAWC-082118-RW-228	NAWC-082118-FRB-228
NAWC-082118-RW-265	NAWC-082118-FRB-265
WGNA-082118-RW-0488	WGNA-082118-FRB-0488
WGNA-082118-RW-3556	WGNA-082118-FRB-3556

Non-detected results were reported to the Limit of Detection (LOD).

The buffering agent Trizma was added to all drinking water samples.

### **Executive Summary**

**Laboratory Performance:** Several MS/MSD RPDs were greater than the 30% quality control limit. Several injected internal standards were above the quality control limits.

**Other Factors Affecting Data Quality:** Results below the RL were estimated.

The data for these analyses were reviewed with reference to the Environmental Protection Agency document EPA/600/R-08/092, Method 537, "Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)", (September 2009), US EPA National Functional Guidelines for Organic Data Review (January 2017), and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories" (July 2013) as applicable. The text of this report has been formulated to address only those areas affecting data quality.

TO: A. FREBOWITZ  
SDG: 320-42363-1

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Tetra Tech, Inc.  
Terri L. Solomon  
Chemist/Data Validator



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Tetra Tech, Inc.  
Joseph A. Samchuck  
Data Validation Manager

Attachments:

Appendix A – Qualified Analytical Results  
Appendix B – Results as Reported by the Laboratory  
Appendix C – Support Documentation

### Data Qualifier Definitions

The following definitions provide brief explanations of the validation qualifiers assigned to results in the data review process.

<b>U</b>	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted detection limit.
<b>J</b>	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
<b>J+</b>	The result is an estimated quantity, but the result may be biased high.
<b>J-</b>	The result is an estimated quantity, but the result may be biased low.
<b>UJ</b>	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
<b>NJ</b>	The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.
<b>R</b>	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
<b>UR</b>	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
<b>X</b>	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

**Appendix A**

Qualified Analytical Results

**Qualifier Codes:**

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
- C01 = GC/MS Tuning Noncompliance
- D = MS/MSD Recovery Noncompliance
- E = LCS/LCSD Recovery Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = ICP PDS Recovery Noncompliance; MSA's  $r < 0.995$
- K = ICP Interference - includes ICS % R Noncompliance
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation Noncompliance
- N = Internal Standard Noncompliance
- N01 = Internal Standard Recovery Noncompliance Dioxins
- N02 = Recovery Standard Noncompliance Dioxins
- N03 = Clean-up Standard Noncompliance Dioxins
- O = Poor Instrument Performance (i.e., base-time drifting)
- P = Uncertainty near detection limit ( $< 2 \times$  IDL for inorganics and  $<$ CRQL for organics)
- Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = RPD between columns/detectors  $>40\%$  for positive results determined via GC/HPLC
- V = Non-linear calibrations; correlation coefficient  $r < 0.995$
- W = EMPC result
- X = Signal to noise response drop
- Y = Percent solids  $<30\%$
- Z = Uncertainty at 2 standard deviations is greater than sample activity
- Z1 = Tentatively Identified Compound considered presumptively present
- Z2 = Tentatively Identified Compound column bleed
- Z3 = Tentatively Identified Compound aldol condensate
- Z4 = Sample activity is less than the at uncertainty at 3 standard deviations and greater than the MDC
- Z5 = Sample activity is less than the at uncertainty at 3 standard deviations and less than the MDC



<b>PROJ_NO: 08005-WE04</b> <b>SDG: 320-42363-1</b> <b>FRACTION: PFAS</b> <b>MEDIA: WATER</b>	NSAMPLE	NAWC-082118-FRB-098			NAWC-082118-FRB-175			NAWC-082118-FRB-228			NAWC-082118-FRB-265		
	LAB_ID	320-42363-6			320-42363-4			320-42363-2			320-42363-10		
	SAMP_DATE	8/21/2018			8/21/2018			8/21/2018			8/21/2018		
	QC_TYPE	FB			FB			FB			FB		
	UNITS	NG/L			NG/L			NG/L			NG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
PENTADECAFLUOROOCTANOIC ACID (PFOA)	7.8	U		7.3	U		7.5	U		7.2	U		
PERFLUOROBUTANESULFONIC ACID (PFBS)	35	U		33	U		34	U		33	U		
PERFLUOROHEPTANOIC ACID (PFHPA)	3.9	U		3.6	U		3.7	U		3.6	U		
PERFLUOROHEXANESULFONIC ACID (PFHXS)	12	U		11	U		11	U		11	U		
PERFLUORONONANOIC ACID (PFNA)	19	U		18	U		19	U		18	U		
PERFLUOROOCTANESULFONIC ACID (PFOS)	16	U		15	U		15	U		14	U		

<b>PROJ_NO: 08005-WE04</b> <b>SDG: 320-42363-1</b> <b>FRACTION: PFAS</b> <b>MEDIA: WATER</b>	NSAMPLE	NAWC-082118-RW-098			NAWC-082118-RW-175			NAWC-082118-RW-228			NAWC-082118-RW-265		
	LAB_ID	320-42363-5			320-42363-3			320-42363-1			320-42363-9		
	SAMP_DATE	8/21/2018			8/21/2018			8/21/2018			8/21/2018		
	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
PENTADECAFLUOROOCTANOIC ACID (PFOA)	11	J	NP	12	J	P	12	J	DNP	15	J	P	
PERFLUOROBUTANESULFONIC ACID (PFBS)	31	U		32	U		31	J	P	32	U		
PERFLUOROHEPTANOIC ACID (PFHPA)	3.5	J	NP	5.1	J	P	4	J	NP	9.1			
PERFLUOROHEXANESULFONIC ACID (PFHXS)	10	U		40			11	U		12	J	P	
PERFLUORONONANOIC ACID (PFNA)	17	U		18	U		18	U		18	U		
PERFLUOROOCTANESULFONIC ACID (PFOS)	11	J	P	65			11	J	DP	23	J	P	

<b>PROJ_NO: 08005-WE04</b> <b>SDG: 320-42363-1</b> <b>FRACTION: PFAS</b> <b>MEDIA: WATER</b>	NSAMPLE	WGNA-082118-FRB-0488			WGNA-082118-FRB-3556			WGNA-082118-RW-0488			WGNA-082118-RW-3556		
	LAB_ID	320-42363-8			320-42363-12			320-42363-7			320-42363-11		
	SAMP_DATE	8/21/2018			8/21/2018			8/21/2018			8/21/2018		
	QC_TYPE	FB			FB			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	
PENTADECAFLUOROOCTANOIC ACID (PFOA)	7.4	U		7.3	U		30			14	J	P	
PERFLUOROBUTANESULFONIC ACID (PFBS)	33	U		33	U		32	U		34	U		
PERFLUOROHEPTANOIC ACID (PFHPA)	3.7	U		3.6	U		11			4.6	J	P	
PERFLUOROHEXANESULFONIC ACID (PFHXS)	11	U		11	U		20	J	P	11	U		
PERFLUORONONANOIC ACID (PFNA)	18	U		18	U		18	U		19	U		
PERFLUOROOCTANESULFONIC ACID (PFOS)	15	U		15	U		19	J	P	13	J	P	

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-228 Lab Sample ID: 320-42363-1  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_058.d  
 Analysis Method: 537 Date Collected: 08/21/2018 09:10  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 277.7 (mL) Date Analyzed: 08/30/2018 07:01  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	11	J <del>J1</del>	36	14	6.1
335-67-1	Perfluorooctanoic acid (PFOA)	12	J <del>J1</del>	18	7.2	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.2
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U <del>J1</del>	27	11	5.0
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.0	J	9.0	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	31	J	81	32	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	91		70-130
STL00996	13C2 PFDA	97		70-130

*Steve L. Selman*  
10/04/2018

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-FRB-228 Lab Sample ID: 320-42363-2  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_061.d  
 Analysis Method: 537 Date Collected: 08/21/2018 09:05  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 268.2 (mL) Date Analyzed: 08/30/2018 07:15  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	37	15	6.3
335-67-1	Perfluorooctanoic acid (PFOA)	7.5	U	19	7.5	2.6
375-95-1	Perfluorononanoic acid (PFNA)	19	U	22	19	7.5
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	28	11	5.1
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.7	U	9.3	3.7	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	34	U	84	34	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	97		70-130
STL00996	13C2 PFDA	103		70-130

*Wesley L. Selman*  
10/04/2018

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-175 Lab Sample ID: 320-42363-3  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_062.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:10  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 280.3(mL) Date Analyzed: 08/30/2018 07:20  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	65		36	14	6.1
335-67-1	Perfluorooctanoic acid (PFOA)	12	J	18	7.1	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	21	18	7.1
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	40		27	11	4.9
375-85-9	Perfluoroheptanoic acid (PFHpA)	5.1	J	8.9	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	32	U	80	32	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	95		70-130
STL00996	13C2 PFDA	102		70-130

*Wesley L. Selman*  
10/04/2018

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-FRB-175 Lab Sample ID: 320-42363-4  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_063.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:05  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 274.2 (mL) Date Analyzed: 08/30/2018 07:24  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	36	15	6.2
335-67-1	Perfluorooctanoic acid (PFOA)	7.3	U	18	7.3	2.6
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.3
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	27	11	5.0
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.6	U	9.1	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	33	U	82	33	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	96		70-130
STL00996	13C2 PFDA	102		70-130

*Wesley L. Salomon*  
10/04/2018

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-098 Lab Sample ID: 320-42363-5  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_064.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:40  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 290.6(mL) Date Analyzed: 08/30/2018 07:29  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	11	J	34	14	5.8
335-67-1	Perfluorooctanoic acid (PFOA)	11	J	17	6.9	2.4
375-95-1	Perfluorononanoic acid (PFNA)	17	U	21	17	6.9
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	10	U	26	10	4.7
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.5	J	8.6	3.4	1.6
375-73-5	Perfluorobutanesulfonic acid (PFBS)	31	U	77	31	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	93		70-130
STL00996	13C2 PFDA	103		70-130

*Wesley L. Salem*  
10/04/2018



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET  
**DO NOT USE**

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-098 RA Lab Sample ID: 320-42363-5 RA  
 Matrix: Water Lab File ID: 2018.08.30\_537AAA\_069.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:40  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 290.6(mL) Date Analyzed: 08/31/2018 08:18  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 243340 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	11	J	34	14	5.8
335-67-1	Perfluorooctanoic acid (PFOA)	11	J	17	6.9	2.4
375-95-1	Perfluorononanoic acid (PFNA)	17	U	21	17	6.9
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	10	U	26	10	4.7
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.4	J	8.6	3.4	1.6
375-73-5	Perfluorobutanesulfonic acid (PFBS)	31	U	77	31	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	88		70-130
STL00996	13C2 PFDA	89		70-130

*Steve L. Salomon*  
10/04/2018

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-FRB-098 Lab Sample ID: 320-42363-6  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_065.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:35  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 256.9(mL) Date Analyzed: 08/30/2018 07:34  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	16	U	39	16	6.6
335-67-1	Perfluorooctanoic acid (PFOA)	7.8	U	19	7.8	2.7
375-95-1	Perfluorononanoic acid (PFNA)	19	U	23	19	7.8
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	29	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.9	U	9.7	3.9	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	88	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	101		70-130
STL00996	13C2 PFDA	106		70-130

*Wesley L. Salomon*  
10/04/2018

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: WGNA-082118-RW-0488 Lab Sample ID: 320-42363-7  
 Matrix: Water Lab File ID: 2018.08.30\_537AAA\_070.d  
 Analysis Method: 537 Date Collected: 08/21/2018 11:40  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 282 (mL) Date Analyzed: 08/31/2018 08:22  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 243340 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	19	J	35	14	6.0
335-67-1	Perfluorooctanoic acid (PFOA)	30		18	7.1	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	21	18	7.1
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	20	J	27	11	4.9
375-85-9	Perfluoroheptanoic acid (PFHpA)	11		8.9	3.5	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	32	U	80	32	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	93		70-130
STL00996	13C2 PFDA	89		70-130

*Steve L. Salomon*  
10/04/2018

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: WGNA-082118-FRB-0488 Lab Sample ID: 320-42363-8  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_069.d  
 Analysis Method: 537 Date Collected: 08/21/2018 11:35  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 271.8 (mL) Date Analyzed: 08/30/2018 07:52  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	37	15	6.3
335-67-1	Perfluorooctanoic acid (PFOA)	7.4	U	18	7.4	2.6
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.4
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	28	11	5.1
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.7	U	9.2	3.7	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	33	U	83	33	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	89		70-130
STL00996	13C2 PFDA	101		70-130

*Wesley L. Salomon*  
10/04/2018

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-265 Lab Sample ID: 320-42363-9  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_070.d  
 Analysis Method: 537 Date Collected: 08/21/2018 12:10  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 280.3(mL) Date Analyzed: 08/30/2018 07:57  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	23	J	36	14	6.1
335-67-1	Perfluorooctanoic acid (PFOA)	15	J	18	7.1	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	21	18	7.1
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	J	27	11	4.9
375-85-9	Perfluoroheptanoic acid (PFHpA)	9.1		8.9	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	32	U	80	32	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	98		70-130
STL00996	13C2 PFDA	104		70-130

*Wesley L. Selman*  
10/04/2018

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-FRB-265 Lab Sample ID: 320-42363-10  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_071.d  
 Analysis Method: 537 Date Collected: 08/21/2018 12:05  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 276.7(mL) Date Analyzed: 08/30/2018 08:02  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	14	U	36	14	6.1
335-67-1	Perfluorooctanoic acid (PFOA)	7.2	U	18	7.2	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.2
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	27	11	5.0
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.6	U	9.0	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	33	U	81	33	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	98		70-130
STL00996	13C2 PFDA	106		70-130

*Mari L. Salaman*  
10/04/2018

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: WGNA-082118-RW-3556 Lab Sample ID: 320-42363-11  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_072.d  
 Analysis Method: 537 Date Collected: 08/21/2018 12:40  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 263.8 (mL) Date Analyzed: 08/30/2018 08:06  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	13	J	38	15	6.4
335-67-1	Perfluorooctanoic acid (PFOA)	14	J	19	7.6	2.7
375-95-1	Perfluorononanoic acid (PFNA)	19	U	23	19	7.6
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	28	11	5.2
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.6	J	9.5	3.8	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	34	U	85	34	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	94		70-130
STL00996	13C2 PFDA	101		70-130

*Steve L. Selman*  
10/04/2018

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: WGNA-082118-FRB-3556 Lab Sample ID: 320-42363-12  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_073.d  
 Analysis Method: 537 Date Collected: 08/21/2018 12:35  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 274.9(mL) Date Analyzed: 08/30/2018 08:11  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	36	15	6.2
335-67-1	Perfluorooctanoic acid (PFOA)	7.3	U	18	7.3	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.3
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	27	11	5.0
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.6	U	9.1	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	33	U	82	33	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	97		70-130
STL00996	13C2 PFDA	107		70-130

*Maria L. Salmeron*  
10/04/2018



**Appendix B**

Results as Reported by the Laboratory

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-228 Lab Sample ID: 320-42363-1  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_058.d  
 Analysis Method: 537 Date Collected: 08/21/2018 09:10  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 277.7(mL) Date Analyzed: 08/30/2018 07:01  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	11	J J1	36	14	6.1
335-67-1	Perfluorooctanoic acid (PFOA)	12	J J1	18	7.2	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.2
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U J1	27	11	5.0
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.0	J	9.0	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	31	J	81	32	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	91		70-130
STL00996	13C2 PFDA	97		70-130

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-FRB-228 Lab Sample ID: 320-42363-2  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_061.d  
 Analysis Method: 537 Date Collected: 08/21/2018 09:05  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 268.2 (mL) Date Analyzed: 08/30/2018 07:15  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	37	15	6.3
335-67-1	Perfluorooctanoic acid (PFOA)	7.5	U	19	7.5	2.6
375-95-1	Perfluorononanoic acid (PFNA)	19	U	22	19	7.5
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	28	11	5.1
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.7	U	9.3	3.7	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	34	U	84	34	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	97		70-130
STL00996	13C2 PFDA	103		70-130

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-175 Lab Sample ID: 320-42363-3  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_062.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:10  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 280.3(mL) Date Analyzed: 08/30/2018 07:20  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	65		36	14	6.1
335-67-1	Perfluorooctanoic acid (PFOA)	12	J	18	7.1	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	21	18	7.1
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	40		27	11	4.9
375-85-9	Perfluoroheptanoic acid (PFHpA)	5.1	J	8.9	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	32	U	80	32	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	95		70-130
STL00996	13C2 PFDA	102		70-130

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-FRB-175 Lab Sample ID: 320-42363-4  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_063.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:05  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 274.2 (mL) Date Analyzed: 08/30/2018 07:24  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	36	15	6.2
335-67-1	Perfluorooctanoic acid (PFOA)	7.3	U	18	7.3	2.6
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.3
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	27	11	5.0
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.6	U	9.1	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	33	U	82	33	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	96		70-130
STL00996	13C2 PFDA	102		70-130

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-098 Lab Sample ID: 320-42363-5  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_064.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:40  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 290.6(mL) Date Analyzed: 08/30/2018 07:29  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	11	J	34	14	5.8
335-67-1	Perfluorooctanoic acid (PFOA)	11	J	17	6.9	2.4
375-95-1	Perfluorononanoic acid (PFNA)	17	U	21	17	6.9
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	10	U	26	10	4.7
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.5	J	8.6	3.4	1.6
375-73-5	Perfluorobutanesulfonic acid (PFBS)	31	U	77	31	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	93		70-130
STL00996	13C2 PFDA	103		70-130

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-098 RA Lab Sample ID: 320-42363-5 RA  
 Matrix: Water Lab File ID: 2018.08.30\_537AAA\_069.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:40  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 290.6(mL) Date Analyzed: 08/31/2018 08:18  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 243340 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	11	J	34	14	5.8
335-67-1	Perfluorooctanoic acid (PFOA)	11	J	17	6.9	2.4
375-95-1	Perfluorononanoic acid (PFNA)	17	U	21	17	6.9
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	10	U	26	10	4.7
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.4	J	8.6	3.4	1.6
375-73-5	Perfluorobutanesulfonic acid (PFBS)	31	U	77	31	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	88		70-130
STL00996	13C2 PFDA	89		70-130

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-FRB-098 Lab Sample ID: 320-42363-6  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_065.d  
 Analysis Method: 537 Date Collected: 08/21/2018 10:35  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 256.9(mL) Date Analyzed: 08/30/2018 07:34  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	16	U	39	16	6.6
335-67-1	Perfluorooctanoic acid (PFOA)	7.8	U	19	7.8	2.7
375-95-1	Perfluorononanoic acid (PFNA)	19	U	23	19	7.8
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	29	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.9	U	9.7	3.9	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	88	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	101		70-130
STL00996	13C2 PFDA	106		70-130



FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: WGNA-082118-RW-0488 Lab Sample ID: 320-42363-7  
 Matrix: Water Lab File ID: 2018.08.30\_537AAA\_070.d  
 Analysis Method: 537 Date Collected: 08/21/2018 11:40  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 282 (mL) Date Analyzed: 08/31/2018 08:22  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 243340 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	19	J	35	14	6.0
335-67-1	Perfluorooctanoic acid (PFOA)	30		18	7.1	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	21	18	7.1
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	20	J	27	11	4.9
375-85-9	Perfluoroheptanoic acid (PFHpA)	11		8.9	3.5	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	32	U	80	32	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	93		70-130
STL00996	13C2 PFDA	89		70-130

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: WGNA-082118-FRB-0488 Lab Sample ID: 320-42363-8  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_069.d  
 Analysis Method: 537 Date Collected: 08/21/2018 11:35  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 271.8(mL) Date Analyzed: 08/30/2018 07:52  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	37	15	6.3
335-67-1	Perfluorooctanoic acid (PFOA)	7.4	U	18	7.4	2.6
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.4
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	28	11	5.1
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.7	U	9.2	3.7	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	33	U	83	33	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	89		70-130
STL00996	13C2 PFDA	101		70-130

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-RW-265 Lab Sample ID: 320-42363-9  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_070.d  
 Analysis Method: 537 Date Collected: 08/21/2018 12:10  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 280.3(mL) Date Analyzed: 08/30/2018 07:57  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	23	J	36	14	6.1
335-67-1	Perfluorooctanoic acid (PFOA)	15	J	18	7.1	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	21	18	7.1
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	J	27	11	4.9
375-85-9	Perfluoroheptanoic acid (PFHpA)	9.1		8.9	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	32	U	80	32	14

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	98		70-130
STL00996	13C2 PFDA	104		70-130

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: NAWC-082118-FRB-265 Lab Sample ID: 320-42363-10  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_071.d  
 Analysis Method: 537 Date Collected: 08/21/2018 12:05  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 276.7(mL) Date Analyzed: 08/30/2018 08:02  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	14	U	36	14	6.1
335-67-1	Perfluorooctanoic acid (PFOA)	7.2	U	18	7.2	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.2
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	27	11	5.0
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.6	U	9.0	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	33	U	81	33	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	98		70-130
STL00996	13C2 PFDA	106		70-130

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: WGNA-082118-RW-3556 Lab Sample ID: 320-42363-11  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_072.d  
 Analysis Method: 537 Date Collected: 08/21/2018 12:40  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 263.8(mL) Date Analyzed: 08/30/2018 08:06  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	13	J	38	15	6.4
335-67-1	Perfluorooctanoic acid (PFOA)	14	J	19	7.6	2.7
375-95-1	Perfluorononanoic acid (PFNA)	19	U	23	19	7.6
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	28	11	5.2
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.6	J	9.5	3.8	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	34	U	85	34	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	94		70-130
STL00996	13C2 PFDA	101		70-130

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: WGNA-082118-FRB-3556 Lab Sample ID: 320-42363-12  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_073.d  
 Analysis Method: 537 Date Collected: 08/21/2018 12:35  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 274.9(mL) Date Analyzed: 08/30/2018 08:11  
 Con. Extract Vol.: 1.00(mL) Dilution Factor: 1  
 Injection Volume: 2(uL) GC Column: GeminiC18 3x100 ID: 3(mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242994 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	36	15	6.2
335-67-1	Perfluorooctanoic acid (PFOA)	7.3	U	18	7.3	2.5
375-95-1	Perfluorononanoic acid (PFNA)	18	U	22	18	7.3
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	11	U	27	11	5.0
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.6	U	9.1	3.6	1.7
375-73-5	Perfluorobutanesulfonic acid (PFBS)	33	U	82	33	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	97		70-130
STL00996	13C2 PFDA	107		70-130

**Appendix C**

Support Documentation

**TestAmerica Sacramento**  
 880 Riverside Parkway  
 West Sacramento, CA 95605-1500  
 phone 916.373.5600 fax 303.467.7248

**Chain of Custody Record**

**TestAmerica**  
 THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program:  DW  NPDES  RCRA  Other:

<b>Client Contact</b>	<b>Project Manager:</b> Andy Frebowitz	<b>Site Contact:</b> Mary Kay Bond	<b>Date:</b> 8/21/2018	<b>COC No.:</b>
TetraTech	<b>Tel/Fax:</b> 610.382.2920	<b>Lab Contact:</b> Dave Alltucker	<b>Carrier:</b> FedEx	1 of 1 COCs
234 Mall Boulevard Suite 260	<b>Analysis Turnaround Time</b>			<b>Sampler:</b> Mary Kay Bond
King of Prussia, PA 19406	<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS			<b>For Lab Use Only:</b>
610-382-2924	TAT if different from Below 21			Walk-in Client:
610-491-9688	<input type="checkbox"/> 2 weeks			Lab Sampling:
Project Name: WE04	<input type="checkbox"/> 1 week			Job / SDG No.:
Site: WE04	<input type="checkbox"/> 2 days			
P O # 1132358 (through EarthToxics)	<input type="checkbox"/> 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	EPA 537 UCMR3	Sample Specific Notes:
NAWC-082118-RW-228	8/21/2018	09:10	G	DW	6	N	Y	Y	MS/MSD
NAWC-082118-FRB-228	8/21/2018	09:05	G	DW	2	N	N	Y	Field Reagent Blank
NAWC-082118-RW-175	8/21/2018	10:10	G	DW	2	N	N	Y	Field Reagent Blank
NAWC-082118-FRB-175	8/21/2018	10:05	G	DW	2	N	N	Y	Field Reagent Blank
NAWC-082118-RW-098	8/21/2018	10:40	G	DW	2	N	N	Y	Field Reagent Blank
NAWC-082118-FRB-098	8/21/2018	10:35	G	DW	2	N	N	Y	Field Reagent Blank
WGNA-082118-RW-0488	8/21/2018	11:40	G	DW	2	N	N	Y	Field Reagent Blank
WGNA-082118-FRB-0488	8/21/2018	11:35	G	DW	2	N	N	Y	Field Reagent Blank
NAWC-082118-RW-265	8/21/2018	12:10	G	DW	2	N	N	Y	Field Reagent Blank
NAWC-082118-FRB-265	8/21/2018	12:05	G	DW	2	N	N	Y	Field Reagent Blank
WGNA-082118-RW-3556	8/21/2018	12:40	G	DW	2	N	N	Y	Field Reagent Blank
WGNA-082118-FRB-3556	8/21/2018	12:35	G	DW	2	N	N	Y	Field Reagent Blank
<b>Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other: Trizma</b>						6			



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**Possible Hazard Identification:**  
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

**Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)**  
 Return to Client  Disposal by Lab  Archive for \_\_\_\_\_ Months

Fed Ex Tracking: 7730 2171 8081

Custody Seals Intact:  Yes  No

Custody Seal No.:

Cooler Temp. (°C): Obs'd: 3.1 Corr'd: 3.1 Therm ID No.: AK-3

Relinquished by: <u>Mary Kay Bond</u>	Company: Tetra Tech	Date/Time: 8/21/2018 16:00	Received by: <u>[Signature]</u>	Company: <u>VA-Sac</u>	Date/Time: <u>8/22/18 930</u>
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:



**Job Narrative**  
**320-42363-1**

**Receipt**

The samples were received on 8/22/2018 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.1° C.

**LCMS**

Method(s) 537: The first level standard from the initial calibration curve is used to evaluate the tune criteria. The instrument mass windows are set at +/- 0.5amu; therefore, detection of the analyte serves as verification that the assigned mass is within +/- 0.5amu of the true value, which meets the DoD/DOE QSM tune criterion.

Method(s) 537: The matrix spike / matrix spike duplicate (MS/MSD) precision for preparation batch 320-242479 and analytical batch 320-242992 was outside control limits. The associated laboratory control sample (LCS) was within acceptance limits. The MS/MSD recoveries were within control limits.

Method(s) 537: Internal standard (ISTD) response for the following sample was outside control limits: NAWC-082118-RW-098 (320-42363-5). The sample was re-analyzed with concurring results, and both sets of data were reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

**Organic Prep**

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

# Definitions/Glossary

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

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## Qualifiers

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### LCMS

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
J1	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
U	Undetected at the Limit of Detection.
M	Manual integrated compound.

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## Glossary

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Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Method Summary

Client: Tetra Tech, Inc.  
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

TestAmerica Job ID: 320-42363-1

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<b>Method</b>	<b>Method Description</b>	<b>Protocol</b>	<b>Laboratory</b>
537	Perfluorinated Alkyl Acids (LC/MS)	EPA	TAL SAC
537	Extraction of Perfluorinated Alkyl Acids	EPA	TAL SAC

**Protocol References:**

EPA = US Environmental Protection Agency

**Laboratory References:**

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

# Sample Summary

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-42363-1

Project/Site: Warminster: PFAS, NAS JRB Willow Grove

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-42363-1	NAWC-082118-RW-228	Water	08/21/18 09:10	08/22/18 09:30
320-42363-2	NAWC-082118-FRB-228	Water	08/21/18 09:05	08/22/18 09:30
320-42363-3	NAWC-082118-RW-175	Water	08/21/18 10:10	08/22/18 09:30
320-42363-4	NAWC-082118-FRB-175	Water	08/21/18 10:05	08/22/18 09:30
320-42363-5	NAWC-082118-RW-098	Water	08/21/18 10:40	08/22/18 09:30
320-42363-6	NAWC-082118-FRB-098	Water	08/21/18 10:35	08/22/18 09:30
320-42363-7	WGNA-082118-RW-0488	Water	08/21/18 11:40	08/22/18 09:30
320-42363-8	WGNA-082118-FRB-0488	Water	08/21/18 11:35	08/22/18 09:30
320-42363-9	NAWC-082118-RW-265	Water	08/21/18 12:10	08/22/18 09:30
320-42363-10	NAWC-082118-FRB-265	Water	08/21/18 12:05	08/22/18 09:30
320-42363-11	WGNA-082118-RW-3556	Water	08/21/18 12:40	08/22/18 09:30
320-42363-12	WGNA-082118-FRB-3556	Water	08/21/18 12:35	08/22/18 09:30

FORM II  
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento

Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Matrix: Water

Level: Low

GC Column (1): GeminiC18 3 ID: 3 (mm)

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
NAWC-082118-RW-228	320-42363-1	91	97
NAWC-082118-FRB-228	320-42363-2	97	103
NAWC-082118-RW-175	320-42363-3	95	102
NAWC-082118-FRB-175	320-42363-4	96	102
NAWC-082118-RW-098	320-42363-5	93	103
NAWC-082118-RW-098 RA	320-42363-5 RA	88	89
NAWC-082118-FRB-098	320-42363-6	101	106
WGNA-082118-RW-048	320-42363-7	93	89
WGNA-082118-FRB-048	320-42363-8	89	101
NAWC-082118-RW-265	320-42363-9	98	104
NAWC-082118-FRB-265	320-42363-10	98	106
WGNA-082118-RW-355	320-42363-11	94	101
WGNA-082118-FRB-355	320-42363-12	97	107
	MB 320-242479/1-A	98	101
	LCS 320-242479/2-A	104	107
NAWC-082118-RW-228 MS	320-42363-1 MS	106	115
NAWC-082118-RW-228 MSD	320-42363-1 MSD	77	86

PFHxA = 13C2 PFHxA  
PFDA = 13C2 PFDA

QC LIMITS  
70-130  
70-130

# Column to be used to flag recovery values

FORM III  
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Matrix: Water Level: Low Lab File ID: 2018.08.29\_537B\_057.d  
 Lab ID: LCS 320-242479/2-A Client ID: \_\_\_\_\_

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	220	216	98	70-130	
Perfluorooctanoic acid (PFOA)	110	106	97	70-130	
Perfluorononanoic acid (PFNA)	110	100	91	70-130	
Perfluorohexanesulfonic acid (PFHxS)	168	172	102	70-130	
Perfluoroheptanoic acid (PFHpA)	54.0	56.1	104	70-130	
Perfluorobutanesulfonic acid (PFBS)	500	448	89	70-130	

# Column to be used to flag recovery and RPD values

FORM III  
LCMS MATRIX SPIKE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Matrix: Water Level: Low Lab File ID: 2018.08.29\_537B\_059.d  
 Lab ID: 320-42363-1 MS Client ID: NAWC-082118-RW-228 MS

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	199	11 J	257	124	70-130	
Perfluorooctanoic acid (PFOA)	99.5	12 J	125	113	70-130	M
Perfluorononanoic acid (PFNA)	99.5	18 U	106	106	70-130	
Perfluorohexanesulfonic acid (PFHxS)	152	11 U	191	126	70-130	
Perfluoroheptanoic acid (PFHpA)	48.9	4.1 J	58.8	112	70-130	
Perfluorobutanesulfonic acid (PFBS)	453	29 J	513	107	70-130	

# Column to be used to flag recovery and RPD values

FORM III  
LCMS MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento

Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Matrix: Water Level: Low

Lab File ID: 2018.08.29\_537B\_060.d

Lab ID: 320-42363-1 MSD

Client ID: NAWC-082118-RW-228 MSD

COMPOUND	SPIKE ADDED (ng/L)	MSD CONCENTRATION (ng/L)	MSD % REC	% RPD	QC LIMITS		#
					RPD	REC	
Perfluorooctanesulfonic acid (PFOS)	194	183	89	33	30	70-130	J1
Perfluorooctanoic acid (PFOA)	97.1	89.4	79	33	30	70-130	J1
Perfluorononanoic acid (PFNA)	97.1	78.0	80	30	30	70-130	
Perfluorohexanesulfonic acid (PFHxS)	148	137	92	33	30	70-130	J1
Perfluoroheptanoic acid (PFHpA)	47.7	44.7	85	27	30	70-130	
Perfluorobutanesulfonic acid (PFBS)	442	407	86	23	30	70-130	

# Column to be used to flag recovery and RPD values



FORM IV  
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab File ID: 2018.08.29\_537B\_056.d Lab Sample ID: MB 320-242479/1-A  
 Matrix: Water Date Extracted: 08/28/2018 06:42  
 Instrument ID: A8\_N Date Analyzed: 08/30/2018 06:52  
 Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-242479/2-A	2018.08.29_537B_057.d	08/30/2018 06:56
NAWC-082118-RW-228	320-42363-1	2018.08.29_537B_058.d	08/30/2018 07:01
NAWC-082118-RW-228 MS	320-42363-1 MS	2018.08.29_537B_059.d	08/30/2018 07:06
NAWC-082118-RW-228 MSD	320-42363-1 MSD	2018.08.29_537B_060.d	08/30/2018 07:10
NAWC-082118-FRB-228	320-42363-2	2018.08.29_537B_061.d	08/30/2018 07:15
NAWC-082118-RW-175	320-42363-3	2018.08.29_537B_062.d	08/30/2018 07:20
NAWC-082118-FRB-175	320-42363-4	2018.08.29_537B_063.d	08/30/2018 07:24
NAWC-082118-RW-098	320-42363-5	2018.08.29_537B_064.d	08/30/2018 07:29
NAWC-082118-FRB-098	320-42363-6	2018.08.29_537B_065.d	08/30/2018 07:34
WGNA-082118-FRB-0488	320-42363-8	2018.08.29_537B_069.d	08/30/2018 07:52
NAWC-082118-RW-265	320-42363-9	2018.08.29_537B_070.d	08/30/2018 07:57
NAWC-082118-FRB-265	320-42363-10	2018.08.29_537B_071.d	08/30/2018 08:02
WGNA-082118-RW-3556	320-42363-11	2018.08.29_537B_072.d	08/30/2018 08:06
WGNA-082118-FRB-3556	320-42363-12	2018.08.29_537B_073.d	08/30/2018 08:11
NAWC-082118-RW-098 RA	320-42363-5 RA	2018.08.30_537AAA_069.d	08/31/2018 08:18
WGNA-082118-RW-0488	320-42363-7	2018.08.30_537AAA_070.d	08/31/2018 08:22

FORM I  
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Client Sample ID: \_\_\_\_\_ Lab Sample ID: MB 320-242479/1-A  
 Matrix: Water Lab File ID: 2018.08.29\_537B\_056.d  
 Analysis Method: 537 Date Collected: \_\_\_\_\_  
 Extraction Method: 537 Date Extracted: 08/28/2018 06:42  
 Sample wt/vol: 250 (mL) Date Analyzed: 08/30/2018 06:52  
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1  
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)  
 % Moisture: \_\_\_\_\_ GPC Cleanup: (Y/N) N  
 Analysis Batch No.: 242992 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	16	U	40	16	6.8
335-67-1	Perfluorooctanoic acid (PFOA)	8.0	U	20	8.0	2.8
375-95-1	Perfluorononanoic acid (PFNA)	20	U	24	20	8.0
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.0	U	10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36	U	90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	98		70-130
STL00996	13C2 PFDA	101		70-130

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Instrument ID: A8\_N Calibration Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 08/15/2018 18:44  
 Calibration ID: 40641

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
INITIAL CALIBRATION MEAN AREA AND MEAN RT	999840	1.85	2469394	2.11		
UPPER LIMIT	1499760	2.35	3704091	2.61		
LOWER LIMIT	499920	1.35	1234697	1.61		
LAB SAMPLE ID	CLIENT SAMPLE ID					
CCVL 320-240166/9		1006603	1.84	2388436	2.10	
ICV 320-240166/11		1022273	1.84	2551643	2.10	
CCVL 320-242979/1		1139590	1.84	2847783	2.09	
CCV 320-242992/18 CCVIS		880773	1.82	2347911	2.08	
MB 320-242479/1-A		1164023	1.81	2966015	2.06	
LCS 320-242479/2-A		1177090	1.81	3060823	2.06	
320-42363-1	NAWC-082118-RW-228	1268081	1.81	3071601	2.07	
320-42363-1 MS	NAWC-082118-RW-228 MS	1222421	1.81	2937520	2.07	
320-42363-1 MSD	NAWC-082118-RW-228 MSD	1115775	1.81	2722744	2.07	
320-42363-2	NAWC-082118-FRB-228	1133243	1.82	2796516	2.07	
320-42363-3	NAWC-082118-RW-175	1115542	1.81	2801077	2.07	
320-42363-4	NAWC-082118-FRB-175	1145851	1.82	2949105	2.07	
320-42363-5	NAWC-082118-RW-098	1309394Q	1.81	3251677	2.07	
320-42363-6	NAWC-082118-FRB-098	1154870	1.82	3011281	2.07	
CCV 320-242992/30 CCVIS		921093	1.81	2433863	2.07	
CCV 320-242994/30 CCVIS		921093	1.81	2433863	2.07	
320-42363-8	WGNA-082118-FRB-0488	1133293	1.81	2850914	2.06	
320-42363-9	NAWC-082118-RW-265	1111187	1.81	2790946	2.07	
320-42363-10	NAWC-082118-FRB-265	1090929	1.81	2797557	2.07	
320-42363-11	WGNA-082118-RW-3556	1215813	1.82	3053694	2.07	
320-42363-12	WGNA-082118-FRB-3556	1074215	1.81	2771310	2.07	
CCV 320-242994/38 CCVIS		907796	1.82	2371241	2.07	

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Sample No.: CCV 320-242992/18 Date Analyzed: 08/30/2018 06:42  
 Instrument ID: A8\_N GC Column: GeminiC18 3x100 ID: 3 (mm)  
 Lab File ID (Standard): 2018.08.29\_537B\_054 Heated Purge: (Y/N) N  
 Calibration ID: 40641

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	880773	1.82	2347911	2.08		
UPPER LIMIT	1233082	2.32	3287075	2.58		
LOWER LIMIT	616541	1.32	1643538	1.58		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-242479/1-A		1164023	1.81	2966015	2.06	
LCS 320-242479/2-A		1177090	1.81	3060823	2.06	
320-42363-1	NAWC-082118-RW-228	1268081	1.81	3071601	2.07	
320-42363-1 MS	NAWC-082118-RW-228 MS	1222421	1.81	2937520	2.07	
320-42363-1 MSD	NAWC-082118-RW-228 MSD	1115775	1.81	2722744	2.07	
320-42363-2	NAWC-082118-FRB-228	1133243	1.82	2796516	2.07	
320-42363-3	NAWC-082118-RW-175	1115542	1.81	2801077	2.07	
320-42363-4	NAWC-082118-FRB-175	1145851	1.82	2949105	2.07	
320-42363-5	NAWC-082118-RW-098	1309394Q	1.81	3251677	2.07	
320-42363-6	NAWC-082118-FRB-098	1154870	1.82	3011281	2.07	

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Sample No.: CCV 320-242992/30 Date Analyzed: 08/30/2018 07:38  
 Instrument ID: A8\_N GC Column: GeminiC18 3x100 ID: 3 (mm)  
 Lab File ID (Standard): 2018.08.29\_537B\_066 Heated Purge: (Y/N) N  
 Calibration ID: 40641

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	921093	1.81	2433863	2.07		
UPPER LIMIT	1289530	2.31	3407408	2.57		
LOWER LIMIT	644765	1.31	1703704	1.57		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-242479/1-A		1164023	1.81	2966015	2.06	
LCS 320-242479/2-A		1177090	1.81	3060823	2.06	
320-42363-1	NAWC-082118-RW-228	1268081	1.81	3071601	2.07	
320-42363-1 MS	NAWC-082118-RW-228 MS	1222421	1.81	2937520	2.07	
320-42363-1 MSD	NAWC-082118-RW-228 MSD	1115775	1.81	2722744	2.07	
320-42363-2	NAWC-082118-FRB-228	1133243	1.82	2796516	2.07	
320-42363-3	NAWC-082118-RW-175	1115542	1.81	2801077	2.07	
320-42363-4	NAWC-082118-FRB-175	1145851	1.82	2949105	2.07	
320-42363-5	NAWC-082118-RW-098	13093940	1.81	3251677	2.07	
320-42363-6	NAWC-082118-FRB-098	1154870	1.82	3011281	2.07	

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Sample No.: CCV 320-242994/30 Date Analyzed: 08/30/2018 07:38  
 Instrument ID: A8\_N GC Column: GeminiC18 3x100 ID: 3 (mm)  
 Lab File ID (Standard): 2018.08.29\_537B\_066 Heated Purge: (Y/N) N  
 Calibration ID: 40641

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	921093	1.81	2433863	2.07		
UPPER LIMIT	1289530	2.31	3407408	2.57		
LOWER LIMIT	644765	1.31	1703704	1.57		
LAB SAMPLE ID	CLIENT SAMPLE ID					
320-42363-8	WGNA-082118-FRB-0488	1133293	1.81	2850914	2.06	
320-42363-9	NAWC-082118-RW-265	1111187	1.81	2790946	2.07	
320-42363-10	NAWC-082118-FRB-265	1090929	1.81	2797557	2.07	
320-42363-11	WGNA-082118-RW-3556	1215813	1.82	3053694	2.07	
320-42363-12	WGNA-082118-FRB-3556	1074215	1.81	2771310	2.07	

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Sample No.: CCV 320-242994/38 Date Analyzed: 08/30/2018 08:16  
 Instrument ID: A8\_N GC Column: GeminiC18 3x100 ID: 3 (mm)  
 Lab File ID (Standard): 2018.08.29\_537B\_074 Heated Purge: (Y/N) N  
 Calibration ID: 40641

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	907796	1.82	2371241	2.07		
UPPER LIMIT	1270914	2.32	3319737	2.57		
LOWER LIMIT	635457	1.32	1659869	1.57		
LAB SAMPLE ID	CLIENT SAMPLE ID					
320-42363-8	WGNA-082118-FRB-0488	1133293	1.81	2850914	2.06	
320-42363-9	NAWC-082118-RW-265	1111187	1.81	2790946	2.07	
320-42363-10	NAWC-082118-FRB-265	1090929	1.81	2797557	2.07	
320-42363-11	WGNA-082118-RW-3556	1215813	1.82	3053694	2.07	
320-42363-12	WGNA-082118-FRB-3556	1074215	1.81	2771310	2.07	

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Instrument ID: A8\_N Calibration Start Date: 08/30/2018 16:19  
 GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 08/30/2018 16:42  
 Calibration ID: 40933

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
INITIAL CALIBRATION MEAN AREA AND MEAN RT	899367	1.83	2339667	2.08		
UPPER LIMIT	1349051	2.33	3509501	2.58		
LOWER LIMIT	449684	1.33	1169834	1.58		
LAB SAMPLE ID	CLIENT SAMPLE ID					
CCVL 320-243207/9			960926	1.83	2460442	2.08
ICV 320-243207/11			788747	1.83	2000251	2.08
CCV 320-243340/59 CCVIS			727647	1.81	1908647	2.06
320-42363-5 RA	NAWC-082118-RW-098 RA		11136520	1.83	27465230	2.08
320-42363-7	WGNA-082118-RW-0488		760091	1.83	1941807	2.08
CCV 320-243340/64 CCVIS			813997	1.82	2128142	2.08

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 50%-150% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits



FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Sample No.: CCV 320-243340/59 Date Analyzed: 08/31/2018 07:18  
 Instrument ID: A8\_N GC Column: GeminiC18 3x100 ID: 3 (mm)  
 Lab File ID (Standard): 2018.08.30\_537AA\_06 Heated Purge: (Y/N) N  
 Calibration ID: 40933

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	727647	1.81	1908647	2.06		
UPPER LIMIT	1018706	2.31	2672106	2.56		
LOWER LIMIT	509353	1.31	1336053	1.56		
LAB SAMPLE ID	CLIENT SAMPLE ID					
320-42363-5 RA	NAWC-082118-RW-098 RA	1113652Q	1.83	2746523Q	2.08	
320-42363-7	WGNA-082118-RW-0488	760091	1.83	1941807	2.08	

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VIII  
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Sample No.: CCV 320-243340/64 Date Analyzed: 08/31/2018 08:27  
 Instrument ID: A8\_N GC Column: GeminiC18 3x100 ID: 3 (mm)  
 Lab File ID (Standard): 2018.08.30\_537AAA\_0 Heated Purge: (Y/N) N  
 Calibration ID: 40933

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	813997	1.82	2128142	2.08		
UPPER LIMIT	1139596	2.32	2979399	2.58		
LOWER LIMIT	569798	1.32	1489699	1.58		
LAB SAMPLE ID	CLIENT SAMPLE ID	WITHIN AREA LIMITS				
320-42363-5 RA	NAWC-082118-RW-098 RA	1113652Q	1.83	2746523Q	2.08	
320-42363-7	WGNA-082118-RW-0488	760091	1.83	1941807	2.08	

13PFOA = 13C2-PFOA  
 PFOS = 13C4 PFOS

Area Limit = 70%-140% of internal standard area  
 RT Limit = ± 0.5 minutes of internal standard RT

# Column used to flag values outside QC limits

FORM VI  
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA  
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1 Analy Batch No.: 240166

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 08/15/2018 18:21 Calibration End Date: 08/15/2018 18:44 Calibration ID: 40641

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-240166/2	2018.08.15_537CURVE_003.d
Level 2	IC 320-240166/3	2018.08.15_537CURVE_004.d
Level 3	IC 320-240166/4	2018.08.15_537CURVE_005.d
Level 4	IC 320-240166/5	2018.08.15_537CURVE_006.d
Level 5	IC 320-240166/6	2018.08.15_537CURVE_007.d
Level 6	IC 320-240166/7	2018.08.15_537CURVE_008.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanesulfonic acid (PFBS)	1.2479 0.9705	1.1886	1.2616	1.1091	1.0906	Ave		1.1447			9.6		30.0				
Perfluoroheptanoic acid (PFHpA)	1.0855 1.0407	1.0364	1.0489	1.0876	1.0460	Ave		1.0575			2.2		30.0				
Perfluorohexanesulfonic acid (PFHxS)	1.6492 1.6115	1.6167	1.6890	1.6380	1.7330	Ave		1.6562			2.8		30.0				
Perfluorooctanoic acid (PFOA)	1.0954 1.0842	1.0529	1.0915	1.1075	1.1058	Ave		1.0895			1.8		30.0				
Perfluorooctanesulfonic acid (PFOS)	1.0830 1.0982	1.0386	1.0683	1.0853	1.1084	Ave		1.0803			2.3		30.0				
Perfluorononanoic acid (PFNA)	0.8630 0.8350	0.7990	0.7881	0.8431	0.8177	Ave		0.8243			3.4		30.0				
13C2 PFHxA	1.0723 1.0545	1.0111	1.0024	1.0515	1.0447	Ave		1.0394			2.6		30.0				
13C2 PFDA	0.7972 0.7976	0.7443	0.7670	0.8351	0.8115	Ave		0.7921			4.1		30.0				

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI  
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA  
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1 Analy Batch No.: 240166

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 08/15/2018 18:21 Calibration End Date: 08/15/2018 18:44 Calibration ID: 40641

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-240166/2	2018.08.15_537CURVE_003.d
Level 2	IC 320-240166/3	2018.08.15_537CURVE_004.d
Level 3	IC 320-240166/4	2018.08.15_537CURVE_005.d
Level 4	IC 320-240166/5	2018.08.15_537CURVE_006.d
Level 5	IC 320-240166/6	2018.08.15_537CURVE_007.d
Level 6	IC 320-240166/7	2018.08.15_537CURVE_008.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5
Perfluorobutanesulfonic acid (PFBS)	PFOS	Ave	998954 15136483	2070355	4549188	9386038	11785636	9.00 180	20.0	45.0	90.1	135
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	106948 1986691	233189	488515	1105731	1440874	0.960 19.4	2.16	4.86	9.72	14.6
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	440547 8441814	945775	2045536	4655795	6289862	3.00 60.5	6.72	15.1	30.2	45.4
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	222587 4216218	482587	1035552	2293687	3102767	1.98 39.6	4.40	9.90	19.8	29.7
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	380845 7518443	794113	1690983	4031609	5257770	3.95 79.1	8.79	19.8	39.5	59.3
Perfluorononanoic acid (PFNA)	13PF OA	Ave	175370 3246932	366204	747749	1746006	2294540	1.98 39.6	4.40	9.90	19.8	29.7
13C2 PFHxA	13PF OA	Ave	1100508 1035478	1053216	960623	1099800	987004	10.0 10.0	10.0	10.0	10.0	10.0
13C2 PFDA	13PF OA	Ave	818198 783206	775306	735076	873467	766710	10.0 10.0	10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD

FORM VI  
 LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA  
 READBACK PERCENT ERROR

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1 Analy Batch No.: 240166

SDG No.: \_\_\_\_\_

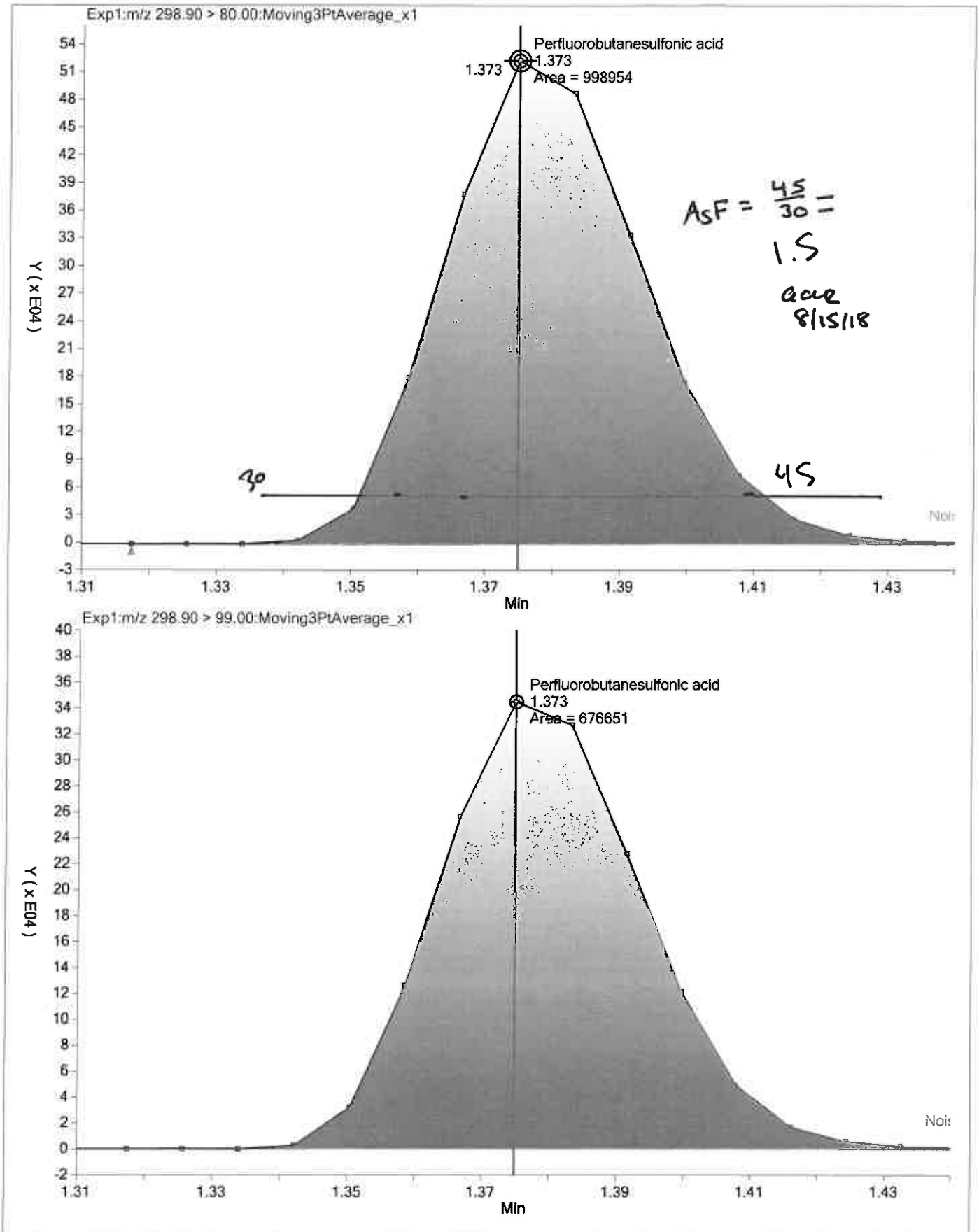
Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

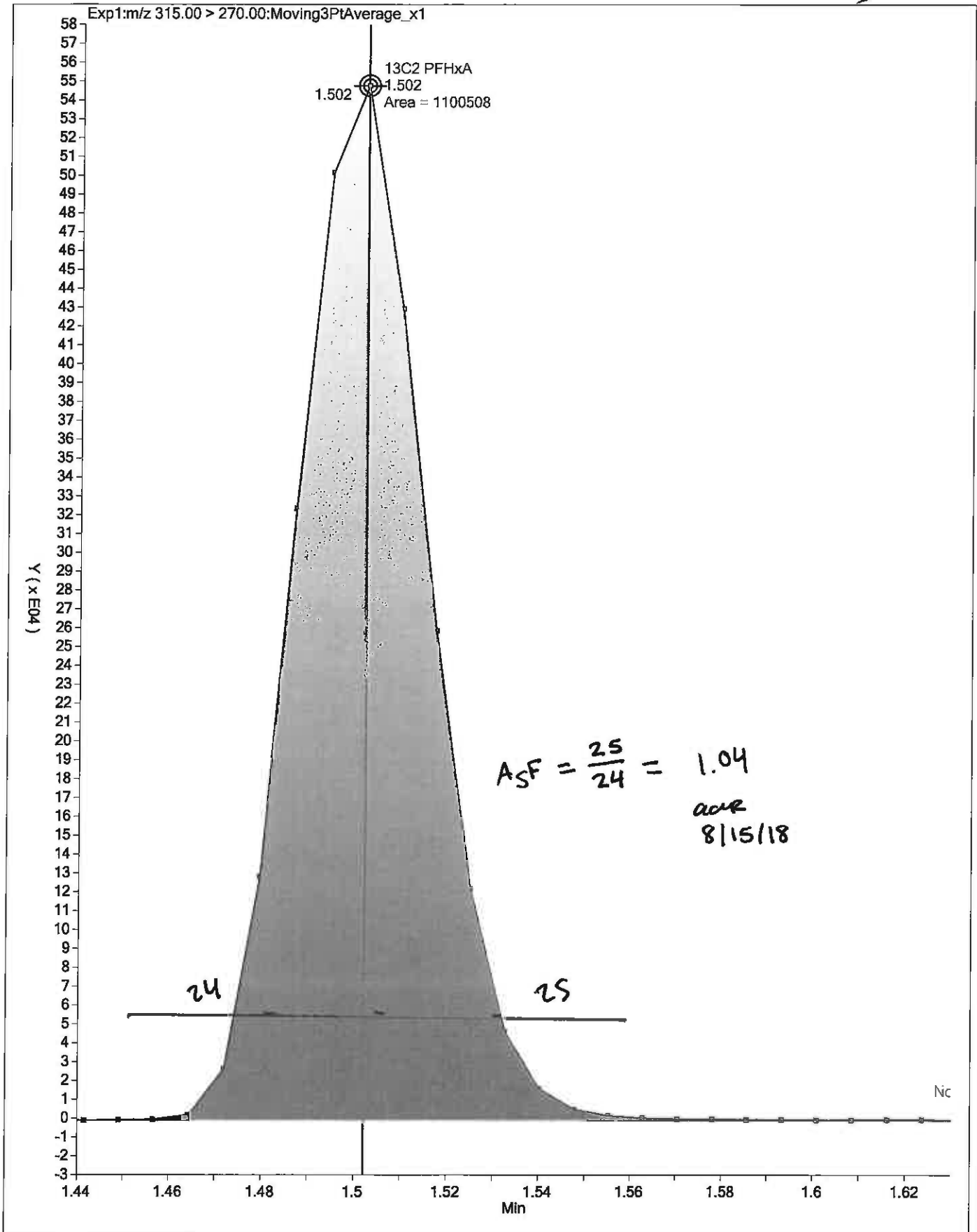
Calibration Start Date: 08/15/2018 18:21 Calibration End Date: 08/15/2018 18:44 Calibration ID: 40641

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-240166/2	2018.08.15_537CURVE_003.d
Level 2	IC 320-240166/3	2018.08.15_537CURVE_004.d
Level 3	IC 320-240166/4	2018.08.15_537CURVE_005.d
Level 4	IC 320-240166/5	2018.08.15_537CURVE_006.d
Level 5	IC 320-240166/6	2018.08.15_537CURVE_007.d
Level 6	IC 320-240166/7	2018.08.15_537CURVE_008.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanesulfonic acid (PFBS)	9.0	3.8	10.2	-3.1	-4.7	-15.2	50	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	2.6	-2.0	-0.8	2.8	-1.1	-1.6	50	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	-0.4	-2.4	2.0	-1.1	4.6	-2.7	50	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	0.5	-3.4	0.2	1.7	1.5	-0.5	50	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	0.2	-3.9	-1.1	0.5	2.6	1.7	50	30	30	30	30	30
Perfluorononanoic acid (PFNA)	4.7	-3.1	-4.4	2.3	-0.8	1.3	50	30	30	30	30	30
13C2 PFHxA	3.2	-2.7	-3.6	1.2	0.5	1.4	30	30	30	30	30	30
13C2 PFDA	0.6	-6.0	-3.2	5.4	2.4	0.7	30	30	30	30	30	30





FORM VI  
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA  
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1 Analy Batch No.: 243207

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 08/30/2018 16:19 Calibration End Date: 08/30/2018 16:42 Calibration ID: 40933

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-243207/2	2018.08.30_537ICALXX_003.d
Level 2	IC 320-243207/3	2018.08.30_537ICALXX_004.d
Level 3	IC 320-243207/4	2018.08.30_537ICALXX_005.d
Level 4	IC 320-243207/5	2018.08.30_537ICALXX_006.d
Level 5	IC 320-243207/6	2018.08.30_537ICALXX_007.d
Level 6	IC 320-243207/7	2018.08.30_537ICALXX_008.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R <sup>2</sup> OR COD	#	MIN R <sup>2</sup> OR COD
	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanesulfonic acid (PFBS)	1.2230 0.9930	1.1860	1.1753	1.1605	1.0890	Ave		1.1378			7.3		30.0				
Perfluoroheptanoic acid (PFHpA)	1.0381 1.0845	1.0721	1.0557	1.1770	1.1132	Ave		1.0901			4.6		30.0				
Perfluorohexanesulfonic acid (PFHxS)	1.6889 1.6717	1.6473	1.7005	1.7822	1.7495	Ave		1.7067			2.9		30.0				
Perfluorooctanoic acid (PFOA)	1.1238 1.0683	1.0221	1.0750	1.0854	1.1051	Ave		1.0799			3.2		30.0				
Perfluorooctanesulfonic acid (PFOS)	1.0648 1.0771	1.0440	1.0513	1.1032	1.0916	Ave		1.0720			2.1		30.0				
Perfluorononanoic acid (PFNA)	0.8008 0.7934	0.8096	0.8197	0.8356	0.8107	Ave		0.8116			1.8		30.0				
13C2 PFHxA	1.1521 1.1375	1.1090	1.1128	1.1379	1.1749	Ave		1.1374			2.2		30.0				
13C2 PFDA	0.8838 0.8930	0.8995	0.8727	0.9522	0.9127	Ave		0.9023			3.1		30.0				

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.



FORM VI  
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA  
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1 Analy Batch No.: 243207

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 08/30/2018 16:19 Calibration End Date: 08/30/2018 16:42 Calibration ID: 40933

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-243207/2	2018.08.30_537ICALXX_003.d
Level 2	IC 320-243207/3	2018.08.30_537ICALXX_004.d
Level 3	IC 320-243207/4	2018.08.30_537ICALXX_005.d
Level 4	IC 320-243207/5	2018.08.30_537ICALXX_006.d
Level 5	IC 320-243207/6	2018.08.30_537ICALXX_007.d
Level 6	IC 320-243207/7	2018.08.30_537ICALXX_008.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5
Perfluorobutanesulfonic acid (PFBS)	PFOS	Ave	885235 14291597	2051546	4145133	8657186	11998694	9.00 180	20.0	45.0	90.1	135
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	88795 1861705	225064	443367	1011347	1464161	0.960 19.4	2.16	4.86	9.72	14.6
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	407943 8080418	957042	2014325	4465219	6473859	3.00 60.5	6.72	15.1	30.2	45.4
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	198271 3735476	437086	919687	1899747	2960649	1.98 39.6	4.40	9.90	19.8	29.7
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	338576 6804405	792676	1627539	3612214	5279410	3.95 79.1	8.79	19.8	39.5	59.3
Perfluorononanoic acid (PFNA)	13PF OA	Ave	141277 2774537	346235	701242	1462550	2171914	1.98 39.6	4.40	9.90	19.8	29.7
13C2 PFHxA	13PF OA	Ave	1026522 1004475	1077815	961641	1005876	1059885	10.0 10.0	10.0	10.0	10.0	10.0
13C2 PFDA	13PF OA	Ave	787485 788559	874271	754115	841794	823302	10.0 10.0	10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD

FORM VI  
 LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA  
 READBACK PERCENT ERROR

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1 Analy Batch No.: 243207

SDG No.: \_\_\_\_\_

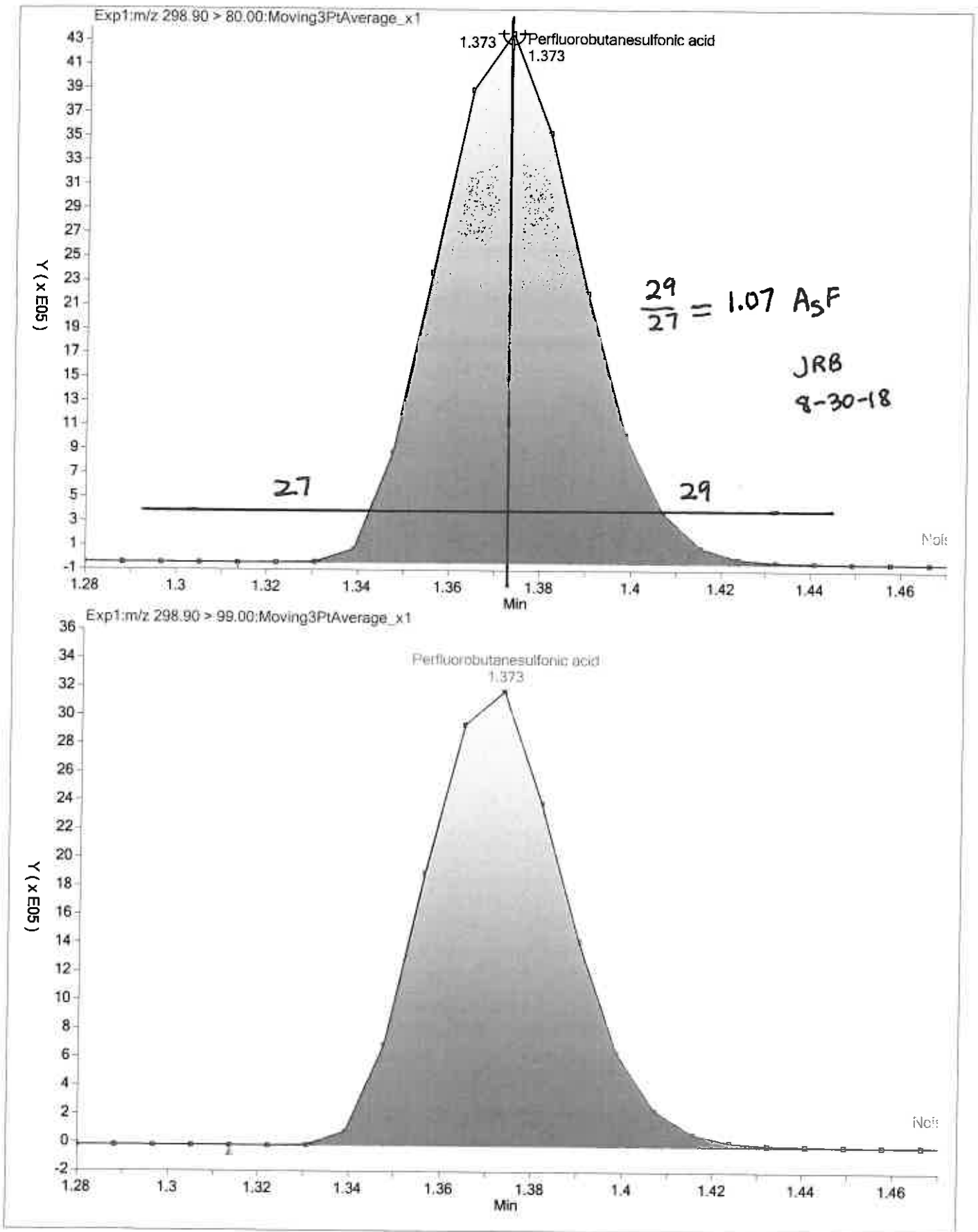
Instrument ID: A8\_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

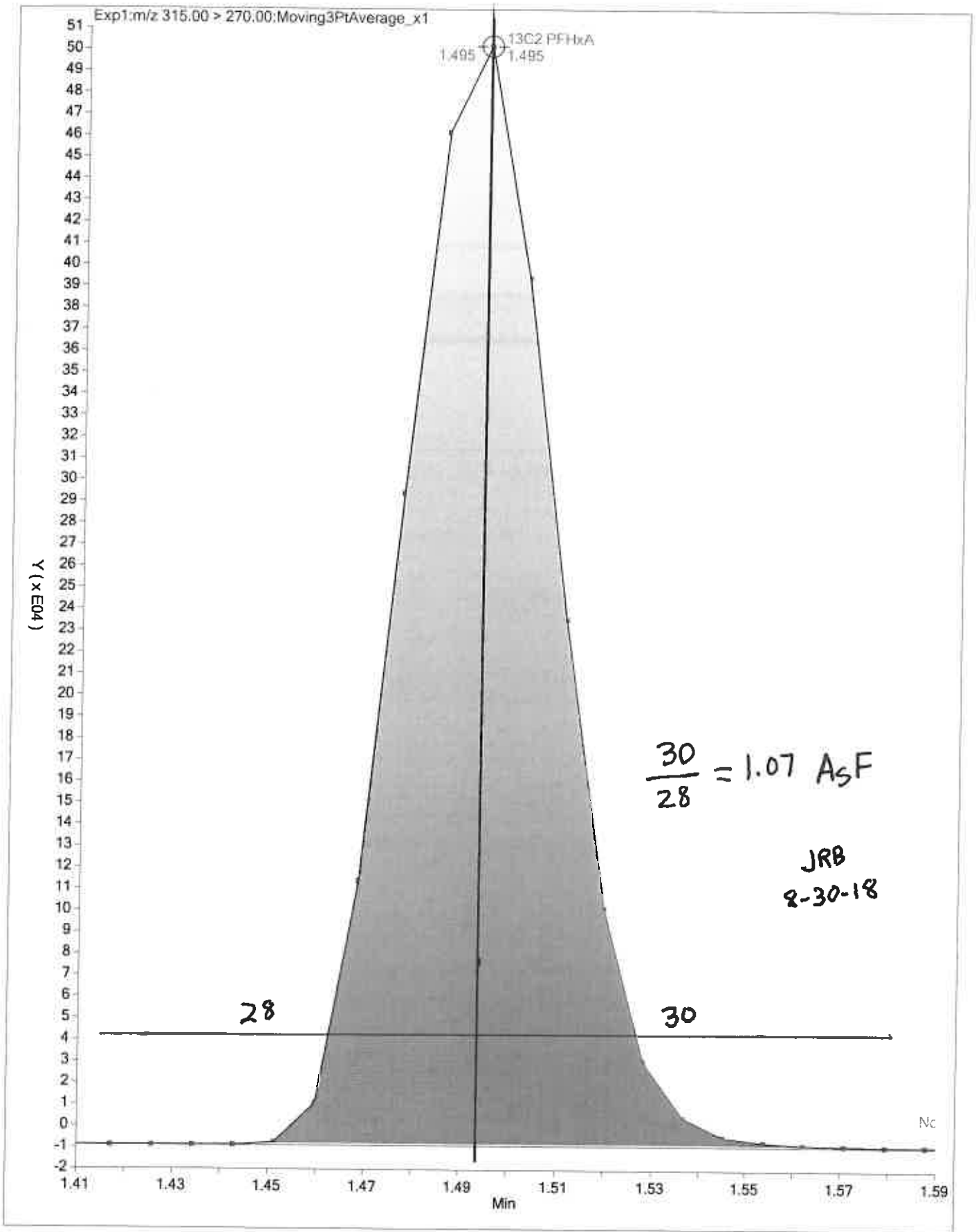
Calibration Start Date: 08/30/2018 16:19 Calibration End Date: 08/30/2018 16:42 Calibration ID: 40933

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-243207/2	2018.08.30_537ICALXX_003.d
Level 2	IC 320-243207/3	2018.08.30_537ICALXX_004.d
Level 3	IC 320-243207/4	2018.08.30_537ICALXX_005.d
Level 4	IC 320-243207/5	2018.08.30_537ICALXX_006.d
Level 5	IC 320-243207/6	2018.08.30_537ICALXX_007.d
Level 6	IC 320-243207/7	2018.08.30_537ICALXX_008.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanesulfonic acid (PFBS)	7.5	4.2	3.3	2.0	-4.3	-12.7	50	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	-4.8	-1.7	-3.2	8.0	2.1	-0.5	50	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	-1.0	-3.5	-0.4	4.4	2.5	-2.1	50	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	4.1	-5.4	-0.5	0.5	2.3	-1.1	50	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	-0.7	-2.6	-1.9	2.9	1.8	0.5	50	30	30	30	30	30
Perfluorononanoic acid (PFNA)	-1.3	-0.2	1.0	3.0	-0.1	-2.2	50	30	30	30	30	30
13C2 PFHxA	1.3	-2.5	-2.2	0.0	3.3	0.0	30	30	30	30	30	30
13C2 PFDA	-2.1	-0.3	-3.3	5.5	1.1	-1.0	30	30	30	30	30	30





FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCVL 320-240166/9 Calibration Date: 08/15/2018 18:53  
 Instrument ID: A8\_N Calib Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/15/2018 18:44  
 Lab File ID: 2018.08.15\_537CURVE\_010.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.145	1.167		20.4	20.0	2.0	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.058	1.033		2.11	2.16	-2.4	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.656	1.611		6.54	6.72	-2.7	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.090	1.020		4.12	4.40	-6.4	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.080	1.039		8.45	8.79	-3.8	50.0
Perfluorononanoic acid (PFNA)	Ave	0.8243	0.8023		4.28	4.40	-2.7	50.0
13C2 PFHxA	Ave	1.039	1.002		9.64	10.0	-3.6	30.0
13C2 PFDA	Ave	0.7921	0.7658		9.67	10.0	-3.3	30.0

FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: ICV 320-240166/11 Calibration Date: 08/15/2018 19:03  
 Instrument ID: A8\_N Calib Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/15/2018 18:44  
 Lab File ID: 2018.08.15\_537CURVE\_012.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.145	1.005		87.9	100	-12.2	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.058	0.9536		9.02	10.0	-9.8	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.656	1.530		18.6	20.2	-7.6	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.090	0.8802		16.3	20.2	-19.2	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.080	0.9603		17.9	20.2	-11.1	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8243	0.7757		19.0	20.2	-5.9	30.0
13C2 PFHxA	Ave	1.039	1.022		9.83	10.0	-1.7	30.0
13C2 PFDA	Ave	0.7921	0.7952		10.0	10.0	0.4	30.0

FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCVL 320-242979/1 Calibration Date: 08/30/2018 02:44  
 Instrument ID: A8\_N Calib Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/15/2018 18:44  
 Lab File ID: 2018.08.29\_537B\_003.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.145	1.243		21.7	20.0	8.6	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.058	1.024		2.09	2.16	-3.2	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.656	1.597		6.48	6.72	-3.6	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.090	1.040		4.20	4.40	-4.6	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.080	1.054		8.57	8.79	-2.4	50.0
Perfluorononanoic acid (PFNA)	Ave	0.8243	0.7376		3.94	4.40	-10.5	50.0
13C2 PFHxA	Ave	1.039	1.065		10.2	10.0	2.5	30.0
13C2 PFDA	Ave	0.7921	0.9126		11.5	10.0	15.2	30.0

FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCV 320-242992/18 Calibration Date: 08/30/2018 06:42  
 Instrument ID: A8\_N Calib Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/15/2018 18:44  
 Lab File ID: 2018.08.29\_537B\_054.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.145	1.248		49.1	45.0	9.0	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.058	1.135		5.21	4.86	7.3	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.656	1.706		15.6	15.1	3.0	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.090	1.076		9.78	9.90	-1.2	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.080	1.044		19.1	19.8	-3.4	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8243	0.8280		9.94	9.90	0.5	30.0
13C2 PFHxA	Ave	1.039	1.139		11.0	10.0	9.6	30.0
13C2 PFDA	Ave	0.7921	0.9459		11.9	10.0	19.4	30.0



FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCV 320-242992/30 Calibration Date: 08/30/2018 07:38  
 Instrument ID: A8\_N Calib Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/15/2018 18:44  
 Lab File ID: 2018.08.29\_537B\_066.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.145	1.112		131	135	-2.8	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.058	1.085		15.0	14.6	2.6	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.656	1.710		46.9	45.4	3.3	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.090	1.079		29.4	29.7	-1.0	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.080	1.080		59.3	59.3	0.0	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8243	0.8073		29.1	29.7	-2.1	30.0
13C2 PFHxA	Ave	1.039	1.127		10.8	10.0	8.4	30.0
13C2 PFDA	Ave	0.7921	0.9474		12.0	10.0	19.6	30.0

FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCV 320-242994/30 Calibration Date: 08/30/2018 07:38  
 Instrument ID: A8\_N Calib Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/15/2018 18:44  
 Lab File ID: 2018.08.29\_537B\_066.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.145	1.112		131	135	-2.8	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.058	1.085		15.0	14.6	2.6	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.656	1.710		46.9	45.4	3.3	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.090	1.079		29.4	29.7	-1.0	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.080	1.080		59.3	59.3	0.0	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8243	0.8073		29.1	29.7	-2.1	30.0
13C2 PFHxA	Ave	1.039	1.127		10.8	10.0	8.4	30.0
13C2 PFDA	Ave	0.7921	0.9474		12.0	10.0	19.6	30.0

FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCV 320-242994/38 Calibration Date: 08/30/2018 08:16  
 Instrument ID: A8\_N Calib Start Date: 08/15/2018 18:21  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/15/2018 18:44  
 Lab File ID: 2018.08.29\_537B\_074.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.145	1.261		49.6	45.0	10.1	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.058	1.118		5.14	4.86	5.7	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.656	1.746		15.9	15.1	5.4	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.090	1.098		9.98	9.90	0.8	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8243	0.8061		9.68	9.90	-2.2	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.080	1.095		20.0	19.8	1.3	30.0
13C2 PFHxA	Ave	1.039	1.141		11.0	10.0	9.8	30.0
13C2 PFDA	Ave	0.7921	0.9497		12.0	10.0	19.9	30.0

FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCVL 320-243207/9 Calibration Date: 08/30/2018 16:52  
 Instrument ID: A8\_N Calib Start Date: 08/30/2018 16:19  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/30/2018 16:42  
 Lab File ID: 2018.08.30\_537ICALXX\_010.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.138	1.175		20.7	20.0	3.3	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.090	1.068		2.12	2.16	-2.0	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.707	1.650		6.50	6.72	-3.3	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.080	1.033		4.21	4.40	-4.4	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.072	1.040		8.52	8.79	-3.0	50.0
Perfluorononanoic acid (PFNA)	Ave	0.8116	0.7621		4.13	4.40	-6.1	50.0
13C2 PFHxA	Ave	1.137	1.089		9.57	10.0	-4.3	30.0
13C2 PFDA	Ave	0.9023	0.8856		9.81	10.0	-1.9	30.0

FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: ICV 320-243207/11 Calibration Date: 08/30/2018 17:01  
 Instrument ID: A8\_N Calib Start Date: 08/30/2018 16:19  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/30/2018 16:42  
 Lab File ID: 2018.08.30\_537ICALXX\_012.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.138	1.148		89.2	88.4	0.9	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.090	1.042		9.56	10.0	-4.4	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.707	1.677		18.6	18.9	-1.7	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.080	1.073		19.9	20.0	-0.6	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.072	1.035		17.9	18.6	-3.5	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8116	0.8003		19.7	20.0	-1.4	30.0
13C2 PFHxA	Ave	1.137	1.135		9.98	10.0	-0.2	30.0
13C2 PFDA	Ave	0.9023	0.9123		10.1	10.0	1.1	30.0

FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCV 320-243340/59 Calibration Date: 08/31/2018 07:18  
 Instrument ID: A8\_N Calib Start Date: 08/30/2018 16:19  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/30/2018 16:42  
 Lab File ID: 2018.08.30\_537AA\_066.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.138	1.170		139	135	2.9	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.090	1.160		15.5	14.6	6.4	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.707	1.734		46.1	45.4	1.6	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.080	1.111		30.5	29.7	2.8	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.072	1.117		61.8	59.3	4.2	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8116	0.8061		29.5	29.7	-0.7	30.0
13C2 PFHxA	Ave	1.137	1.168		10.3	10.0	2.7	30.0
13C2 PFDA	Ave	0.9023	0.9552		10.6	10.0	5.9	30.0

FORM VII  
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1  
 SDG No.: \_\_\_\_\_  
 Lab Sample ID: CCV 320-243340/64 Calibration Date: 08/31/2018 08:27  
 Instrument ID: A8\_N Calib Start Date: 08/30/2018 16:19  
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/30/2018 16:42  
 Lab File ID: 2018.08.30\_537AAA\_071.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.138	1.224		48.4	45.0	7.6	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.090	1.119		4.99	4.86	2.6	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.707	1.628		14.4	15.1	-4.6	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.080	1.024		9.39	9.90	-5.2	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.072	1.044		19.2	19.8	-2.6	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8116	0.7902		9.64	9.90	-2.6	30.0
13C2 PFHxA	Ave	1.137	1.134		9.97	10.0	-0.3	30.0
13C2 PFDA	Ave	0.9023	0.8833		9.79	10.0	-2.1	30.0

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Start Date: 08/15/2018 18:21

Analysis Batch Number: 240166 End Date: 08/15/2018 19:03

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-240166/2		08/15/2018 18:21	1	2018.08.15_537C URVE 003.d	GeminiC18 3x100 3(mm)
IC 320-240166/3		08/15/2018 18:25	1	2018.08.15_537C URVE 004.d	GeminiC18 3x100 3(mm)
IC 320-240166/4		08/15/2018 18:30	1	2018.08.15_537C URVE 005.d	GeminiC18 3x100 3(mm)
IC 320-240166/5 ICISAV		08/15/2018 18:35	1	2018.08.15_537C URVE 006.d	GeminiC18 3x100 3(mm)
IC 320-240166/6		08/15/2018 18:39	1	2018.08.15_537C URVE 007.d	GeminiC18 3x100 3(mm)
IC 320-240166/7		08/15/2018 18:44	1	2018.08.15_537C URVE 008.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/15/2018 18:49	1		GeminiC18 3x100 3(mm)
CCVL 320-240166/9		08/15/2018 18:53	1	2018.08.15_537C URVE 010.d	GeminiC18 3x100 3(mm)
ICB 320-240166/10		08/15/2018 18:58	1		GeminiC18 3x100 3(mm)
ICV 320-240166/11		08/15/2018 19:03	1	2018.08.15_537C URVE 012.d	GeminiC18 3x100 3(mm)



LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Start Date: 08/30/2018 02:44

Analysis Batch Number: 242979 End Date: 08/30/2018 03:21

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-242979/1		08/30/2018 02:44	1	2018.08.29_537B 003.d	GeminiC18 3x100 3(mm)
CCV 320-242979/9 CCVIS		08/30/2018 03:21	1		GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Start Date: 08/30/2018 06:42

Analysis Batch Number: 242992 End Date: 08/30/2018 07:38

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-242992/18 CCVIS		08/30/2018 06:42	1	2018.08.29_537B 054.d	GeminiC18 3x100 3(mm)
MB 320-242479/1-A		08/30/2018 06:52	1	2018.08.29_537B 056.d	GeminiC18 3x100 3(mm)
LCS 320-242479/2-A		08/30/2018 06:56	1	2018.08.29_537B 057.d	GeminiC18 3x100 3(mm)
320-42363-1		08/30/2018 07:01	1	2018.08.29_537B 058.d	GeminiC18 3x100 3(mm)
320-42363-1 MS		08/30/2018 07:06	1	2018.08.29_537B 059.d	GeminiC18 3x100 3(mm)
320-42363-1 MSD		08/30/2018 07:10	1	2018.08.29_537B 060.d	GeminiC18 3x100 3(mm)
320-42363-2		08/30/2018 07:15	1	2018.08.29_537B 061.d	GeminiC18 3x100 3(mm)
320-42363-3		08/30/2018 07:20	1	2018.08.29_537B 062.d	GeminiC18 3x100 3(mm)
320-42363-4		08/30/2018 07:24	1	2018.08.29_537B 063.d	GeminiC18 3x100 3(mm)
320-42363-5		08/30/2018 07:29	1	2018.08.29_537B 064.d	GeminiC18 3x100 3(mm)
320-42363-6		08/30/2018 07:34	1	2018.08.29_537B 065.d	GeminiC18 3x100 3(mm)
CCV 320-242992/30 CCVIS		08/30/2018 07:38	1	2018.08.29_537B 066.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Start Date: 08/30/2018 07:38

Analysis Batch Number: 242994 End Date: 08/30/2018 08:16

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-242994/30 CCVIS		08/30/2018 07:38	1	2018.08.29_537B 066.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/30/2018 07:48	1		GeminiC18 3x100 3(mm)
320-42363-8		08/30/2018 07:52	1	2018.08.29_537B 069.d	GeminiC18 3x100 3(mm)
320-42363-9		08/30/2018 07:57	1	2018.08.29_537B 070.d	GeminiC18 3x100 3(mm)
320-42363-10		08/30/2018 08:02	1	2018.08.29_537B 071.d	GeminiC18 3x100 3(mm)
320-42363-11		08/30/2018 08:06	1	2018.08.29_537B 072.d	GeminiC18 3x100 3(mm)
320-42363-12		08/30/2018 08:11	1	2018.08.29_537B 073.d	GeminiC18 3x100 3(mm)
CCV 320-242994/38 CCVIS		08/30/2018 08:16	1	2018.08.29_537B 074.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Start Date: 08/30/2018 16:19

Analysis Batch Number: 243207 End Date: 08/30/2018 17:01

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-243207/2		08/30/2018 16:19	1	2018.08.30_537I CALXX 003.d	GeminiC18 3x100 3(mm)
IC 320-243207/3		08/30/2018 16:24	1	2018.08.30_537I CALXX 004.d	GeminiC18 3x100 3(mm)
IC 320-243207/4		08/30/2018 16:28	1	2018.08.30_537I CALXX 005.d	GeminiC18 3x100 3(mm)
IC 320-243207/5 ICISAV		08/30/2018 16:33	1	2018.08.30_537I CALXX 006.d	GeminiC18 3x100 3(mm)
IC 320-243207/6		08/30/2018 16:38	1	2018.08.30_537I CALXX 007.d	GeminiC18 3x100 3(mm)
IC 320-243207/7		08/30/2018 16:42	1	2018.08.30_537I CALXX 008.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/30/2018 16:47	1		GeminiC18 3x100 3(mm)
CCVL 320-243207/9		08/30/2018 16:52	1	2018.08.30_537I CALXX 010.d	GeminiC18 3x100 3(mm)
ICB 320-243207/10		08/30/2018 16:56	1		GeminiC18 3x100 3(mm)
ICV 320-243207/11		08/30/2018 17:01	1	2018.08.30_537I CALXX 012.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Instrument ID: A8\_N Start Date: 08/31/2018 07:18

Analysis Batch Number: 243340 End Date: 08/31/2018 08:27

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-243340/59 CCVIS		08/31/2018 07:18	1	2018.08.30_537A A 066.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/31/2018 08:13	1		GeminiC18 3x100 3(mm)
320-42363-5 RA		08/31/2018 08:18	1	2018.08.30_537A AA 069.d	GeminiC18 3x100 3(mm)
320-42363-7		08/31/2018 08:22	1	2018.08.30_537A AA 070.d	GeminiC18 3x100 3(mm)
CCV 320-243340/64 CCVIS		08/31/2018 08:27	1	2018.08.30_537A AA 071.d	GeminiC18 3x100 3(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Batch Number: 242479 Batch Start Date: 08/28/18 06:42 Batch Analyst: Arauz, Horacio J

Batch Method: 537 Batch End Date: 08/28/18 22:10

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-HSP 00029
MB 320-242479/1		537, 537				250 mL	1.00 mL	7.0 SU	
LCS 320-242479/2		537, 537				250 mL	1.00 mL	7.0 SU	100 uL
320-42363-A-1	NAWC-082118-RW-2 28	537, 537	T	306.20 g	28.46 g	277.7 mL	1.00 mL	7.0 SU	
320-42363-A-1 MS	NAWC-082118-RW-2 28	537, 537	T	304.81 g	28.54 g	276.3 mL	1.00 mL	7.0 SU	100 uL
320-42363-A-1 MSD	NAWC-082118-RW-2 28	537, 537	T	312.06 g	28.72 g	283.3 mL	1.00 mL	7.0 SU	100 uL
320-42363-A-2	NAWC-082118-FRB- 228	537, 537	T	296.16 g	27.95 g	268.2 mL	1.00 mL	7.0 SU	
320-42363-A-3	NAWC-082118-RW-1 75	537, 537	T	309.50 g	29.22 g	280.3 mL	1.00 mL	7.0 SU	
320-42363-A-4	NAWC-082118-FRB- 175	537, 537	T	302.07 g	27.85 g	274.2 mL	1.00 mL	7.0 SU	
320-42363-A-5	NAWC-082118-RW-0 98	537, 537	T	319.02 g	28.43 g	290.6 mL	1.00 mL	7.0 SU	
320-42363-A-6	NAWC-082118-FRB- 098	537, 537	T	284.85 g	27.95 g	256.9 mL	1.00 mL	7.0 SU	
320-42363-A-7	WGNA-082118-RW-0 488	537, 537	T	310.18 g	28.20 g	282 mL	1.00 mL	7.0 SU	
320-42363-A-8	WGNA-082118-FRB- 0488	537, 537	T	300.40 g	28.62 g	271.8 mL	1.00 mL	7.0 SU	
320-42363-A-9	NAWC-082118-RW-2 65	537, 537	T	308.47 g	28.16 g	280.3 mL	1.00 mL	7.0 SU	
320-42363-A-10	NAWC-082118-FRB- 265	537, 537	T	304.47 g	27.79 g	276.7 mL	1.00 mL	7.0 SU	
320-42363-A-11	WGNA-082118-RW-3 556	537, 537	T	291.93 g	28.10 g	263.8 mL	1.00 mL	7.0 SU	
320-42363-A-12	WGNA-082118-FRB- 3556	537, 537	T	302.71 g	27.81 g	274.9 mL	1.00 mL	7.0 SU	

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-IS 00081	LC537-SU 00078	AnalysisComment			
MB 320-242479/1		537, 537		100 uL	100 uL	Chlorine ND			
LCS 320-242479/2		537, 537		100 uL	100 uL	Chlorine ND			
320-42363-A-1	NAWC-082118-RW-2 28	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-1 MS	NAWC-082118-RW-2 28	537, 537	T	100 uL	100 uL	Chlorine ND			

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Batch Number: 242479 Batch Start Date: 08/28/18 06:42 Batch Analyst: Arauz, Horacio J

Batch Method: 537 Batch End Date: 08/28/18 22:10

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-IS 00081	LC537-SU 00078	AnalysisComment			
320-42363-A-1 MSD	NAWC-082118-RW-2 28	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-2	NAWC-082118-FRB- 228	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-3	NAWC-082118-RW-1 75	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-4	NAWC-082118-FRB- 175	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-5	NAWC-082118-RW-0 98	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-6	NAWC-082118-FRB- 098	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-7	WGNA-082118-RW-0 488	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-8	WGNA-082118-FRB- 0488	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-9	NAWC-082118-RW-2 65	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-10	NAWC-082118-FRB- 265	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-11	WGNA-082118-RW-3 556	537, 537	T	100 uL	100 uL	Chlorine ND			
320-42363-A-12	WGNA-082118-FRB- 3556	537, 537	T	100 uL	100 uL	Chlorine ND			

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-42363-1

SDG No.: \_\_\_\_\_

Batch Number: 242479 Batch Start Date: 08/28/18 06:42 Batch Analyst: Arauz, Horacio J

Batch Method: 537 Batch End Date: 08/28/18 22:10

Batch Notes	
Analyst ID - Aliquot Step	JER
Batch Comment	Client labels match TA label, HJA 08/28/18
Analyst ID - Concentration	HJA/VPM
Analyst ID - Final Volume Step	JER
Internal Standard ID#	1346107
Manifold ID	1, 3
Methanol ID	1343777
pH Indicator ID	0818
Pipette ID	Q34709G
Analyst ID - IS Reagent Drop	JER
Analyst ID - IS Reagent Drop Witness	GXL
Analyst ID - SU Reagent Drop	HJA
Analyst ID - SU Reagent Drop Witness	KJP
Analyst ID - TA Reagent Drop	HJA
Analyst ID - TA Reagent Drop Witness	KJP
SPE Cartridge Lot ID	6390138-02
Trizma ID	SLBR5241V
Reagent Water ID	8-27-18

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.



PFAS Calibration Calculations:

**Initial Calibration**  
Instrument A8\_N

8/15/2018

PFOA

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	Reported RRF
1.98	222587	1026304	10	1.09536	1.0954
4.4	482587	1041660	10	1.05292	1.0529
9.9	1035552	958352	10	1.09147	1.0915
19.8	2293687	1045953	10	1.10753	1.1075
29.7	3102767	944777	10	1.10577	1.1058
39.6	4216218	981996	10	1.08422	1.0842
Average				1.08955	1.0895
Standard Deviation				0.0200	
RSD				0.0183	
%RSD				1.83275	1.8

**Continuing Calibration**

08/30/2018 @ 6:42

PFOA

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	%D	Reported RRF	Reported %D
9.9	938305	880773	10	1.0761	-1.231693	1.076	-1.2

**Sample Identification**  
Compound

NAWC-082118-RW-228  
PFOA

Compound Area	477256	Average RRF	1.0895
Internal Standard Amount (ng)	10	Sample Volume(ml)	277.7
Dilution Factor	1	Volume Extract (ml)	1
Internal Standard Area	1268081	Injection Volume (µl)	1

Concentration 12.4395 ng/L  
Reported Result 12 ng/L

**MS/MSD %R**

NAWC-082118-RW-228			
PFOA MS %R	Spike amount	MS concentration	Sample Result
113.57	99.5	125	12
PFOA MSD %R	Spike amount	MSD concentration	Sample Result
79.71	97.1	89.4	12
MS/MSD RPD			
33.21			

**Surrogate PFHxA**

Compound Area	1198296		
Internal Standard Amount (ng)	10		
Dilution Factor	1	Volume Extract (ml)	1
Internal Standard Area	1268081	Injection Volume (µl)	1
Average RRF	1.0394		
Concentration	9.0915		
Surrogate %R	90.91	Spike amount	10

**LCS %R**

320-242479/2-A			
PFOA	Spike amount	LCS concentration	
96.36	110	106	

TestAmerica Sacramento  
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\2018.08.29\_537B\_058.d  
 Lims ID: 320-42363-A-1-A  
 Client ID: NAWC-082118-RW-228  
 Sample Type: Client  
 Inject. Date: 30-Aug-2018 07:01:31 ALS Bottle#: 39 Worklist Smp#: 22  
 Injection Vol: 2.0 ul Dil. Factor: 1.0000  
 Sample Info: 320-42363-a-1-a  
 Misc. Info.: Plate: 1 Rack: 2  
 Operator ID: SACINSTLCMS01 Instrument ID: A8\_N  
 Method: \\ChromNa\Sacramento\ChromData\A8\_N\20180829-63501.b\537\_A8\_N.m  
 Limit Group: LC 537 ICAL  
 Last Update: 30-Aug-2018 15:47:00 Calib Date: 15-Aug-2018 18:44:32  
 Integrator: Picker  
 Quant Method: Internal Standard Quant By: Initial Calibration  
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8\_N\20180815-62769.b\2018.08.15\_537CURVE\_008.d  
 Column 1 : Det: EXP1  
 Process Host: XAWRK020

First Level Reviewer: barnettj Date: 30-Aug-2018 15:46:23

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.366	1.366	0.0	1.000	1057838	8.63		1231	
298.90 > 99.00	1.358	1.366	-0.008	0.994	695562		1.52(0.00-0.00)	1412	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.479	1.487	-0.008	1.000	1198296	9.09		11963	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.631	1.631	0.0	1.000	145943	0.8228		56.8	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.624	1.631	-0.007	1.000	147659	1.10		22.3	
* 6 13C2-PFOA									
415.00 > 370.00	1.813	1.821	-0.008		1268081	10.0		9090	S
5 Perfluorooctanoic acid									
413.00 > 369.00	1.813	1.821	-0.008	1.000	477256	3.45		54.1	
413.00 > 169.00	1.813	1.821	-0.008	1.000	263655		1.81(0.00-0.00)	661	
* 7 13C4 PFOS									
503.00 > 80.00	2.071	2.079	-0.008		3071601	28.7		3151	
9 Perfluorononanoic acid									
463.00 > 419.00	2.079	2.086	-0.007	1.000	50109	0.4794		4.5	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.071	2.109	-0.038	1.000	347568	3.00		156	
499.00 > 99.00	2.071	2.109	-0.038	1.000	65347		5.32(0.00-0.00)	102	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.238	2.246	-0.008	1.000	979264	9.75		6012	

DODCMD_ID	INSTALLATION_ID	SDG	SITE_NAME	NORM_SITE_NAME	LOCATION_NAME	LOCATION_TYPE_DESC	COORD_X	COORD_Y	CONTRACT_ID	DO_CTO_NUMBER	CONTR_NAME	SAMPLE_NAME	SAMPLE_MATRIX_DESC	SAMPLE_TYPE_DESC	COLLECT_DATE	ANALYTICAL_METHOD	ANALYTICAL_METHOD_GRP_DESC
MID_ATLANTIC	WARMINSTER_NAWC	320-42363-1	OFFSITE_RW	SITE 00001	NAWC-RW-265	Domestic well	2710328.671	336538.4046	N6247016D9008	WE04	TETRA TECH, INC.	NAWC-082118-RW-265	Ground water	Normal (Regular)	21-Aug-18	537	Perfluoroalkyl Compounds
MID_ATLANTIC	WARMINSTER_NAWC	320-42363-1	OFFSITE_RW	SITE 00001	NAWC-RW-228	Domestic well			N6247016D9008	WE04	TETRA TECH, INC.	NAWC-082118-FRB-228	Water for QC samples	Field Reagent Blank	21-Aug-18	537	Perfluoroalkyl Compounds
MID_ATLANTIC	WARMINSTER_NAWC	320-42363-1	OFFSITE_RW	SITE 00001	NAWC-RW-098	Domestic well	2713451.033	333197.3633	N6247016D9008	WE04	TETRA TECH, INC.	NAWC-082118-RW-098	Ground water	Normal (Regular)	21-Aug-18	537	Perfluoroalkyl Compounds
MID_ATLANTIC	WARMINSTER_NAWC	320-42363-1	OFFSITE_RW	SITE 00001	NAWC-RW-228	Domestic well			N6247016D9008	WE04	TETRA TECH, INC.	NAWC-082118-FRB-265	Water for QC samples	Field Reagent Blank	21-Aug-18	537	Perfluoroalkyl Compounds
MID_ATLANTIC	WARMINSTER_NAWC	320-42363-1	OFFSITE_RW	SITE 00001	NAWC-RW-228	Domestic well	2712023.231	335701.7893	N6247016D9008	WE04	TETRA TECH, INC.	NAWC-082118-RW-228	Ground water	Normal (Regular)	21-Aug-18	537	Perfluoroalkyl Compounds
MID_ATLANTIC	WARMINSTER_NAWC	320-42363-1	OFFSITE_RW	SITE 00001	NAWC-RW-175	Domestic well	2710028.502	338582.8374	N6247016D9008	WE04	TETRA TECH, INC.	NAWC-082118-RW-175	Ground water	Normal (Regular)	21-Aug-18	537	Perfluoroalkyl Compounds
MID_ATLANTIC	WARMINSTER_NAWC	320-42363-1							N6247016D9008	WE04	TETRA TECH, INC.	NAWC-082118-FRB-098	Water for QC samples	Field Reagent Blank	21-Aug-18	537	Perfluoroalkyl Compounds
MID_ATLANTIC	WARMINSTER_NAWC	320-42363-1							N6247016D9008	WE04	TETRA TECH, INC.	NAWC-082118-FRB-175	Water for QC samples	Field Reagent Blank	21-Aug-18	537	Perfluoroalkyl Compounds