



**Off-Base Drinking Water Sample Results,
Combined Level 2 and Level 4 Laboratory Report,
Electronic Data Deliverable, Data Validation Report,
and the Sample Location Figure, SDG 320-37999-1**

*Naval Air Warfare Center Warminster
Warminster, Pennsylvania*

August 2019

N62269_001211
WARMINSTER_NAWC
SSIC 5000-33c

LABORATORY DATA PACKAGE, 320-37999-1, NAS WILLOW GROVE NAWC
WARMINSTER PA
04/24/2018
TESTAMERICA LABORATORIES INC

Approved for public release: distribution unlimited.

ANALYTICAL REPORT

Job Number: 320-37999-1

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
4/24/2018 9:39 AM

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04/24/2018

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Definitions/Glossary

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

TestAmerica Job ID: 320-37999-1

Qualifiers

LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
M	Manual integrated compound.

Glossary

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
320-37999-1

Receipt

The samples were received on 4/10/2018 8:55 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.9° 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.

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

Organic Prep

Method(s) 537: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-218546.

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

Detection Summary

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

TestAmerica Job ID: 320-37999-1

Client Sample ID: NAWC-040918-RW-359

Lab Sample ID: 320-37999-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	91	M	39	6.7	ng/L	1		537	Total/NA
Perfluorooctanoic acid (PFOA)	22		20	2.8	ng/L	1		537	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	56		30	5.4	ng/L	1		537	Total/NA
Perfluoroheptanoic acid (PFHpA)	23		9.8	1.9	ng/L	1		537	Total/NA

Client Sample ID: NAWC-040918-FRB-359

Lab Sample ID: 320-37999-2

No Detections.

Client Sample ID: WGNA-040918-RW-4848

Lab Sample ID: 320-37999-3

No Detections.

Client Sample ID: WGNA-040918-FRB-4848

Lab Sample ID: 320-37999-4

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: 320-37999-1

Client Sample ID: NAWC-040918-RW-359

Lab Sample ID: 320-37999-1

Date Collected: 04/09/18 09:10

Matrix: Water

Date Received: 04/10/18 08:55

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	91	M	39	6.7	ng/L		04/18/18 09:04	04/21/18 19:51	1
Perfluorooctanoic acid (PFOA)	22		20	2.8	ng/L		04/18/18 09:04	04/21/18 19:51	1
Perfluorononanoic acid (PFNA)	20	U	24	7.9	ng/L		04/18/18 09:04	04/21/18 19:51	1
Perfluorohexanesulfonic acid (PFHxS)	56		30	5.4	ng/L		04/18/18 09:04	04/21/18 19:51	1
Perfluoroheptanoic acid (PFHpA)	23		9.8	1.9	ng/L		04/18/18 09:04	04/21/18 19:51	1
Perfluorobutanesulfonic acid (PFBS)	35	U	89	16	ng/L		04/18/18 09:04	04/21/18 19:51	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	86		70 - 130				04/18/18 09:04	04/21/18 19:51	1
13C2 PFDA	81		70 - 130				04/18/18 09:04	04/21/18 19:51	1

Client Sample ID: NAWC-040918-FRB-359

Lab Sample ID: 320-37999-2

Date Collected: 04/09/18 09:05

Matrix: Water

Date Received: 04/10/18 08:55

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	15	U	38	6.5	ng/L		04/18/18 09:04	04/21/18 19:56	1
Perfluorooctanoic acid (PFOA)	7.6	U	19	2.7	ng/L		04/18/18 09:04	04/21/18 19:56	1
Perfluorononanoic acid (PFNA)	19	U	23	7.6	ng/L		04/18/18 09:04	04/21/18 19:56	1
Perfluorohexanesulfonic acid (PFHxS)	11	U	29	5.3	ng/L		04/18/18 09:04	04/21/18 19:56	1
Perfluoroheptanoic acid (PFHpA)	3.8	U	9.5	1.8	ng/L		04/18/18 09:04	04/21/18 19:56	1
Perfluorobutanesulfonic acid (PFBS)	34	U	86	15	ng/L		04/18/18 09:04	04/21/18 19:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	95		70 - 130				04/18/18 09:04	04/21/18 19:56	1
13C2 PFDA	88		70 - 130				04/18/18 09:04	04/21/18 19:56	1

Client Sample ID: WGNA-040918-RW-4848

Lab Sample ID: 320-37999-3

Date Collected: 04/09/18 16:10

Matrix: Water

Date Received: 04/10/18 08:55

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	16	U M	40	6.8	ng/L		04/18/18 09:04	04/21/18 20:00	1
Perfluorooctanoic acid (PFOA)	8.0	U	20	2.8	ng/L		04/18/18 09:04	04/21/18 20:00	1
Perfluorononanoic acid (PFNA)	20	U	24	8.0	ng/L		04/18/18 09:04	04/21/18 20:00	1
Perfluorohexanesulfonic acid (PFHxS)	12	U M	30	5.5	ng/L		04/18/18 09:04	04/21/18 20:00	1
Perfluoroheptanoic acid (PFHpA)	4.0	U M	10	1.9	ng/L		04/18/18 09:04	04/21/18 20:00	1
Perfluorobutanesulfonic acid (PFBS)	36	U M	90	16	ng/L		04/18/18 09:04	04/21/18 20:00	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	96		70 - 130				04/18/18 09:04	04/21/18 20:00	1
13C2 PFDA	91		70 - 130				04/18/18 09:04	04/21/18 20:00	1

Client Sample Results

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

TestAmerica Job ID: 320-37999-1

Client Sample ID: WGNA-040918-FRB-4848

Lab Sample ID: 320-37999-4

Date Collected: 04/09/18 16:05

Matrix: Water

Date Received: 04/10/18 08:55

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	16	U	40	6.8	ng/L		04/18/18 09:04	04/21/18 20:05	1
Perfluorooctanoic acid (PFOA)	8.0	U	20	2.8	ng/L		04/18/18 09:04	04/21/18 20:05	1
Perfluorononanoic acid (PFNA)	20	U	24	8.0	ng/L		04/18/18 09:04	04/21/18 20:05	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	30	5.5	ng/L		04/18/18 09:04	04/21/18 20:05	1
Perfluoroheptanoic acid (PFHpA)	4.0	U	10	1.9	ng/L		04/18/18 09:04	04/21/18 20:05	1
Perfluorobutanesulfonic acid (PFBS)	36	U	90	16	ng/L		04/18/18 09:04	04/21/18 20:05	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
¹³ C2 PFHxA	95		70 - 130	04/18/18 09:04	04/21/18 20:05	1
¹³ C2 PFDA	85		70 - 130	04/18/18 09:04	04/21/18 20:05	1

Default Detection Limits

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

TestAmerica Job ID: 320-37999-1

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: 320-37999-1

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)
320-37999-1	NAWC-040918-RW-359	86	81
320-37999-2	NAWC-040918-FRB-359	95	88
320-37999-3	WGNA-040918-RW-4848	96	91
320-37999-4	WGNA-040918-FRB-4848	95	85
LCS 320-218546/2-A	Lab Control Sample	99	89
LCSD 320-218546/3-A	Lab Control Sample Dup	98	88
MB 320-218546/1-A	Method Blank	102	87

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: 320-37999-1

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

Lab Sample ID: MB 320-218546/1-A
Matrix: Water
Analysis Batch: 219245

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 218546

Analyte	MB	MB	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorooctanesulfonic acid (PFOS)	16	U	40	6.8	ng/L		04/18/18 09:04	04/21/18 19:37	1
Perfluorooctanoic acid (PFOA)	8.0	U	20	2.8	ng/L		04/18/18 09:04	04/21/18 19:37	1
Perfluorononanoic acid (PFNA)	20	U	24	8.0	ng/L		04/18/18 09:04	04/21/18 19:37	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	30	5.5	ng/L		04/18/18 09:04	04/21/18 19:37	1
Perfluoroheptanoic acid (PFHpA)	4.0	U	10	1.9	ng/L		04/18/18 09:04	04/21/18 19:37	1
Perfluorobutanesulfonic acid (PFBS)	36	U	90	16	ng/L		04/18/18 09:04	04/21/18 19:37	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C2 PFHxA	102		70 - 130	04/18/18 09:04	04/21/18 19:37	1
13C2 PFDA	87		70 - 130	04/18/18 09:04	04/21/18 19:37	1

Lab Sample ID: LCS 320-218546/2-A
Matrix: Water
Analysis Batch: 219245

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 218546

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanoic acid (PFOA)	110	105		ng/L		95	70 - 130
Perfluorononanoic acid (PFNA)	110	101		ng/L		92	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	168	186		ng/L		111	70 - 130
Perfluoroheptanoic acid (PFHpA)	54.0	56.4		ng/L		104	70 - 130
Perfluorobutanesulfonic acid (PFBS)	500	499		ng/L		100	70 - 130

Surrogate	LCS	LCS	Limits
	%Recovery	Qualifier	
13C2 PFHxA	99		70 - 130
13C2 PFDA	89		70 - 130

Lab Sample ID: LCSD 320-218546/3-A
Matrix: Water
Analysis Batch: 219245

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 218546

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanoic acid (PFOA)	110	112		ng/L		102	70 - 130	7	30
Perfluorononanoic acid (PFNA)	110	104		ng/L		94	70 - 130	3	30
Perfluorohexanesulfonic acid (PFHxS)	168	181		ng/L		108	70 - 130	3	30
Perfluoroheptanoic acid (PFHpA)	54.0	53.7		ng/L		99	70 - 130	5	30
Perfluorobutanesulfonic acid (PFBS)	500	483		ng/L		96	70 - 130	3	30

Surrogate	LCSD	LCSD	Limits
	%Recovery	Qualifier	
13C2 PFHxA	98		70 - 130
13C2 PFDA	88		70 - 130

TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-37999-1

LCMS

Prep Batch: 218546

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-37999-1	NAWC-040918-RW-359	Total/NA	Water	537	
320-37999-2	NAWC-040918-FRB-359	Total/NA	Water	537	
320-37999-3	WGNA-040918-RW-4848	Total/NA	Water	537	
320-37999-4	WGNA-040918-FRB-4848	Total/NA	Water	537	
MB 320-218546/1-A	Method Blank	Total/NA	Water	537	
LCS 320-218546/2-A	Lab Control Sample	Total/NA	Water	537	
LCSD 320-218546/3-A	Lab Control Sample Dup	Total/NA	Water	537	

Analysis Batch: 219245

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-37999-1	NAWC-040918-RW-359	Total/NA	Water	537	218546
320-37999-2	NAWC-040918-FRB-359	Total/NA	Water	537	218546
320-37999-3	WGNA-040918-RW-4848	Total/NA	Water	537	218546
320-37999-4	WGNA-040918-FRB-4848	Total/NA	Water	537	218546
MB 320-218546/1-A	Method Blank	Total/NA	Water	537	218546
LCS 320-218546/2-A	Lab Control Sample	Total/NA	Water	537	218546
LCSD 320-218546/3-A	Lab Control Sample Dup	Total/NA	Water	537	218546

Lab Chronicle

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

TestAmerica Job ID: 320-37999-1

Client Sample ID: NAWC-040918-RW-359

Date Collected: 04/09/18 09:10

Date Received: 04/10/18 08:55

Lab Sample ID: 320-37999-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			218546	04/18/18 09:04	SK	TAL SAC
Total/NA	Analysis	537		1	219245	04/21/18 19:51	JRB	TAL SAC

Client Sample ID: NAWC-040918-FRB-359

Date Collected: 04/09/18 09:05

Date Received: 04/10/18 08:55

Lab Sample ID: 320-37999-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			218546	04/18/18 09:04	SK	TAL SAC
Total/NA	Analysis	537		1	219245	04/21/18 19:56	JRB	TAL SAC

Client Sample ID: WGNA-040918-RW-4848

Date Collected: 04/09/18 16:10

Date Received: 04/10/18 08:55

Lab Sample ID: 320-37999-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			218546	04/18/18 09:04	SK	TAL SAC
Total/NA	Analysis	537		1	219245	04/21/18 20:00	JRB	TAL SAC

Client Sample ID: WGNA-040918-FRB-4848

Date Collected: 04/09/18 16:05

Date Received: 04/10/18 08:55

Lab Sample ID: 320-37999-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			218546	04/18/18 09:04	SK	TAL SAC
Total/NA	Analysis	537		1	219245	04/21/18 20:05	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: 320-37999-1

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
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-18
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
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
L-A-B	DoD ELAP		L2468	01-20-21
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-18 *
New Jersey	NELAP	2	CA005	06-30-18
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	05-31-18
US Fish & Wildlife	Federal		LE148388-0	07-31-18
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-19
Virginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-18
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

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

TestAmerica Job ID: 320-37999-1

Method	Method Description	Protocol	Laboratory
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: 320-37999-1

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

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-37999-1	NAWC-040918-RW-359	Water	04/09/18 09:10	04/10/18 08:55
320-37999-2	NAWC-040918-FRB-359	Water	04/09/18 09:05	04/10/18 08:55
320-37999-3	WGNA-040918-RW-4848	Water	04/09/18 16:10	04/10/18 08:55
320-37999-4	WGNA-040918-FRB-4848	Water	04/09/18 16:05	04/10/18 08:55

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Instrument ID: A8_N Analysis Batch Number: 217453

Lab Sample ID: IC 320-217453/3 Client Sample ID: _____

Date Analyzed: 04/11/18 11:45 Lab File ID: 2018.04.11_537ICALB_004.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.10	Peak assignment corrected	westendor fc	04/11/18 12:31

Lab Sample ID: IC 320-217453/4 Client Sample ID: _____

Date Analyzed: 04/11/18 11:50 Lab File ID: 2018.04.11_537ICALB_005.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.10	Peak assignment corrected	westendor fc	04/11/18 12:31

Lab Sample ID: IC 320-217453/5 Client Sample ID: _____

Date Analyzed: 04/11/18 11:55 Lab File ID: 2018.04.11_537ICALB_006.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.11	Peak assignment corrected	westendor fc	04/11/18 12:31

Lab Sample ID: IC 320-217453/6 ICISAV Client Sample ID: _____

Date Analyzed: 04/11/18 11:59 Lab File ID: 2018.04.11_537ICALB_007.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.10	Peak assignment corrected	westendor fc	04/11/18 12:31

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Instrument ID: A8_N Analysis Batch Number: 217453

Lab Sample ID: IC 320-217453/7 Client Sample ID: _____

Date Analyzed: 04/11/18 12:04 Lab File ID: 2018.04.11_537ICALB_008.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.10	Peak assignment corrected	westendor fc	04/11/18 12:31

Lab Sample ID: IC 320-217453/8 Client Sample ID: _____

Date Analyzed: 04/11/18 12:09 Lab File ID: 2018.04.11_537ICALB_009.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.09	Peak assignment corrected	westendor fc	04/11/18 12:31

Lab Sample ID: CCVL 320-217453/10 Client Sample ID: _____

Date Analyzed: 04/11/18 12:18 Lab File ID: 2018.04.11_537ICALB_011.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.10	Peak assignment corrected	westendor fc	04/11/18 12:32

Lab Sample ID: ICV 320-217453/12 Client Sample ID: _____

Date Analyzed: 04/11/18 12:27 Lab File ID: 2018.04.11_537ICALB_013.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.10	Peak assignment corrected	westendor fc	04/11/18 12:35

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Instrument ID: A8_N Analysis Batch Number: 219239

Lab Sample ID: CCVL 320-219239/1 Client Sample ID: _____

Date Analyzed: 04/21/18 17:22 Lab File ID: 2018.04.21_537A_004.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.12	Peak assignment corrected	roycea	04/23/18 09:05

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Instrument ID: A8_N Analysis Batch Number: 219245

Lab Sample ID: CCV 320-219245/1 CCVIS Client Sample ID: _____

Date Analyzed: 04/21/18 19:28 Lab File ID: 2018.04.21_537A_031.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.11	Peak assignment corrected	roycea	04/23/18 09:10

Lab Sample ID: LCS 320-218546/2-A Client Sample ID: _____

Date Analyzed: 04/21/18 19:42 Lab File ID: 2018.04.21_537A_034.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.09	Peak assignment corrected	roycea	04/23/18 09:10

Lab Sample ID: LCSD 320-218546/3-A Client Sample ID: _____

Date Analyzed: 04/21/18 19:46 Lab File ID: 2018.04.21_537A_035.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.10	Peak assignment corrected	roycea	04/23/18 09:10

Lab Sample ID: 320-37999-1 Client Sample ID: NAWC-040918-RW-359

Date Analyzed: 04/21/18 19:51 Lab File ID: 2018.04.21_537A_036.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.10	Peak assignment corrected	barnettj	04/23/18 10:39

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Instrument ID: A8_N Analysis Batch Number: 219245

Lab Sample ID: 320-37999-3 Client Sample ID: WGNA-040918-RW-4848

Date Analyzed: 04/21/18 20:00 Lab File ID: 2018.04.21_537A_038.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorobutanesulfonic acid (PFBS)	1.39	Missed Peak	barnettj	04/23/18 10:40
Perfluoroheptanoic acid (PFHpA)	1.67	Missed Peak	barnettj	04/23/18 10:40
Perfluorohexanesulfonic acid (PFHxS)	1.67	Missed Peak	barnettj	04/23/18 10:40
Perfluorooctanesulfonic acid (PFOS)	2.10	Peak assignment corrected	barnettj	04/23/18 10:40

Lab Sample ID: CCV 320-219245/10 CCVIS Client Sample ID: _____

Date Analyzed: 04/21/18 20:10 Lab File ID: 2018.04.21_537A_040.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.10	Peak assignment corrected	barnettj	04/23/18 10:38

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-37999-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration					
					Reagent ID	Volume Added							
LC537-HSP_00029	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						
LC537-ICV_00030	07/30/18	02/15/18	MeOH/H2O, Lot 067374	10 mL	LC537-IS_00059	1000 uL	13C2-PFOA	10 ng/mL					
							13C4 PFOS	28.68 ng/mL					
					.LC537-IS_00059	07/30/18	01/30/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
									LCMPFOS_00021	180 uL	13C4 PFOS	0.2868 ug/mL	
						(Purchased Reagent)	13C2-PFOA	50 ug/mL					
						(Purchased Reagent)	13C4 PFOS	47.8 ug/mL					
LC537-ICV_00030	07/30/18	02/15/18	MeOH/H2O, Lot 067374	10 mL	LC537-SU_00059	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_00059	07/30/18	01/30/18	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.: 320-37999-1

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
LC537-IS_00067	10/10/18	04/10/18	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-L1_00022	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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-37999-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorohexanesulfonic acid (PFHxS)	3.003 ng/mL
							Perfluorononanoic acid (PFNA)	1.98 ng/mL
							Perfluorooctanoic acid (PFOA)	1.98 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	3.95328 ng/mL
.LC537-IS_00065	10/02/18	04/02/18	Methanol, Lot 090285	30000 uL	LC537-SU_00064	500 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/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
LC537-L2_00022	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
		13C4 PFOS	28.68 ng/mL					
LC537-SU_00064	2 mL	13C2 PFDA	10 ng/mL					

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-37999-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LC537-HSP_00028	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	849 uL	13C2 PFHxA	10 ng/mL
					LCPFHpA_00009	81 uL	Perfluorobutanesulfonic acid (PFBS)	1250.86 ng/mL
					LCPFHxS-br_00005	277 uL	Perfluoroheptanoic acid (PFHpA)	135 ng/mL
					LCPFNA_00009	165 uL	Perfluorohexanesulfonic acid (PFHxS)	420.117 ng/mL
					LCPFOA_00010	165 uL	Perfluorononanoic acid (PFNA)	275 ng/mL
LCPFOS-br_00005	355 uL	Perfluorooctanoic acid (PFOA)	275 ng/mL					
..LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	549.067 ng/mL
..LCPFHpA_00009	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFHxS-br_00005	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 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
..LCPFOS-br_00005	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	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
					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
LC537-L3_00025	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
LC537-SU_00064	2 mL	13C4 PFOS	28.68 ng/mL					
.LC537-HSP_00028	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	849 uL	13C2 PFDA	10 ng/mL
					LCPFHpA_00009	81 uL	13C2 PFHxA	10 ng/mL
					LCPFHxS-br_00005	277 uL	13C2 PFHxA	10 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-37999-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					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
LC537-L4_00022	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
					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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-37999-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..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
LC537-L5_00026	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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-37999-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration		
					Reagent ID	Volume Added				
..LCPFOS-br_00005	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		
LC537-L6_00022	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-IS_00065	500 uL	13C2-PFOA	10 ng/mL		
							13C4 PFOS	28.68 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		
..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		

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

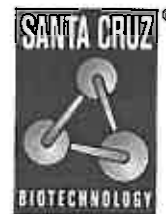
SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..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
LC537-SU_00066	10/10/18	04/10/18	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

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

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

LC537_PFHxS2_00002

n: 6-E-17SKV

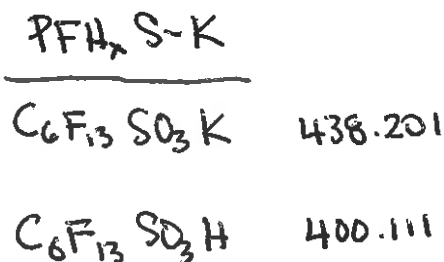


The Future is Custom

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 = $\frac{400.11}{438.201} = 0.91307$ PFH₂S
 cas# 355-46-4

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

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Reagent

LC537_PFN2_00002

17.6.14.17 SW

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: C₉HF₁₇O₂
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

LC537_PFOA2_00002

Certificate of analysis

P: 6/9/17 

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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Reagent

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

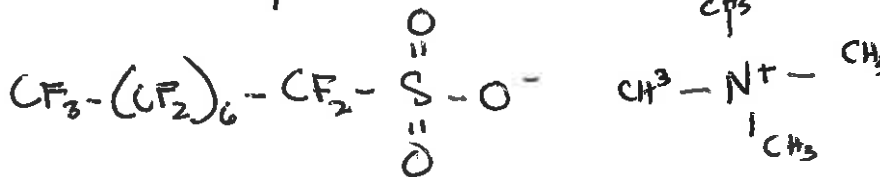
TEST	SPECIFICATION	RESULT
APPEARANCE (COLOR)	WHITE TO OFF WHITE	OFF-WHITE
APPEARANCE (FORM)	POWDER OR POWDER WITH CHUNK(S)	POWDER
CARBON CONTENT	29.77 % - 31.29 %	29.97 %
INFRARED SPECTRUM	CONFORMS TO STRUCTURE	CONFORMS

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

LCM2PFOA_00007



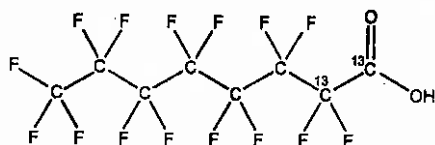
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2PFOA
COMPOUND: Perfluoro-n-[1,2-¹³C₂]octanoic acid

LOT NUMBER: M2PFOA0216

STRUCTURE:
CAS #: Not available



MOLECULAR FORMULA: ¹³C₂¹²C₆HF₁₆O₂
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 416.05
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 02/12/2016
EXPIRY DATE: (mm/dd/yyyy) 02/12/2021

ISOTOPIC PURITY: ≥99% ¹³C
(1,2-¹³C₂)

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:

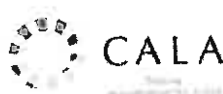
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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.

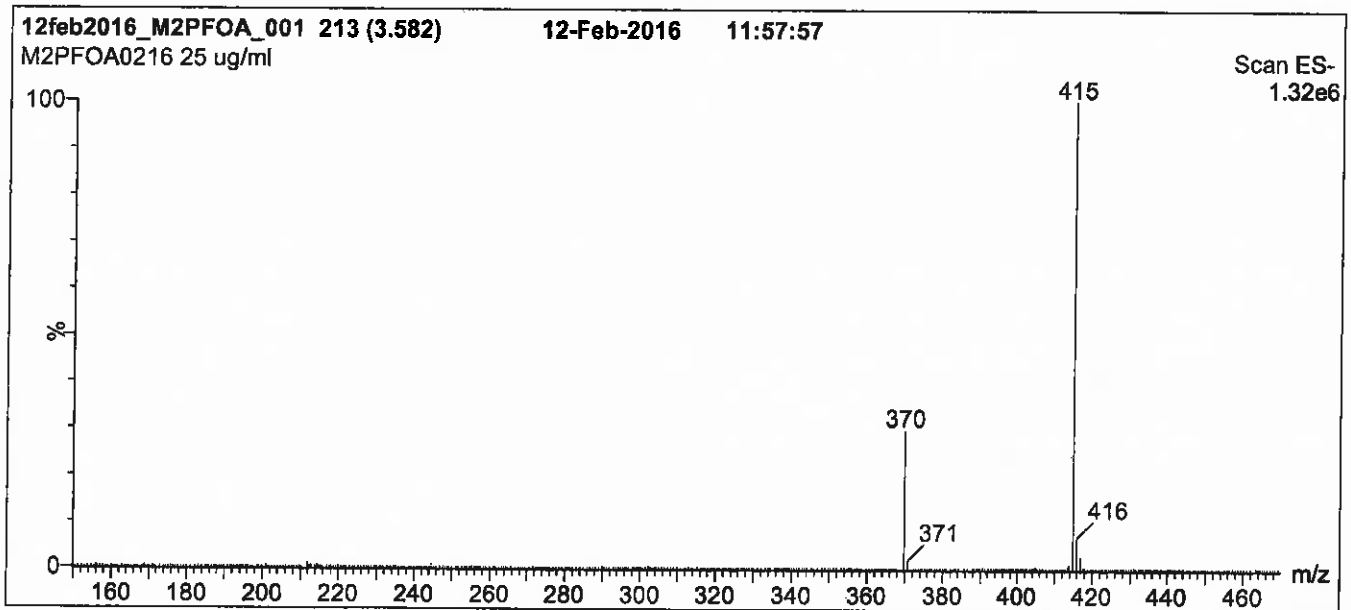
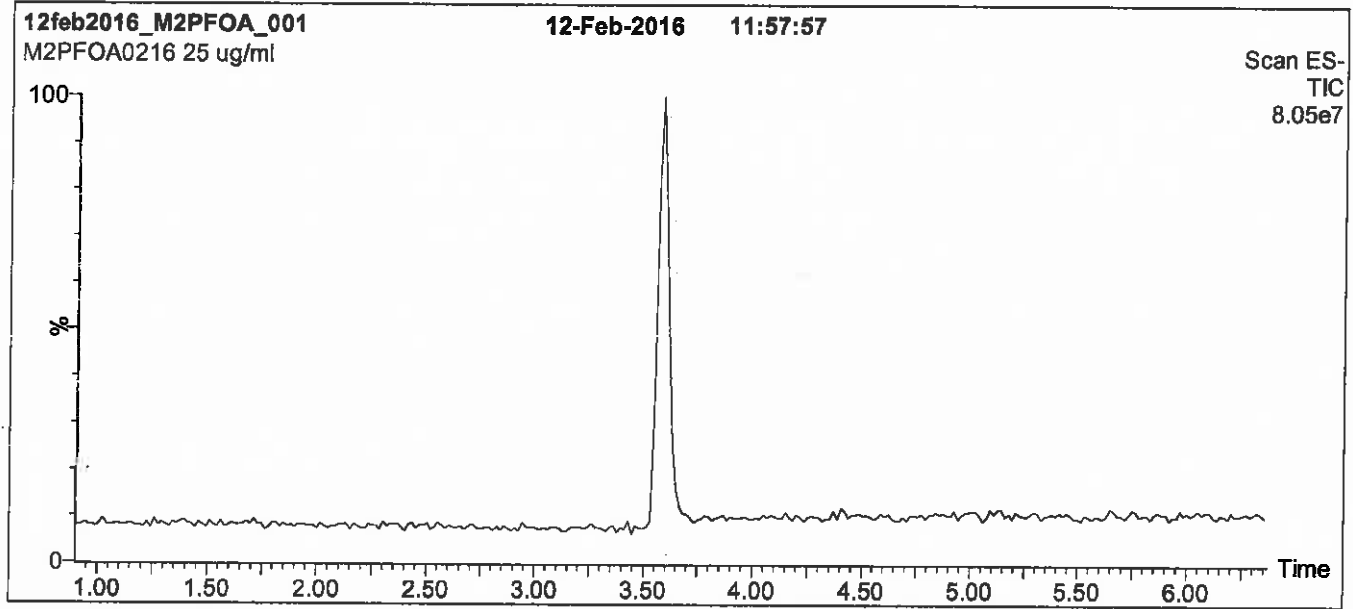
QUALITY MANAGEMENT:

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 or contact us directly at 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

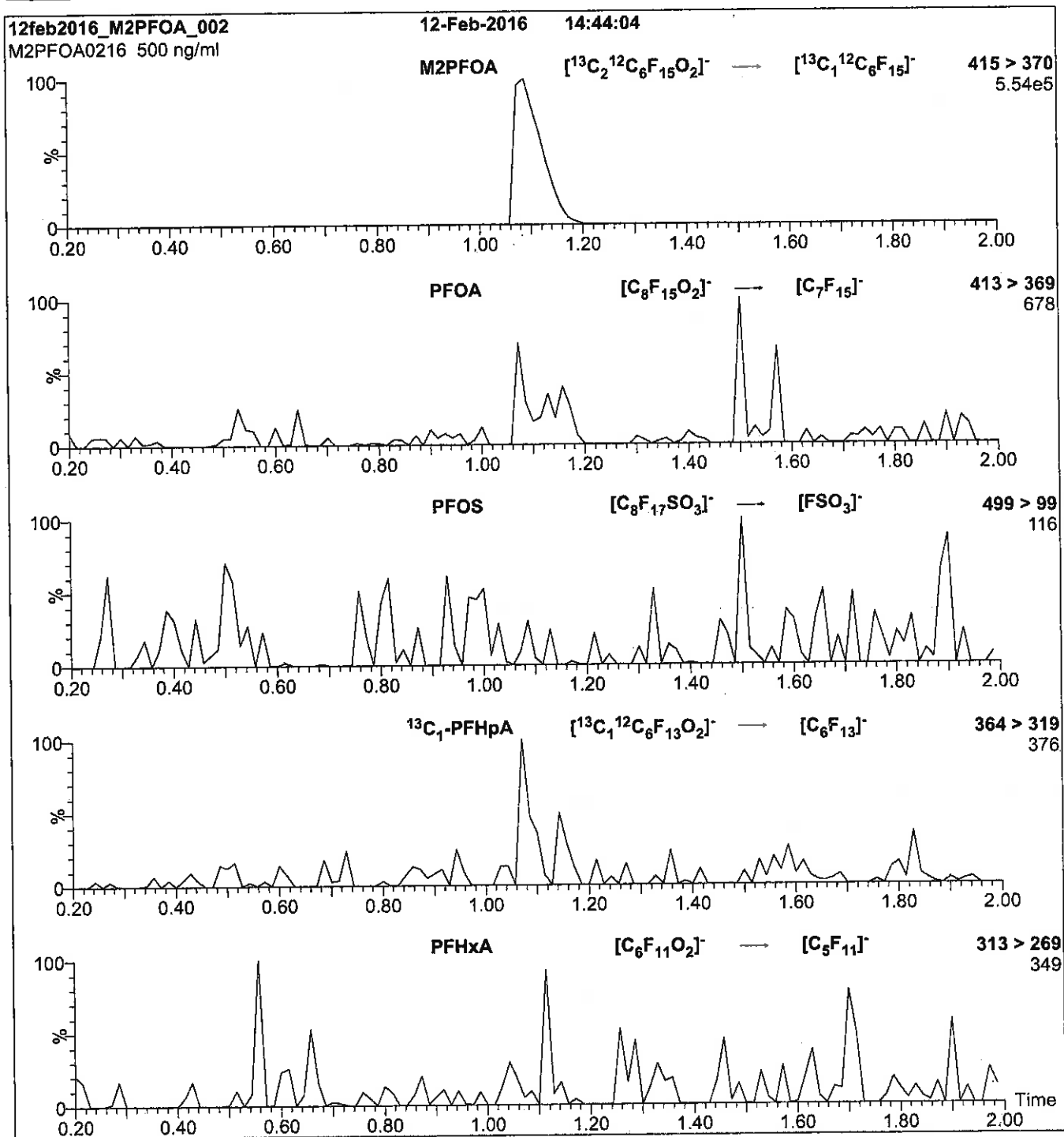
Flow: 300 μ l/min

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 μl (500 ng/ml M2PFOA)

Mobile phase: Isocratic 80% MeOH / 20% H₂O

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

MS Parameters

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

Reagent

LCM2PFOA_00010

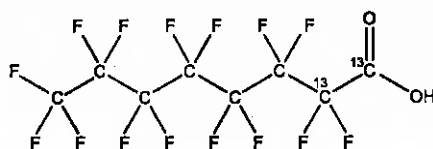


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2PFOA **LOT NUMBER:** M2PFOA0216
COMPOUND: Perfluoro-n-[1,2-¹³C₂]octanoic acid

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₂¹²C₈HF₁₆O₂
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 416.05
SOLVENT(S): Methanol
 Water (<1%)

CHEMICAL PURITY: >98%

ISOTOPIC PURITY: ≥99%¹³C
 (1,2-¹³C₂)

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:

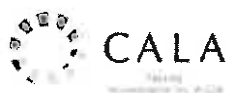
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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.

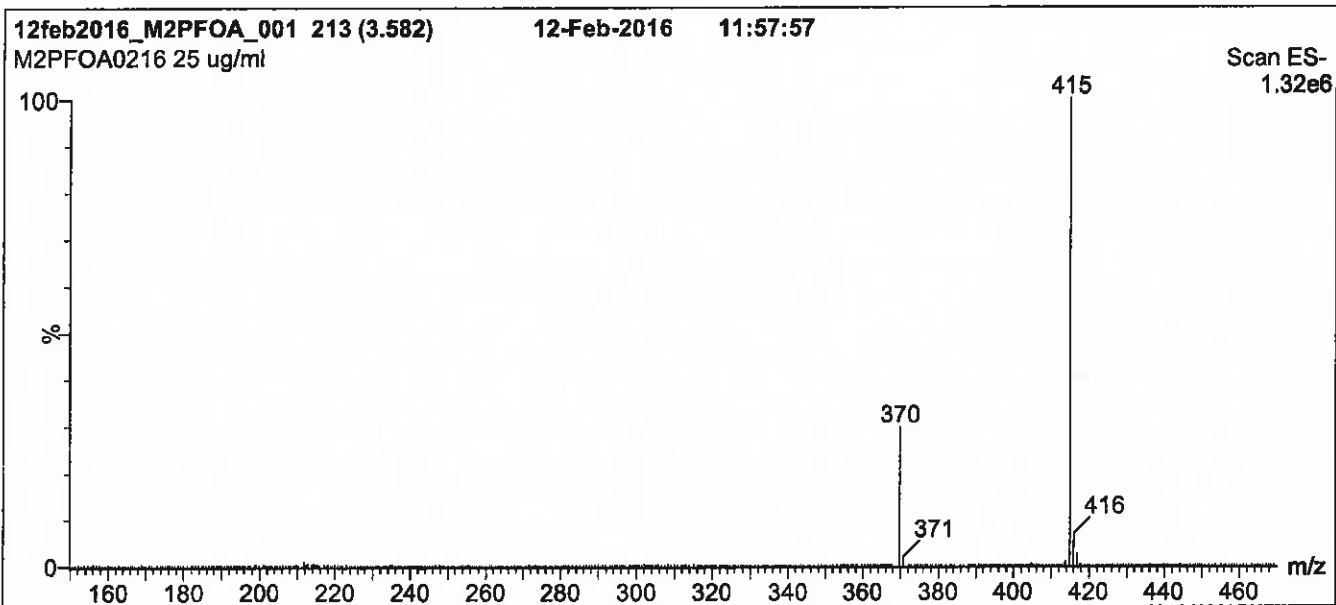
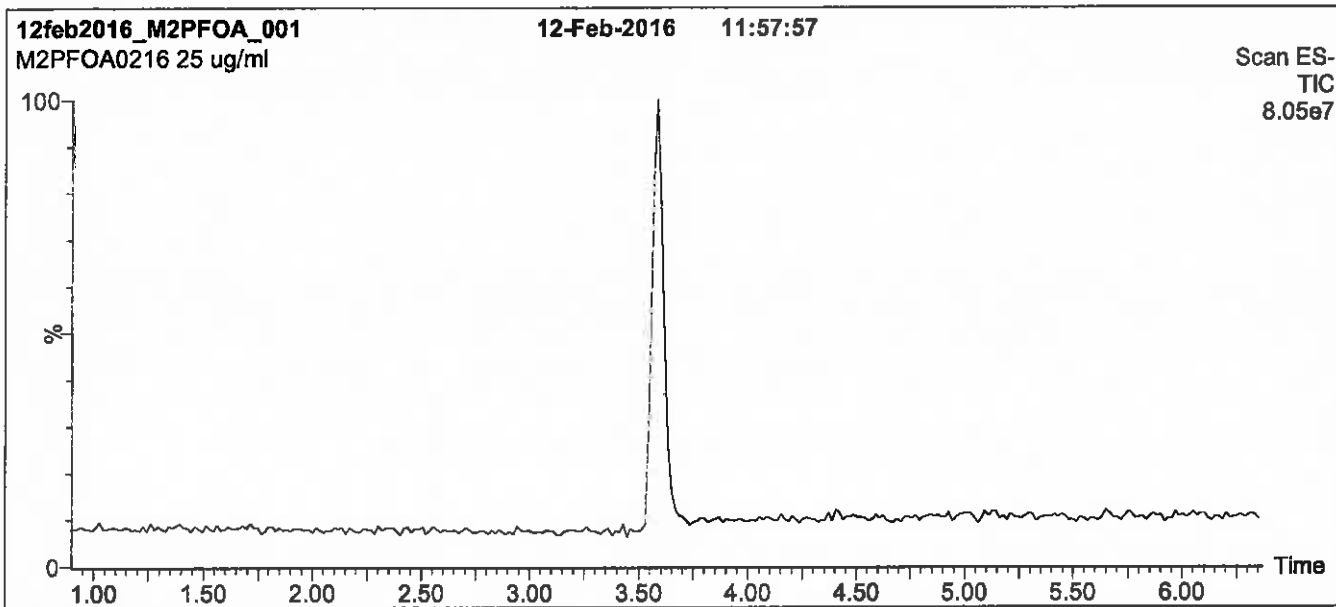
QUALITY MANAGEMENT:

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).



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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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc 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

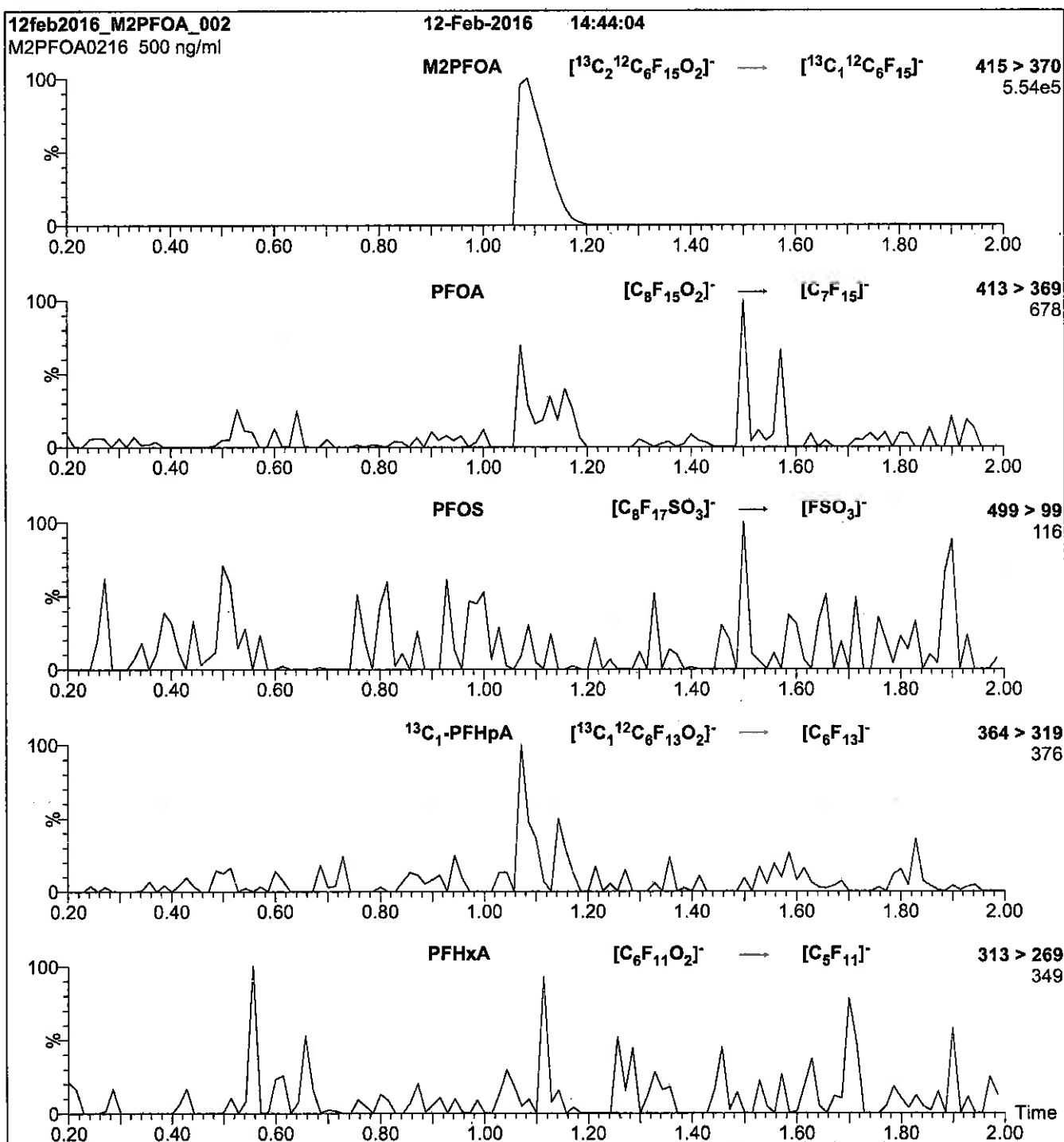
Flow: 300 μ l/min

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 μl (500 ng/ml M2PFOA)

Mobile phase: Isocratic 80% MeOH / 20% H_2O

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

MS Parameters

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

Reagent

LCMPFDA_00012

R: SBC 12/21/16



814255

ID: LCMFDA_00012

Exp: 09/30/21 Prpd: SBC

13C2-Perfluorodecanoic a

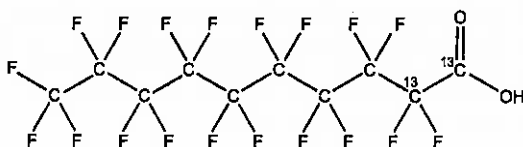


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFDA **LOT NUMBER:** MPFDA0916
COMPOUND: Perfluoro-n-[1,2-¹³C₂]decanoic acid

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₂¹²C₈HF₁₉O₂
CONCENTRATION: 50 ± 2.5 µg/ml

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

CHEMICAL PURITY: >98%

ISOTOPIC PURITY: ≥99% ¹³C
(1,2-¹³C₂)

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

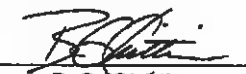
DOCUMENTATION/ DATA ATTACHED:

- 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 ¹³C₁-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: 
B.G. Chrftim **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:

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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:

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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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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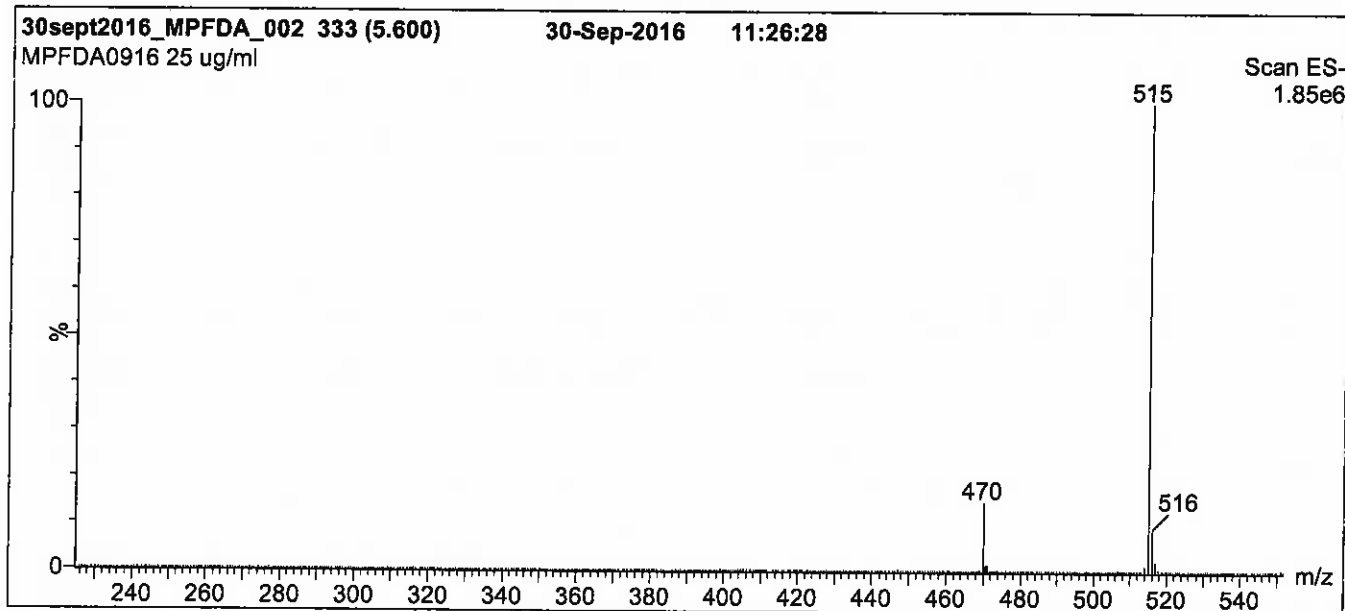
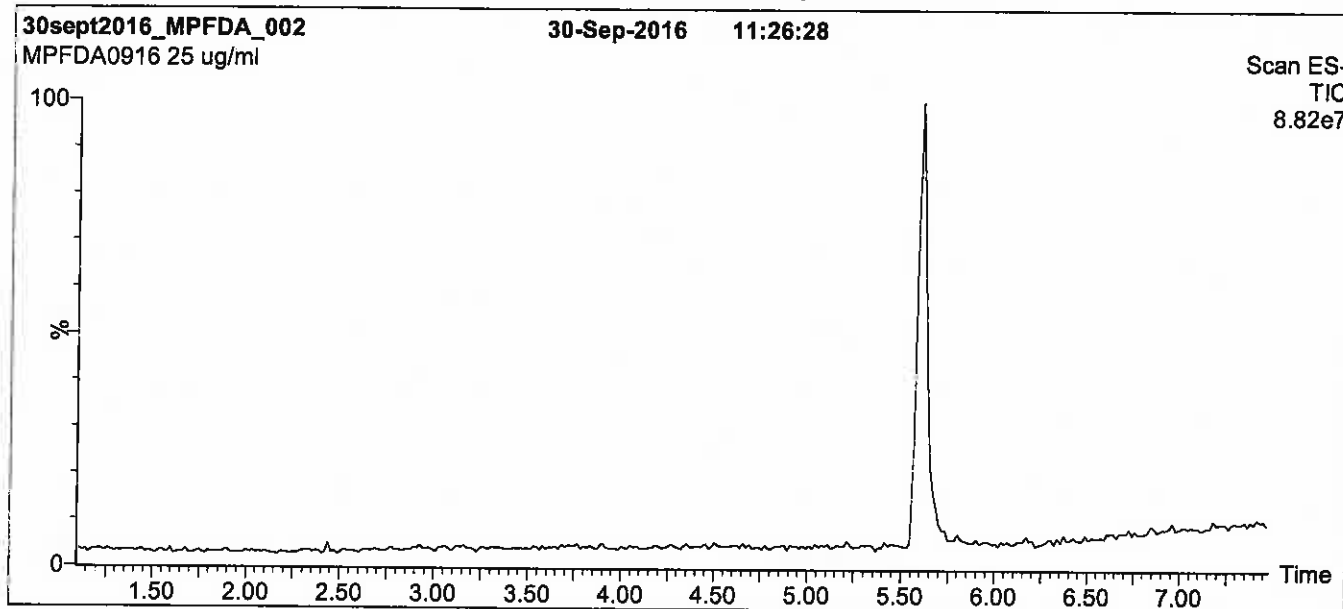
QUALITY MANAGEMENT:

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).



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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 RP₁₈
1.7 μ m, 2.1 x 100 mm

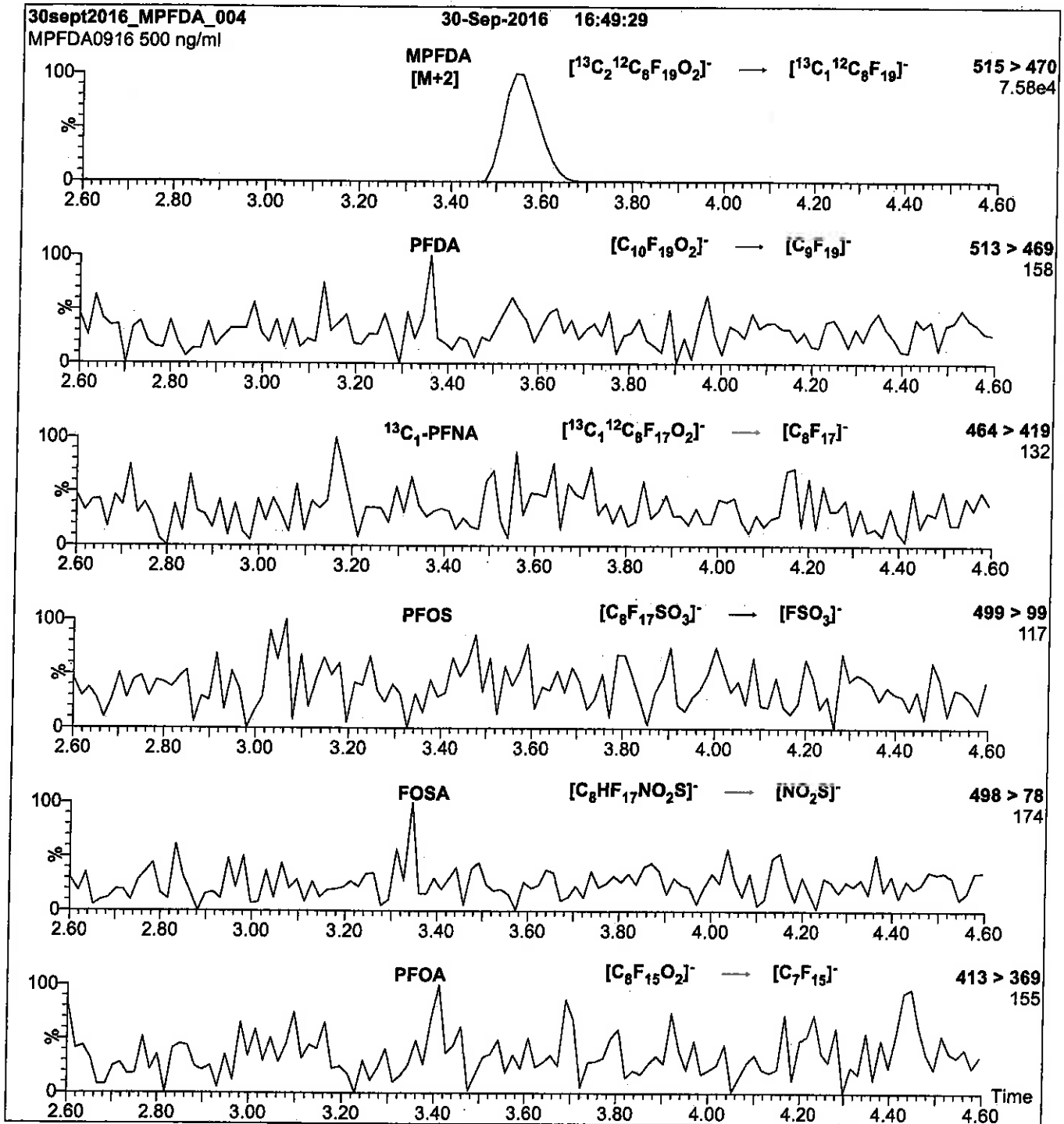
Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 μ 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 μ l (500 ng/ml MPFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCMPFHxA_00015

r: 5/17/17 SKJ

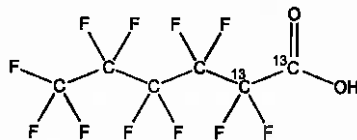


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFHxA **LOT NUMBER:** MPFHxA1116
COMPOUND: Perfluoro-n-[1,2-¹³C₂]hexanoic acid

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₂¹²C₄HF₁₁O₂ **MOLECULAR WEIGHT:** 316.04
CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol
 Water (<1%)
CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥99%¹³C
 (1,2-¹³C₂)
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

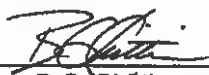
DOCUMENTATION/ DATA ATTACHED:

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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HAZARDS:

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EXPIRY DATE / PERIOD OF VALIDITY:

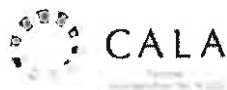
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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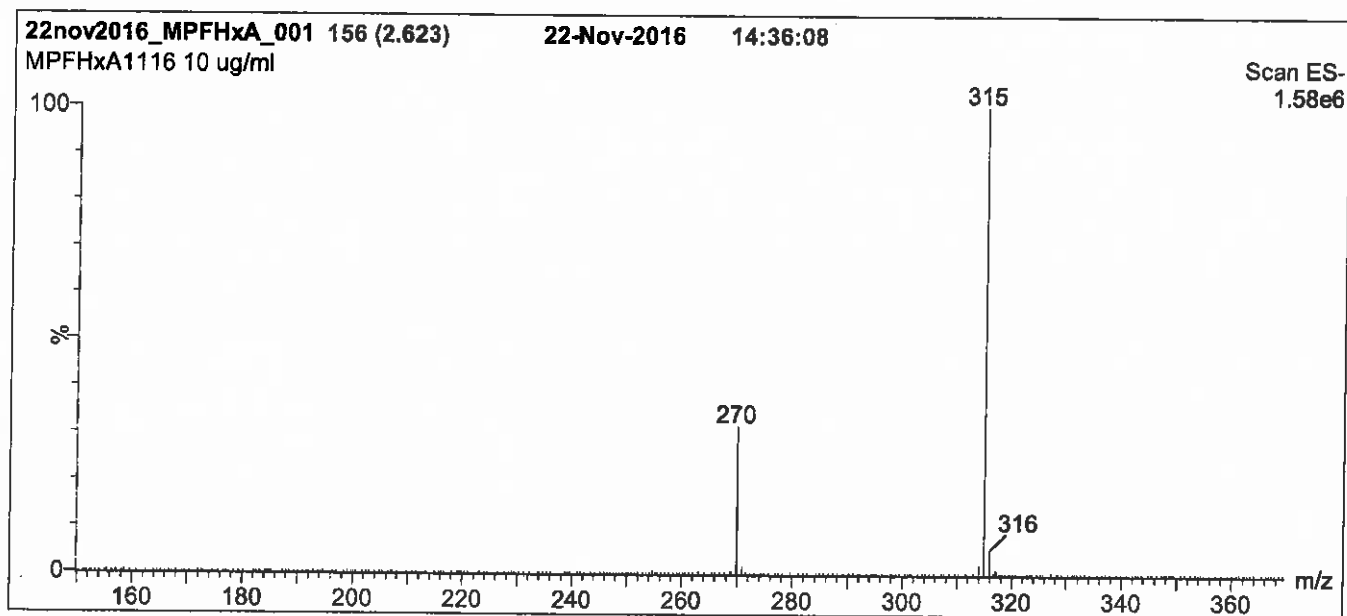
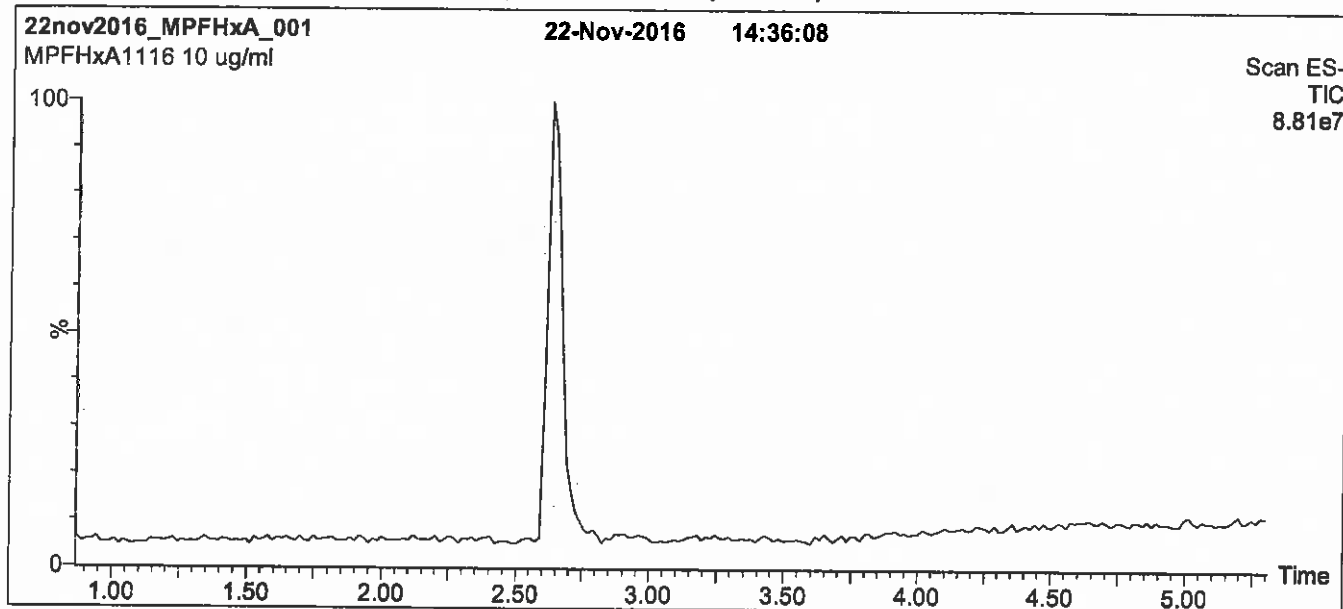
QUALITY MANAGEMENT:

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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

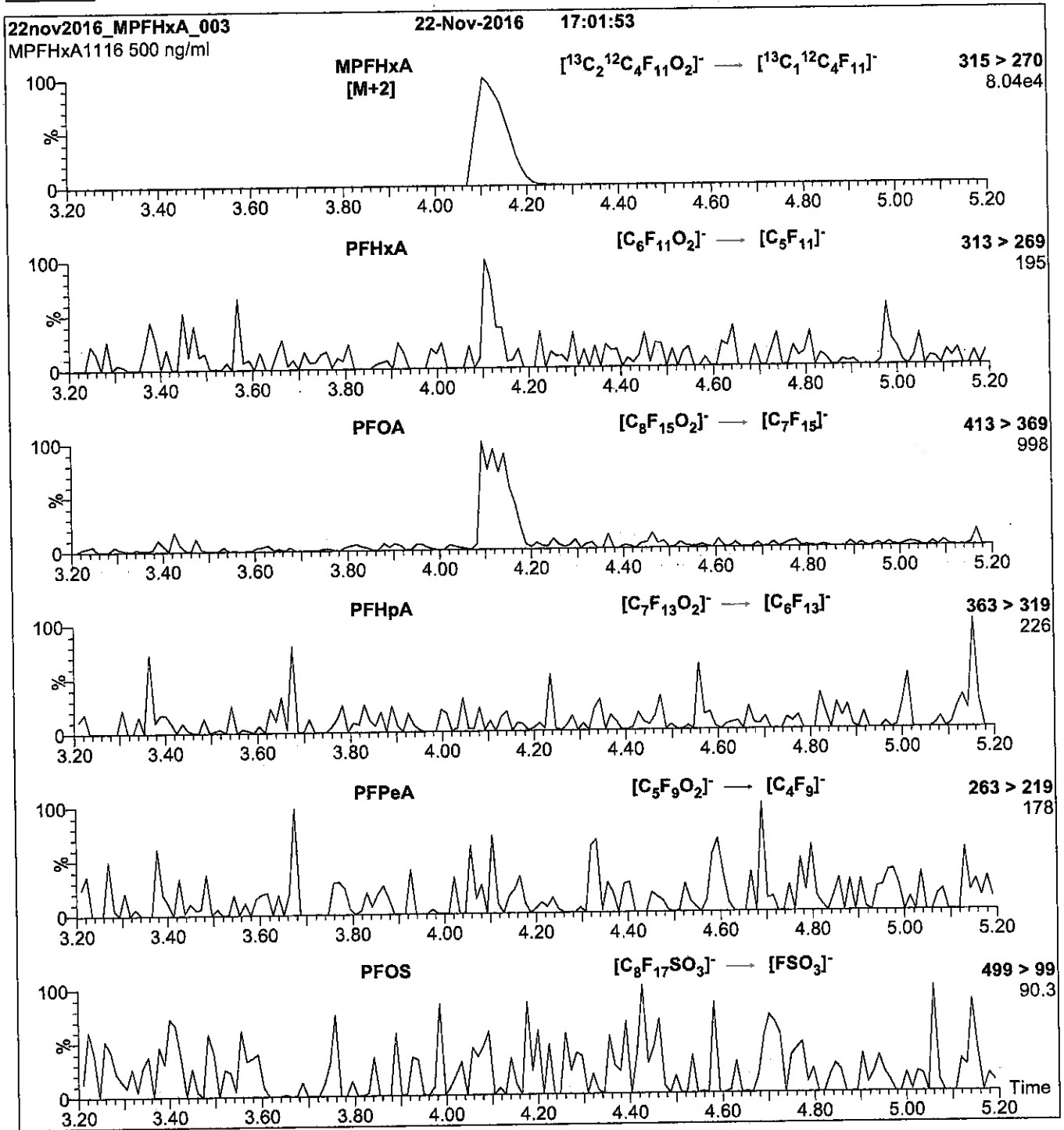
Column: Acquity UPLC BEH Shield RP_{II}
1.7 μ m, 2.1 x 100 mm
Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions over 0.5 min.
Time: 10 min

Flow: 300 μ 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 μ l (500 ng/ml MPFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
 (both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCMPFOS_00021

r: 5/6/17 skv

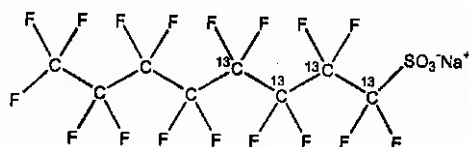


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFOS **LOT NUMBER:** MPFOS1216
COMPOUND: Sodium perfluoro-1-[1,2,3,4-¹³C₄]octanesulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₄¹²C₄F₁₇SO₃Na **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% ¹³C
LAST TESTED: (mm/dd/yyyy) 12/12/2016 (1,2,3,4-¹³C₄)
EXPIRY DATE: (mm/dd/yyyy) 12/12/2021
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 ~ 0.8% Sodium perfluoro-1-[1,2,3-¹³C₃]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: 
B.G. Chrifim **Date:** 12/14/2016
(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.

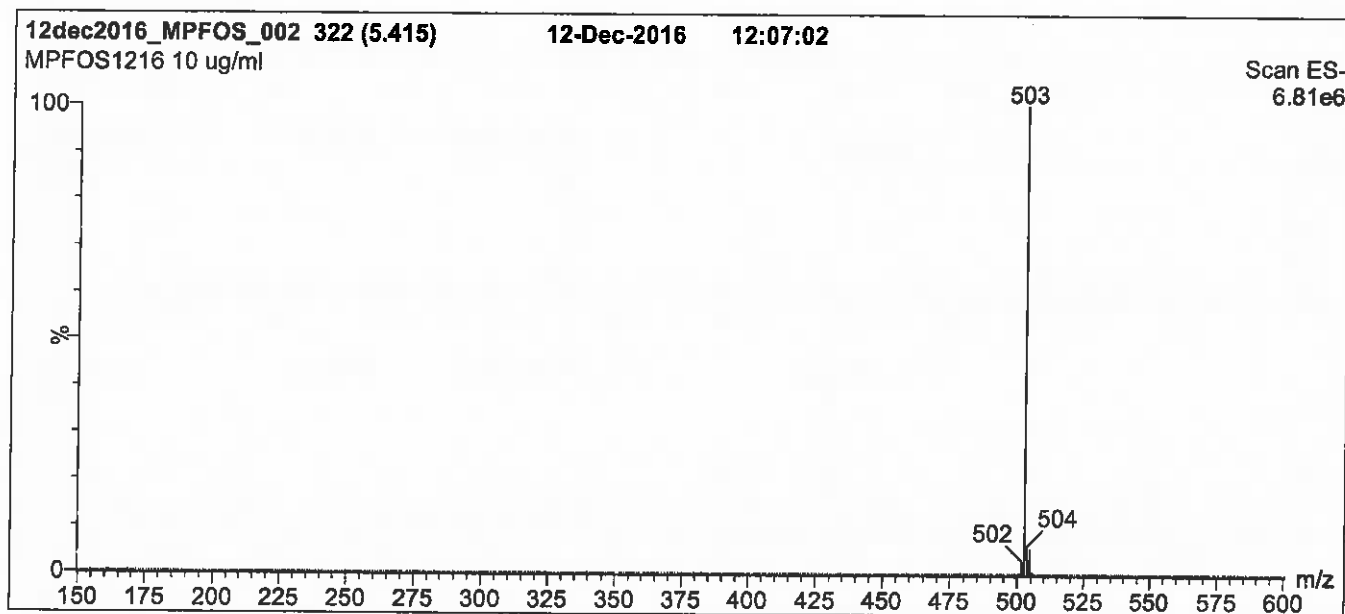
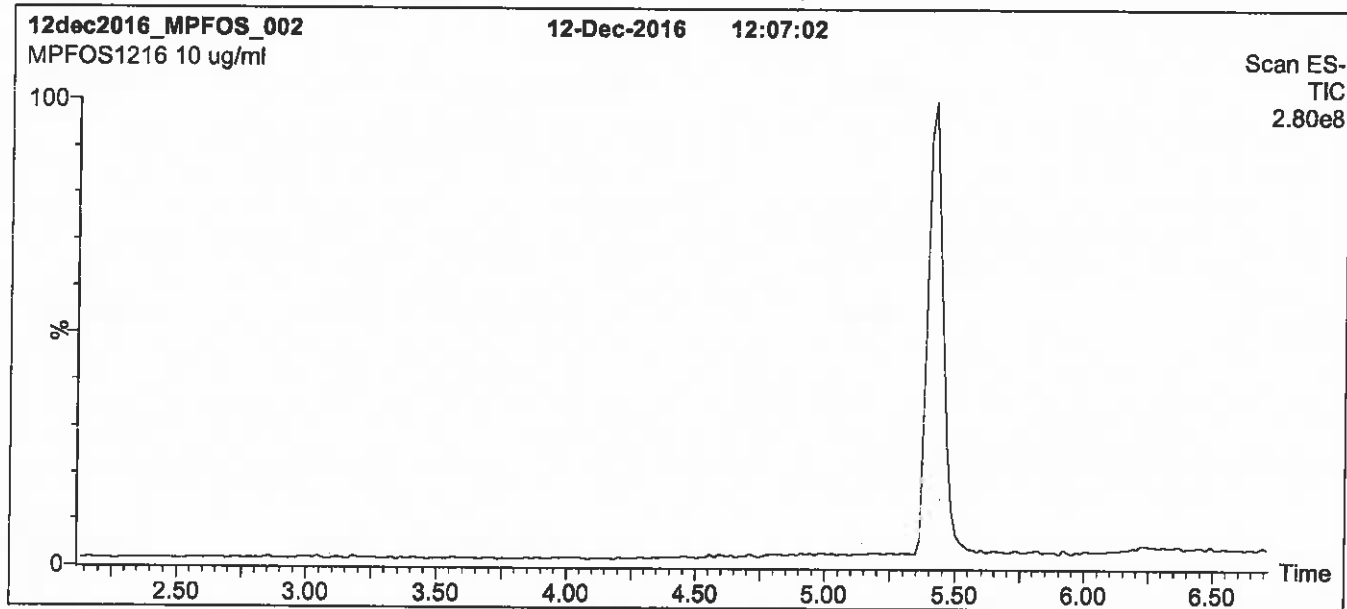
QUALITY MANAGEMENT:

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 or contact us directly at 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 85% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

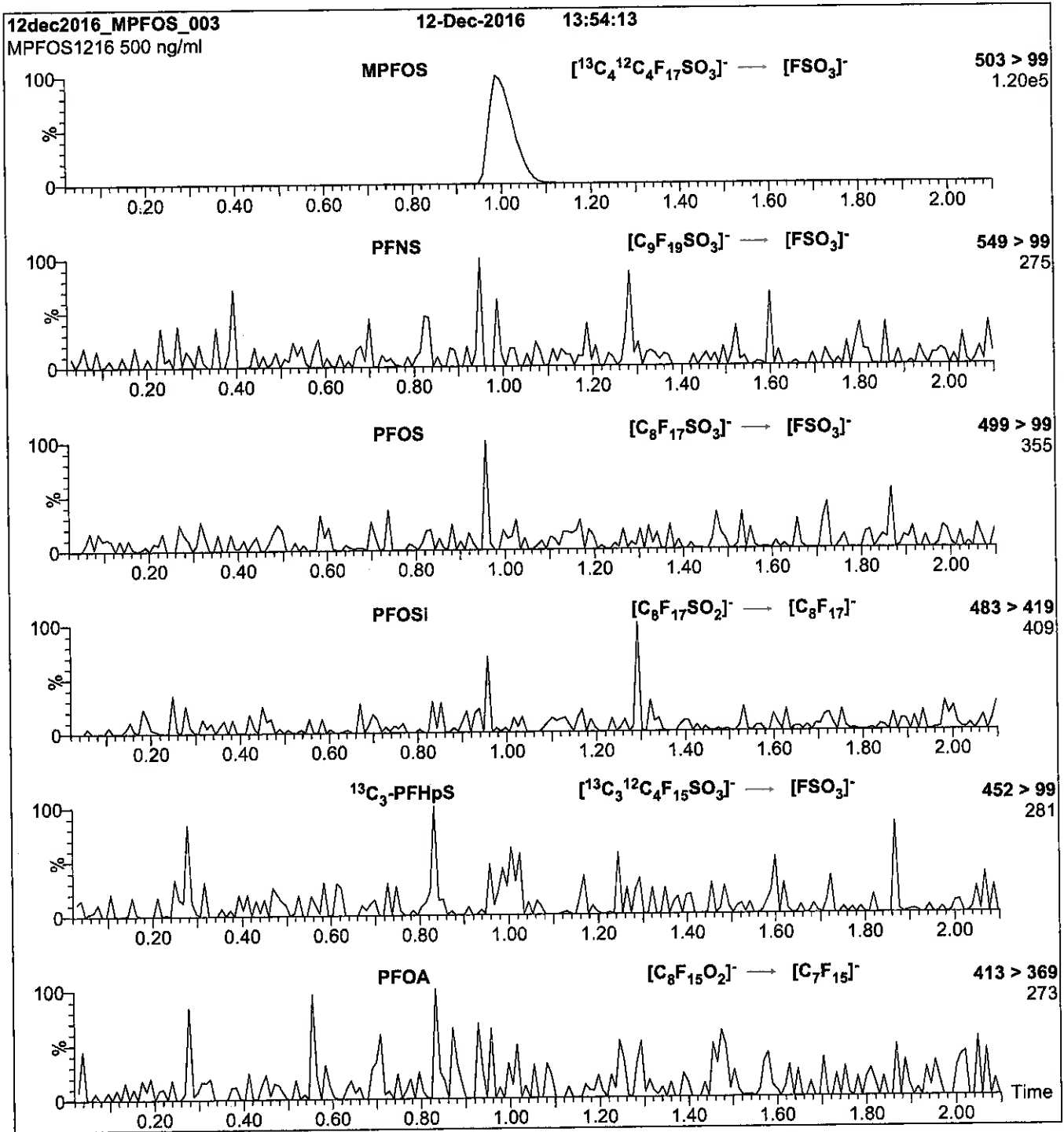
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 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 μl (500 ng/ml MPFOS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
 (both with 10 mM NH_4OAc buffer)

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

MS Parameters

Collision Gas (mbar) = 3.35e-3
 Collision Energy (eV) = 40

Reagent

LCMPFOS_00024

r: 8/2/17 SKJ

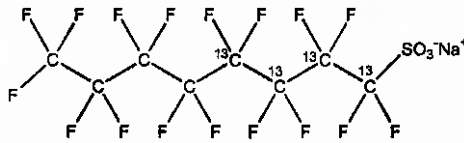


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFOS **LOT NUMBER:** MPFOS0517
COMPOUND: Sodium perfluoro-1-[1,2,3,4-¹³C₄]octanesulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	¹³ C ₄ ¹² C ₄ F ₁₇ SO ₃ Na	MOLECULAR WEIGHT:	526.08
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.8 ± 2.4 µg/ml (MPFOS anion)	SOLVENT(S):	Methanol
CHEMICAL PURITY:	>98%	ISOTOPIC PURITY:	≥99% ¹³ C (1,2,3,4- ¹³ C ₄)
LAST TESTED: (mm/dd/yyyy)	05/19/2017		
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-[1,2,3-¹³C₃]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

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.

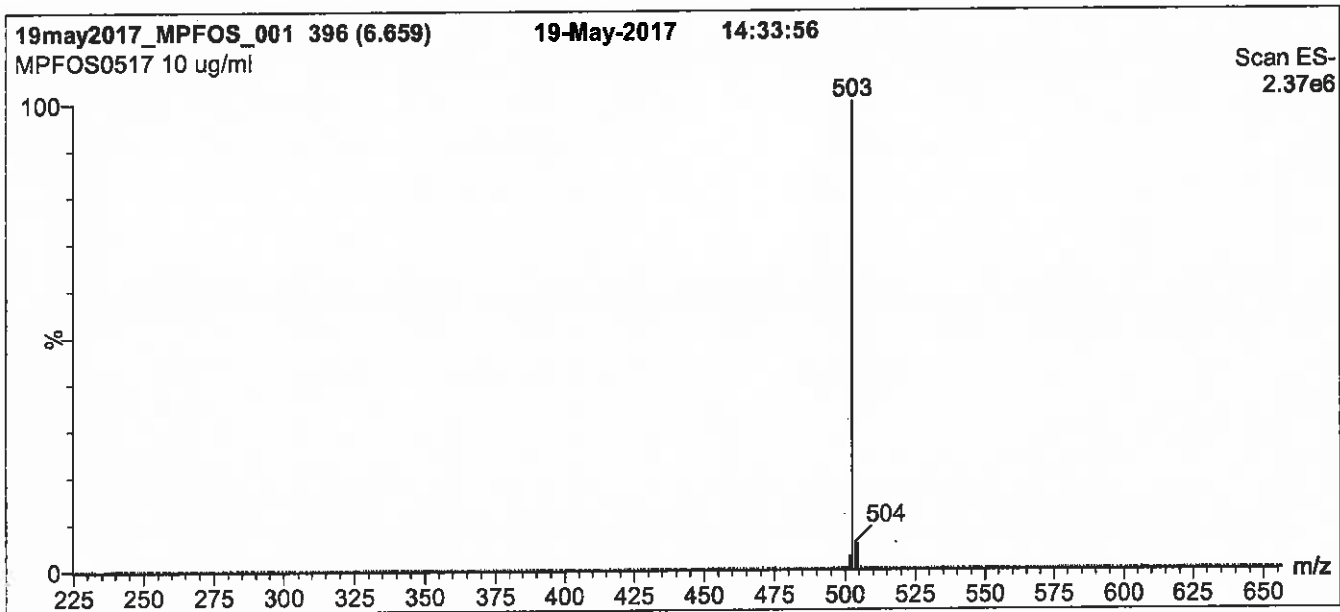
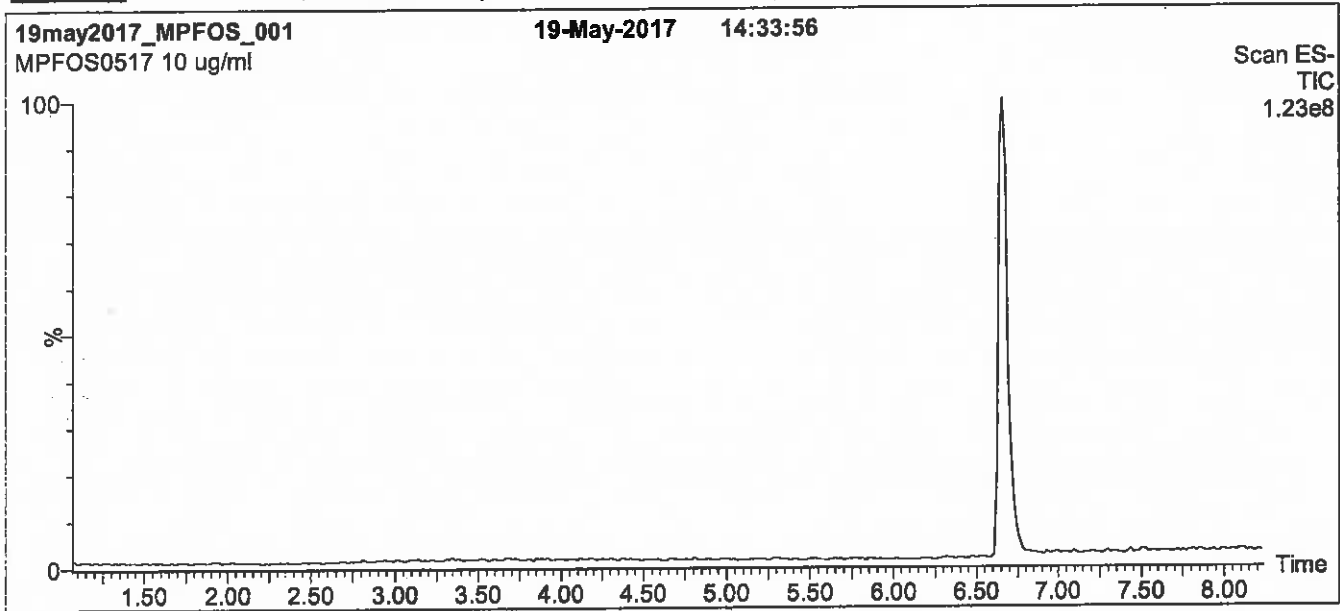
QUALITY MANAGEMENT:

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 or contact us directly at 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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc 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

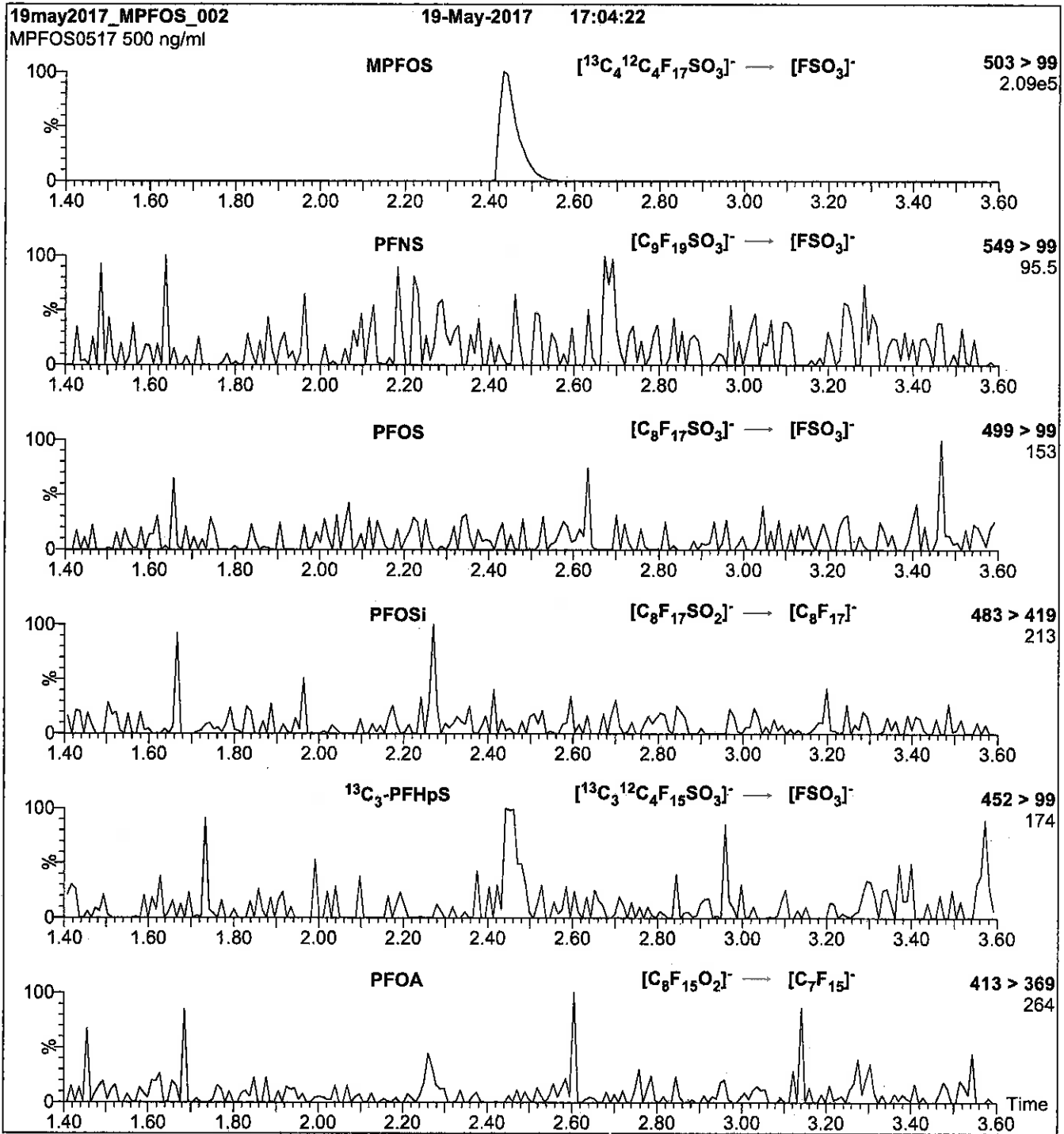
Flow: 300 μ l/min

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



Conditions for Figure 2:

Injection: Direct loop injection
 10 μl (500 ng/ml MPFOS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
 (both with 10 mM NH_4OAc buffer)

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

MS Parameters

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

Reagent

LCPFBSA_00002

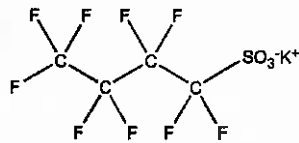
n: 12/17 SKW



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFBS **LOT NUMBER:** LPFBS1116
COMPOUND: Potassium perfluoro-1-butanesulfonate
STRUCTURE: **CAS #:** 29420-49-3



MOLECULAR FORMULA: C₄F₉SO₃K **MOLECULAR WEIGHT:** 338.19
CONCENTRATION: 50.0 ± 2.5 µg/ml (K salt) **SOLVENT(S):** Methanol
44.2 ± 2.2 µg/ml (PFBS anion)
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.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:  **Date:** 12/05/2016
B.G. Chittim (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:

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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:

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.

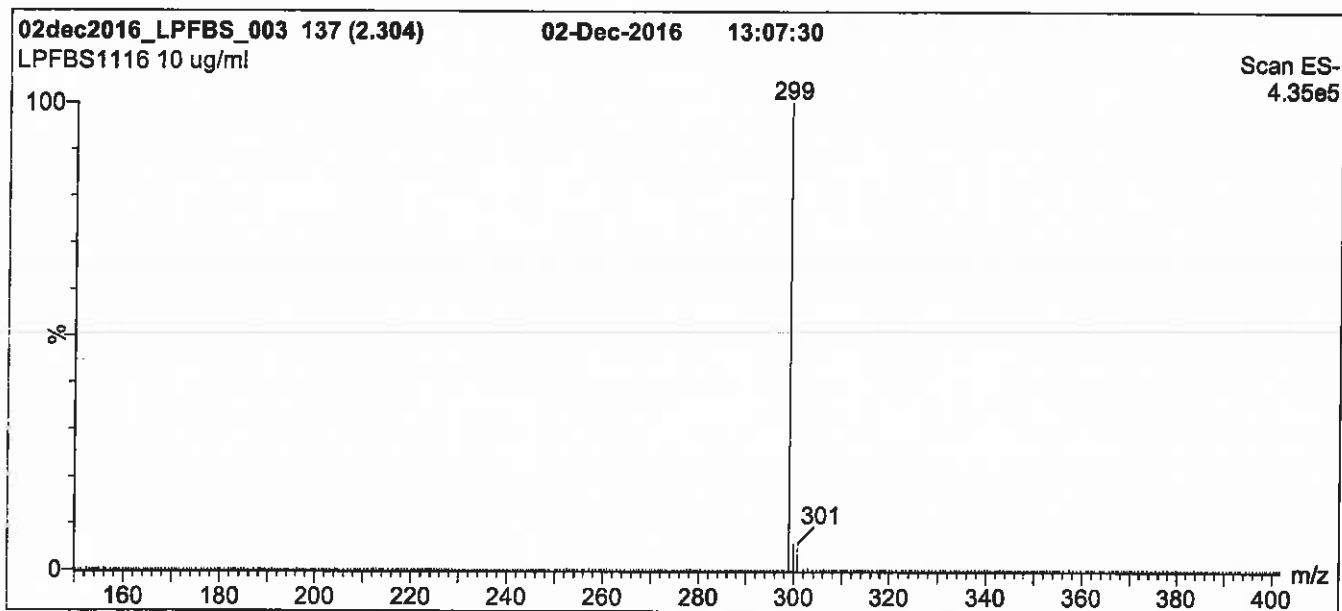
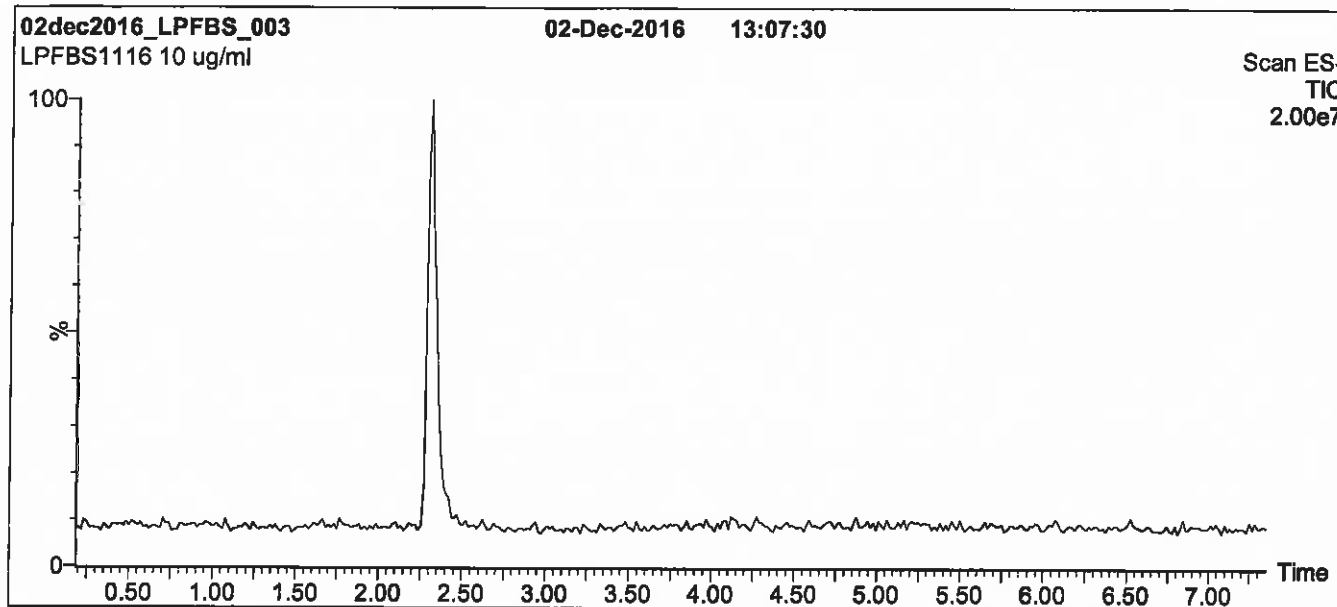
QUALITY MANAGEMENT:

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 RP₁₈,
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 40% (80:20 MeOH:ACN) / 60% H₂O
 (both with 10 mM NH₄OAc 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

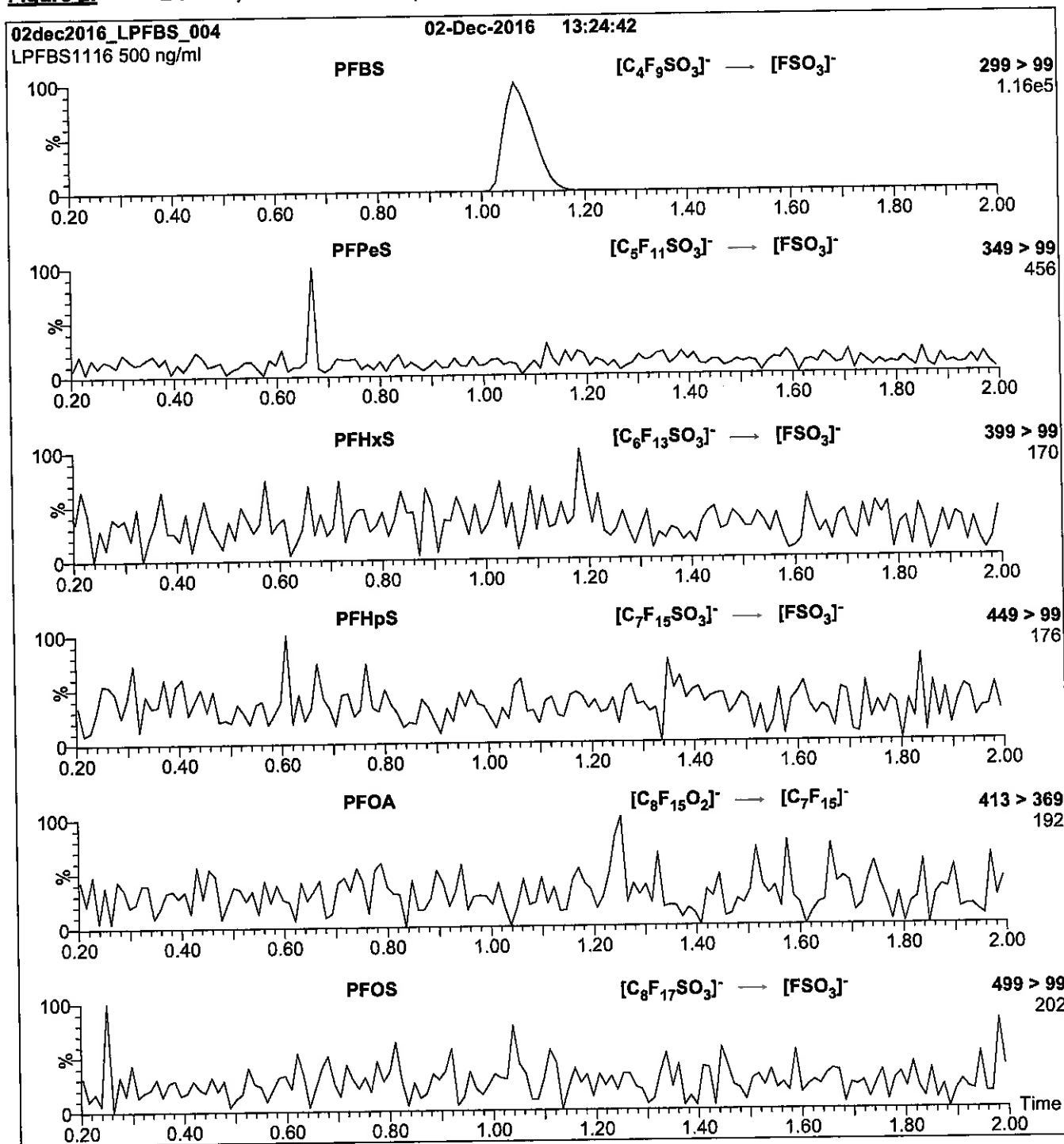
Flow: 300 μ l/min

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 μ l (500 ng/ml L-PFBS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
 (both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFHpA_00009

P: 9/21/17 SKJ



WELLINGTON LABORATORIES

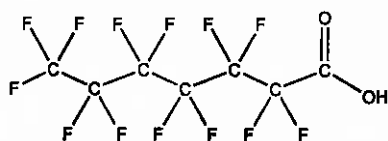
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: PFHpA1216

STRUCTURE:

CAS #: 375-85-9



MOLECULAR FORMULA: C₇HF₁₃O₂
CONCENTRATION: 50 ± 2.5 µg/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

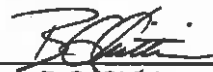
DOCUMENTATION/ DATA ATTACHED:

- 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:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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

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

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

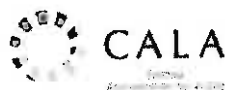
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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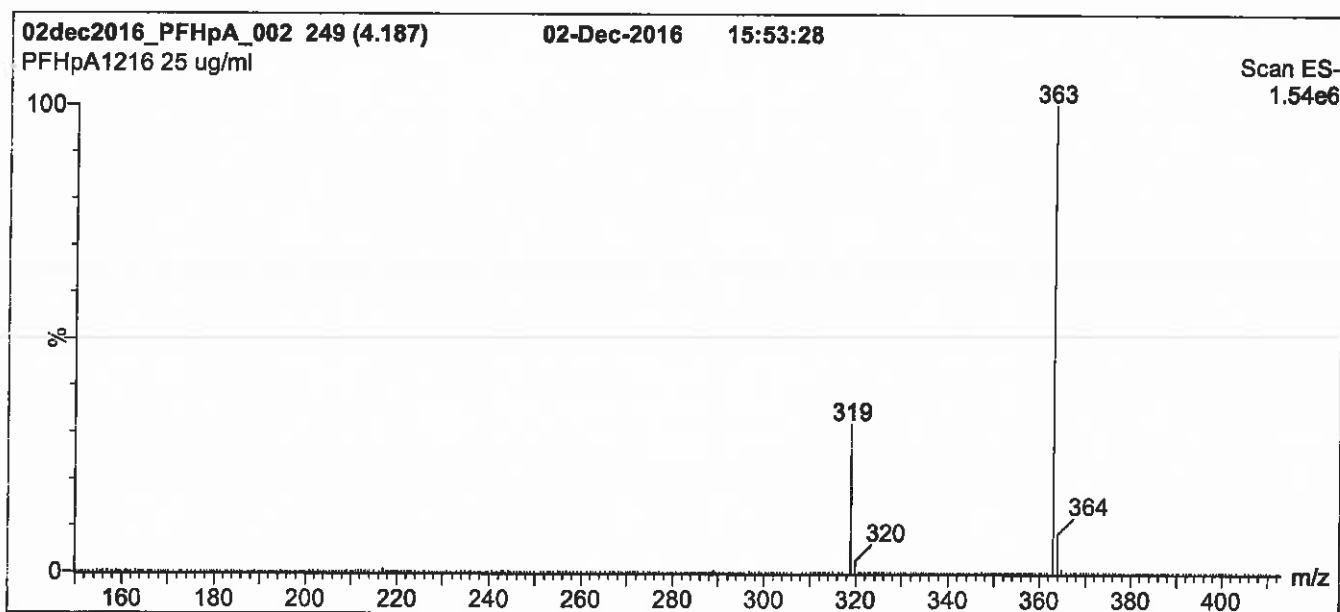
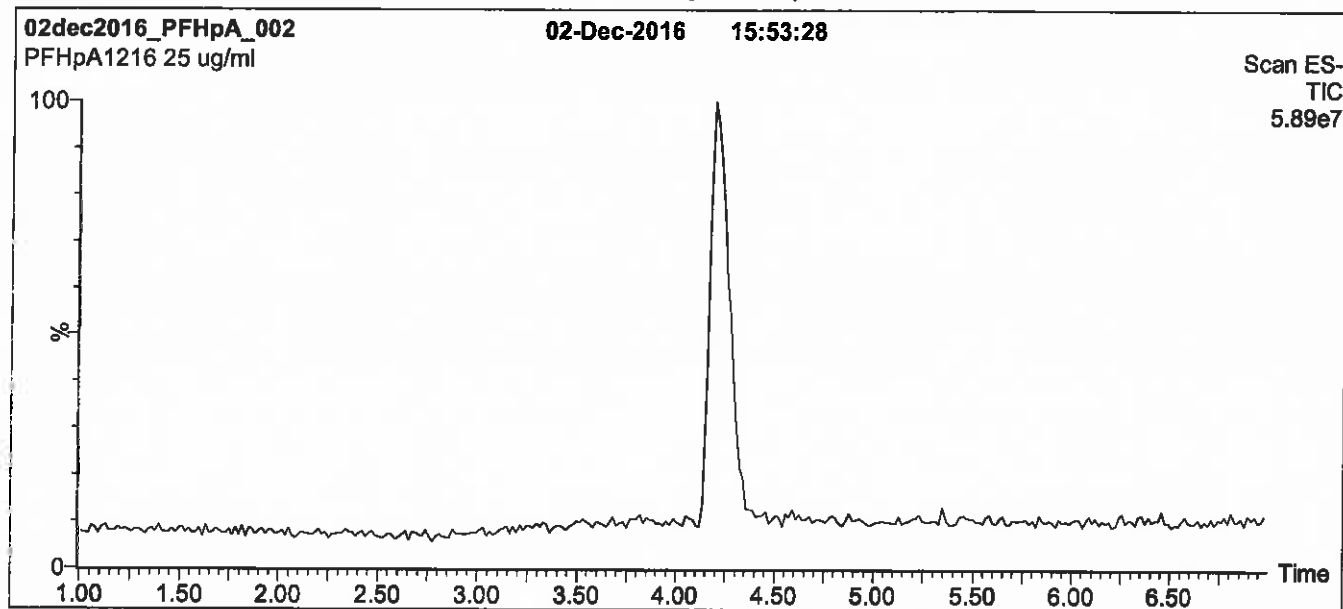
QUALITY MANAGEMENT:

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 or contact us directly at 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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc 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

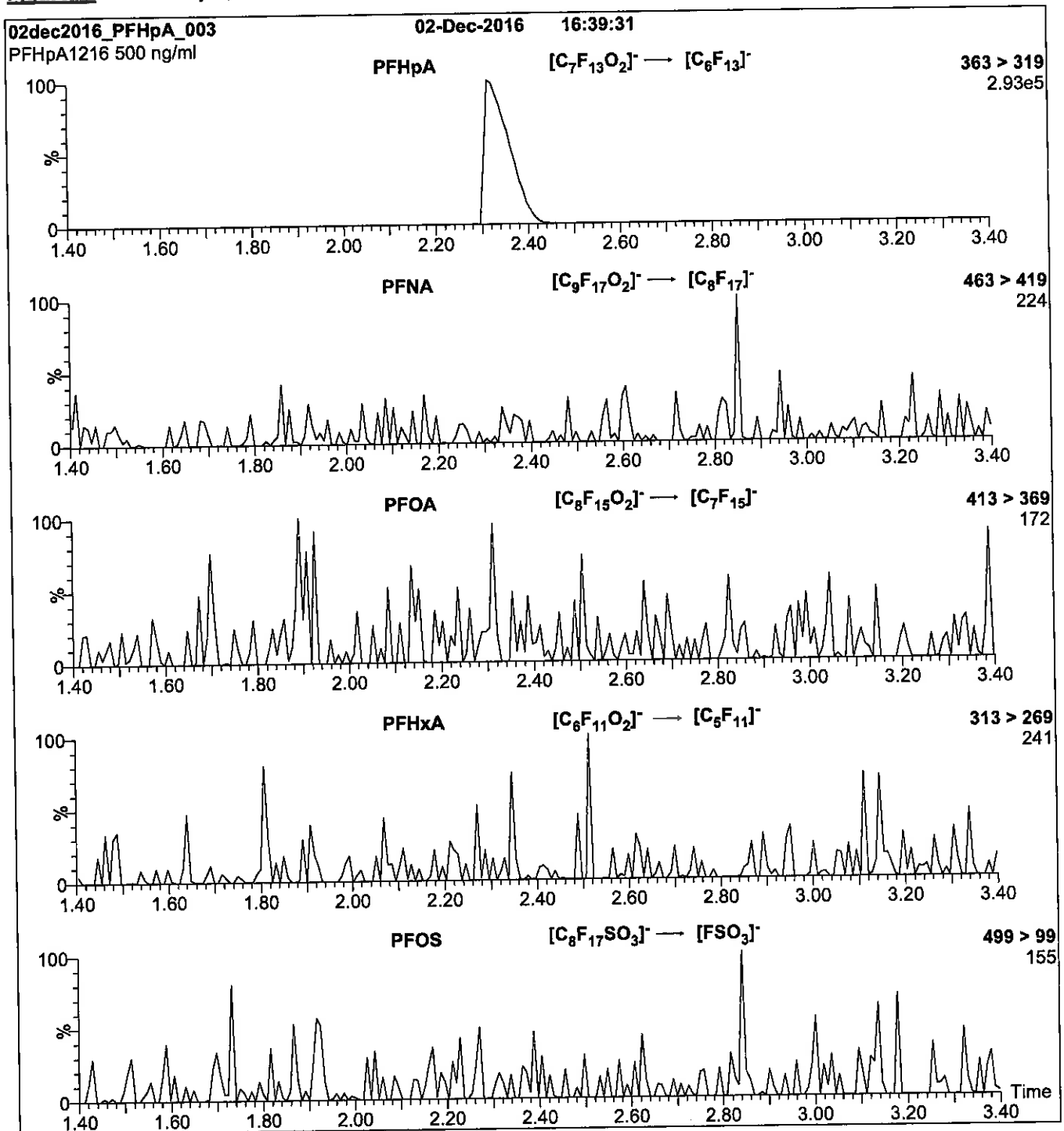
Flow: 300 μ l/min

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 μ l (500 ng/ml PFHpA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
 (both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFHxS-br_00005



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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 ¹⁹F-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).

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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 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:

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HOMOGENEITY:

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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:

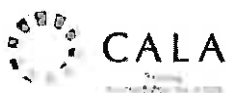
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Table A: br-PFHxSK; Isomeric Components and Percent Composition (by ¹⁹F-NMR)*

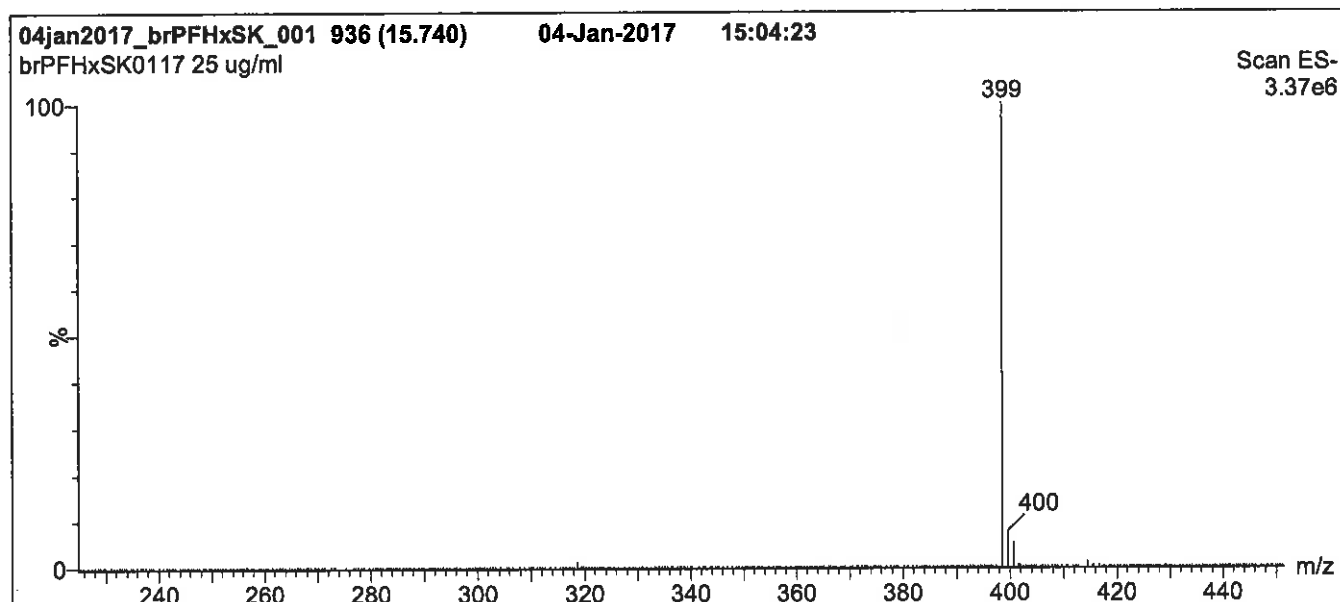
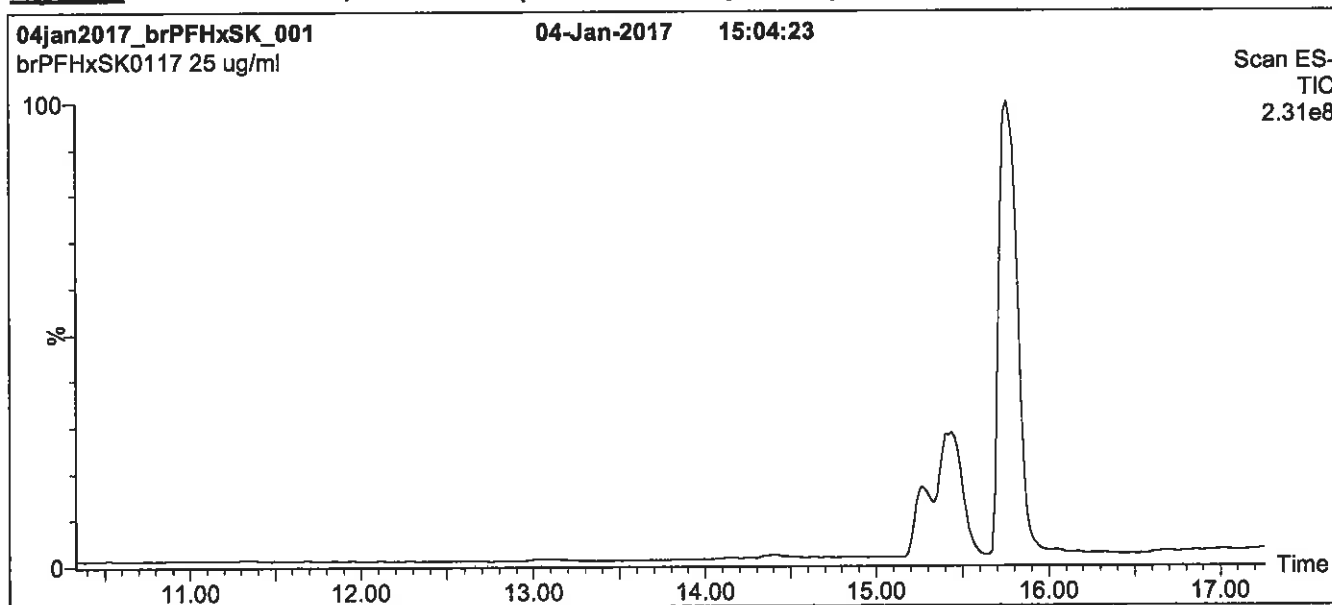
Isomer	Name	Structure	Percent Composition by ¹⁹ F-NMR
1	Potassium perfluoro-1-hexanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$\begin{array}{c} \text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}(\text{SO}_3^-\text{K}^+) \\ \\ \text{CF}_3 \end{array}$	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$\begin{array}{c} \text{CF}_3\text{CF}_2\text{CF}_2\text{CF}(\text{CF}_3)\text{CF}_2\text{SO}_3^-\text{K}^+ \\ \\ \text{CF}_3 \end{array}$	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	$\begin{array}{c} \text{CF}_3\text{CF}_2\text{CF}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+ \\ \\ \text{CF}_3 \end{array}$	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	$\begin{array}{c} \text{CF}_3\text{CF}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3^-\text{K}^+ \\ \\ \text{CF}_3 \end{array}$	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	$\begin{array}{c} \text{CF}_3 \\ \\ \text{CF}_3\text{C}(\text{CF}_3)_2\text{CF}_2\text{SO}_3^-\text{K}^+ \\ \\ \text{CF}_3 \end{array}$	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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 20% (80:20 MeOH:ACN) / 80% H₂O
(both with 10 mM NH₄OAc 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

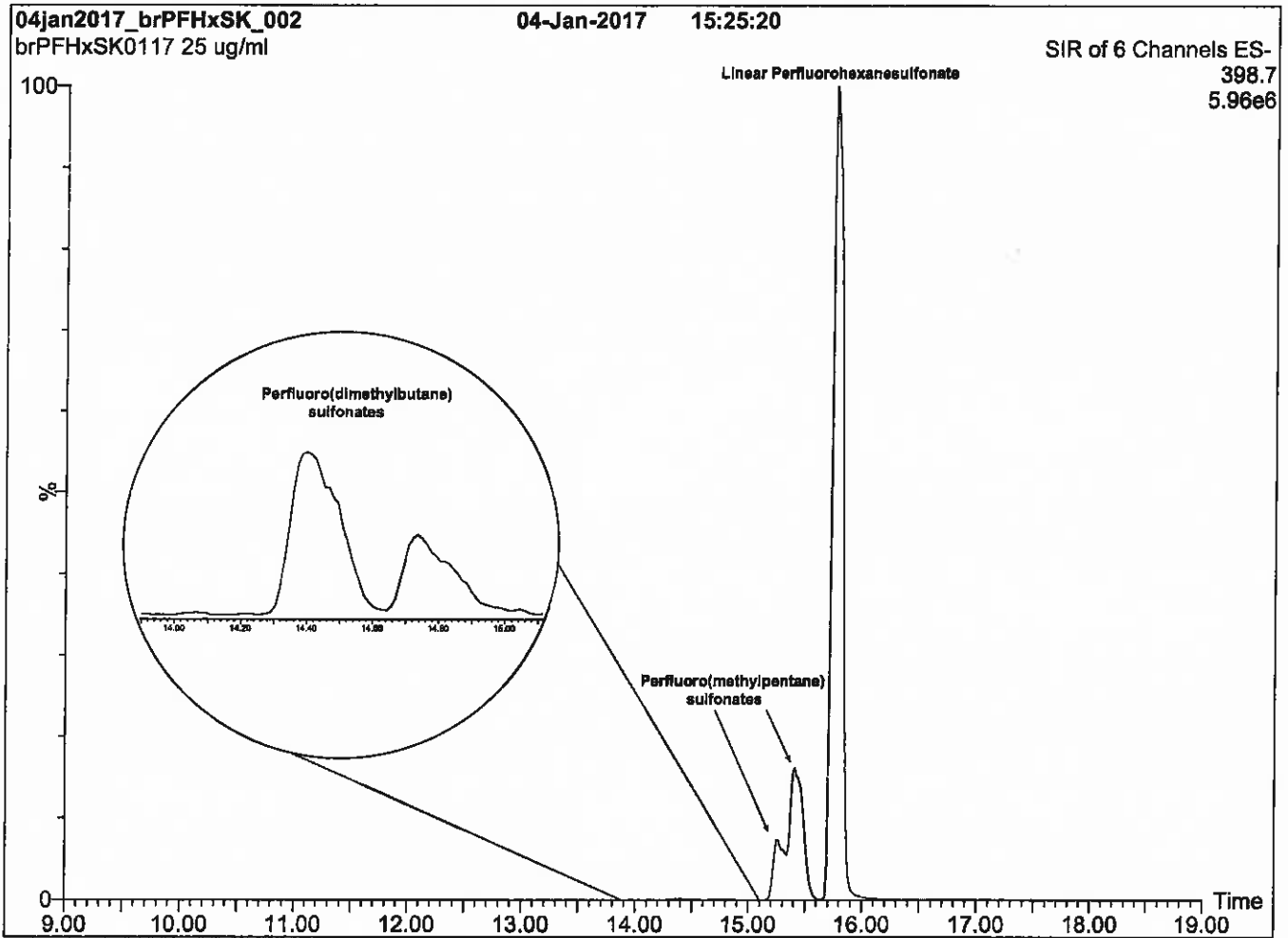
Flow: 300 μ l/min

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 RP₁₈
1.7 μm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 20% (80:20 MeOH:ACN) / 80% H₂O
(both with 10 mM NH₄OAc 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

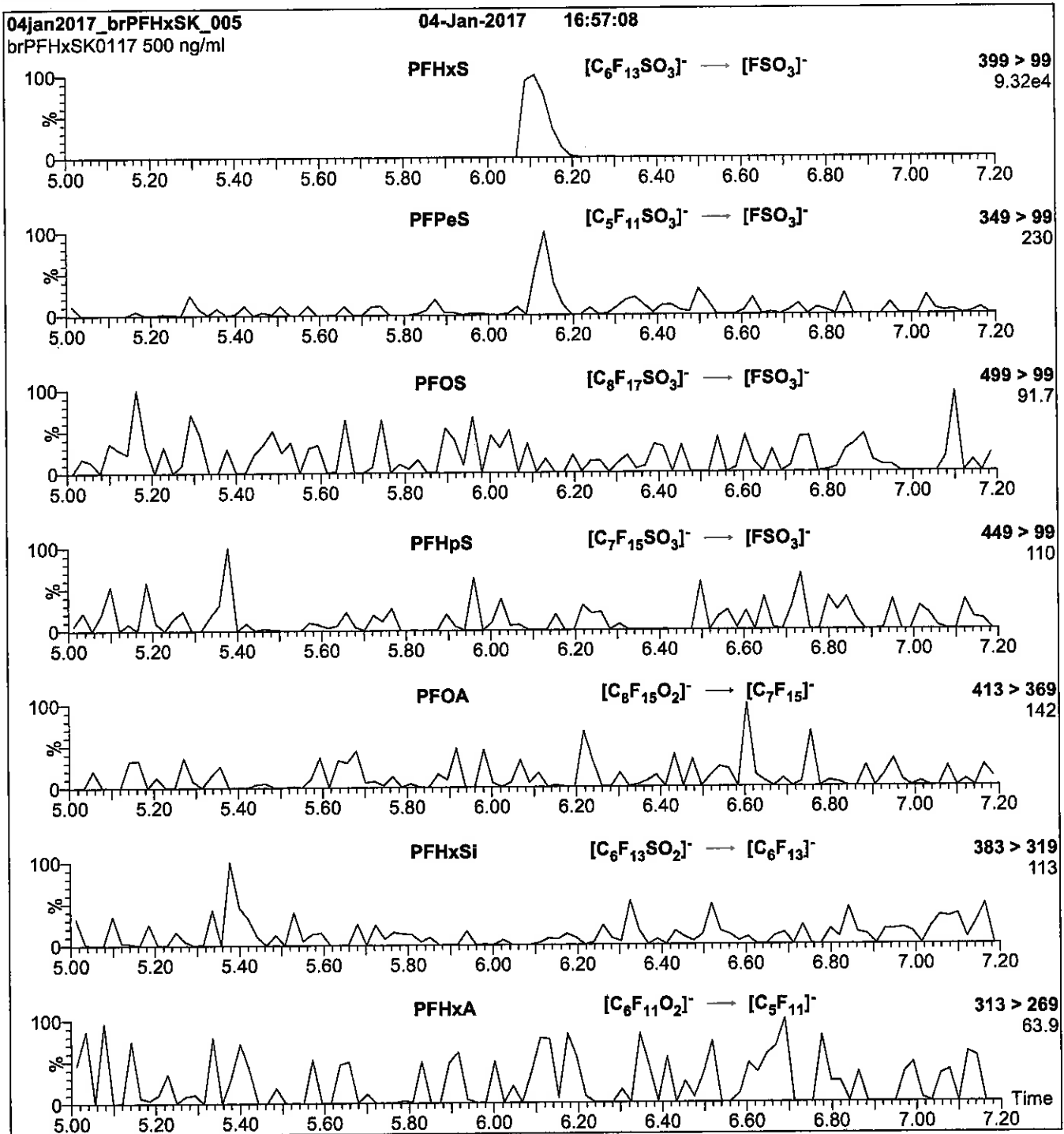
Flow: 300 μl/min

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 μ l (500 ng/ml br-PFHxSK)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFNA_00009

r: 9/2/17 skv

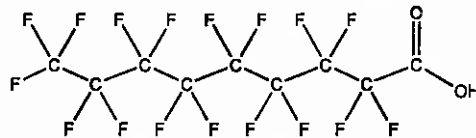


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFNA **LOT NUMBER:** PFNA0717
COMPOUND: Perfluoro-n-nonanoic acid

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



MOLECULAR FORMULA: $C_9HF_{17}O_2$ **MOLECULAR WEIGHT:** 464.08
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **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).

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:

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HAZARDS:

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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.

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EXPIRY DATE / PERIOD OF VALIDITY:

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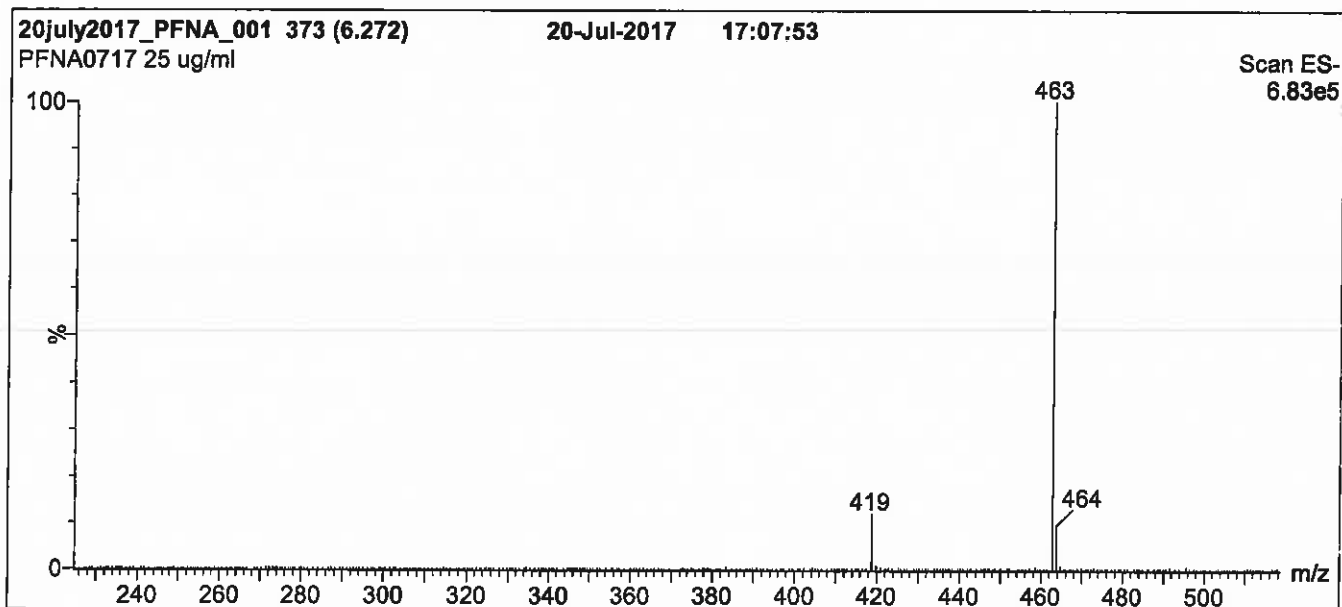
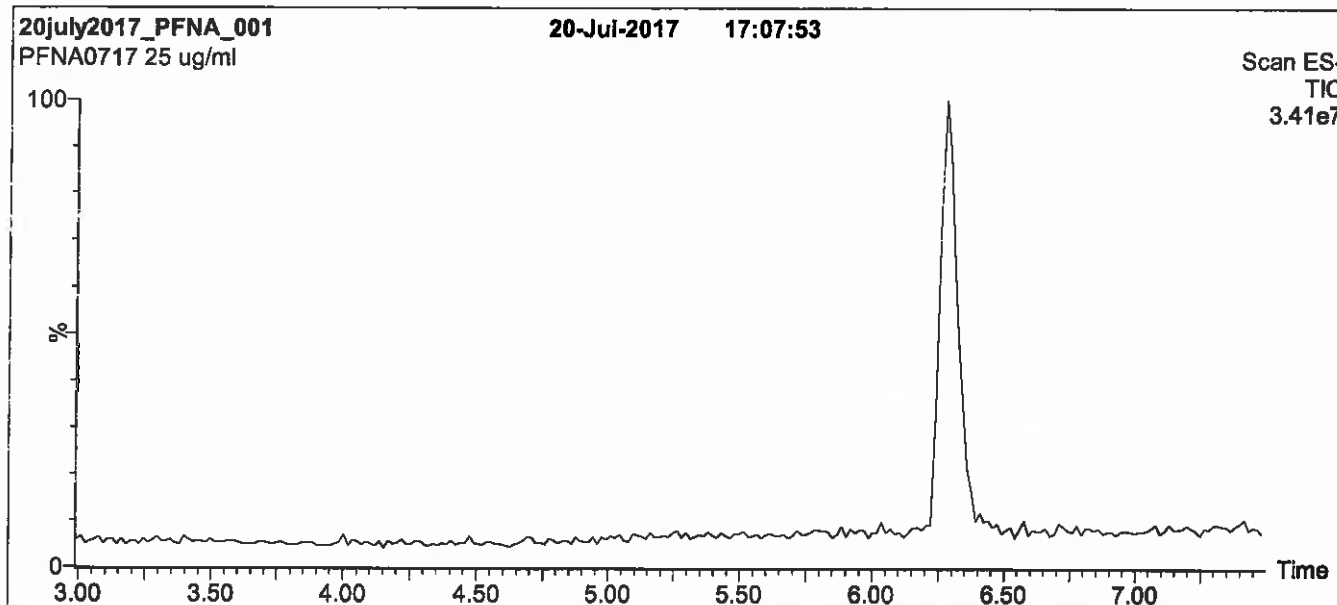
QUALITY MANAGEMENT:

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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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 50% (80:20 MeOH:ACN) / 50% H₂O
 (both with 10 mM NH₄OAc 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

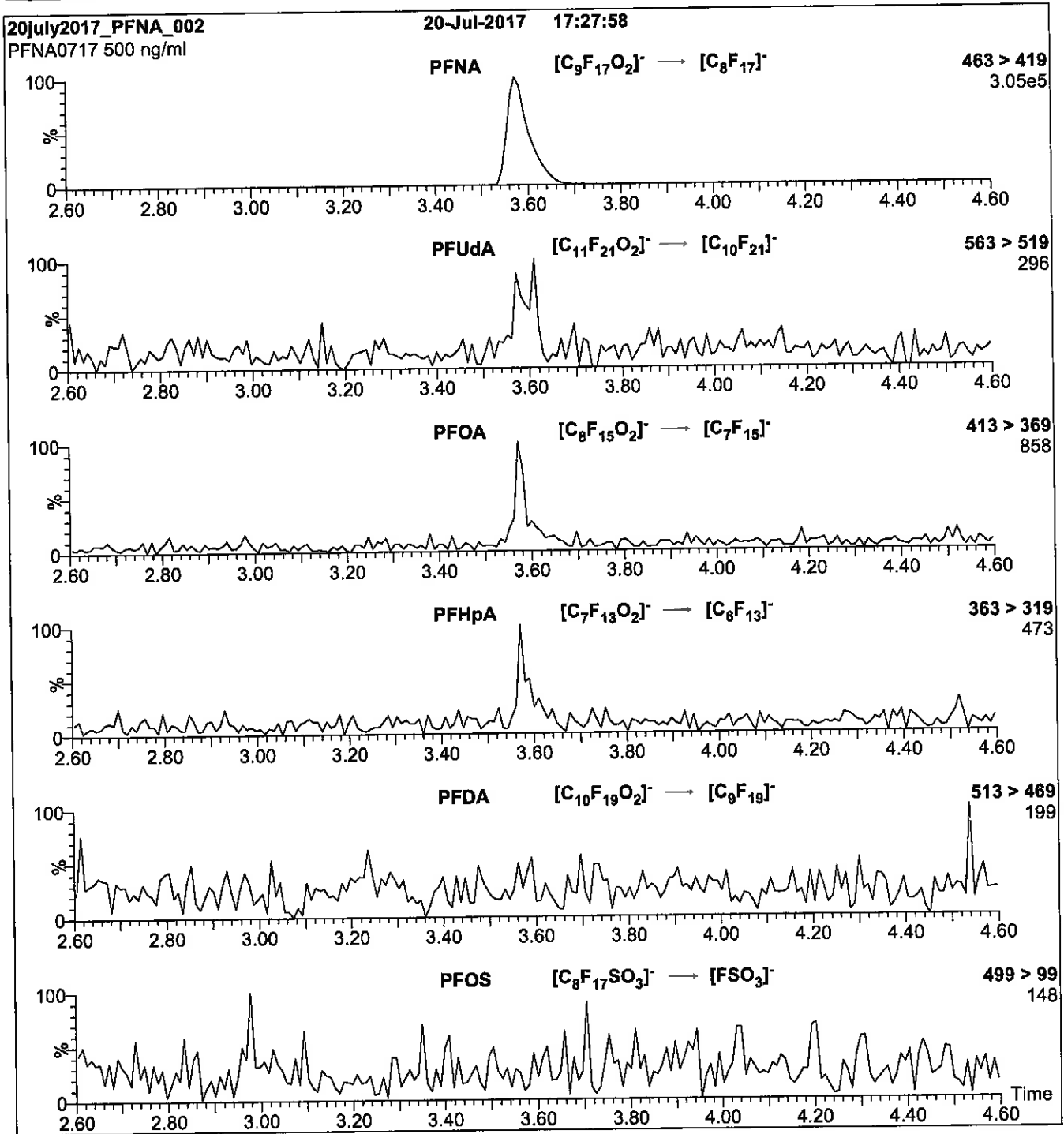
Flow: 300 μ l/min

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 μ l (500 ng/ml PFNA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
 (both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFOA_00010

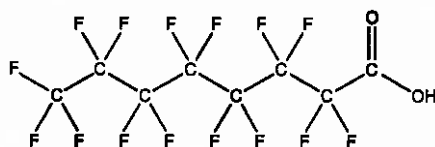
P: 10/2017 SKV



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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



MOLECULAR FORMULA: C₈HF₁₅O₂
CONCENTRATION: 50 ± 2.5 µg/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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EXPIRY DATE / PERIOD OF VALIDITY:

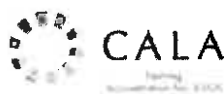
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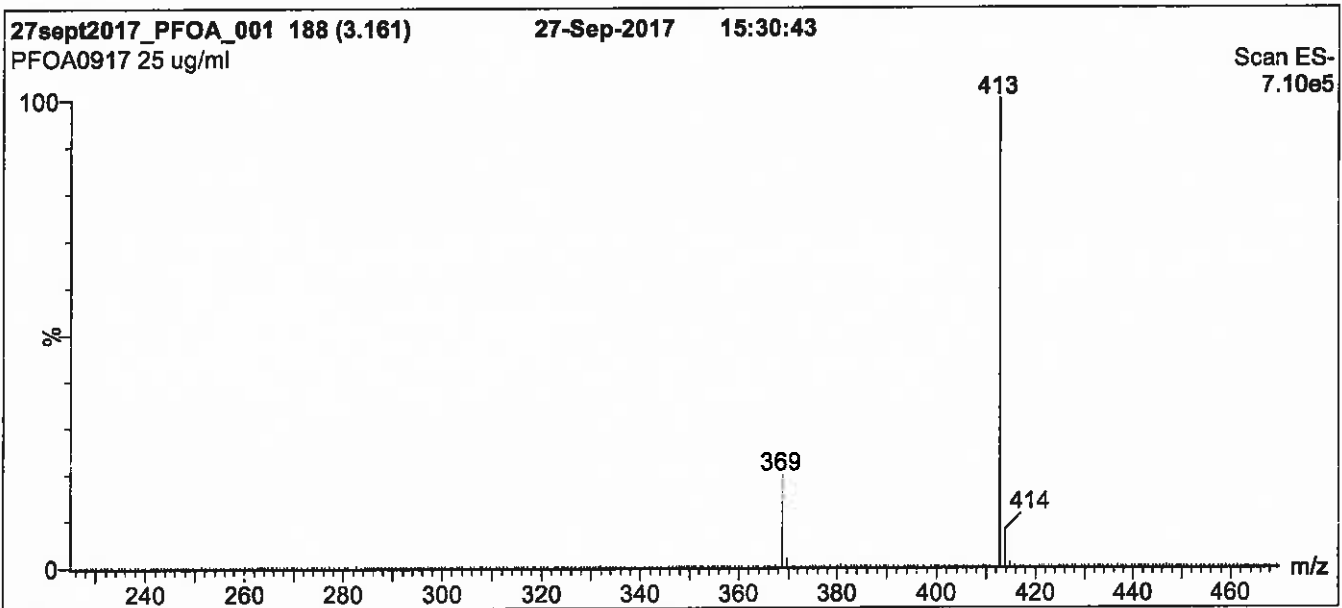
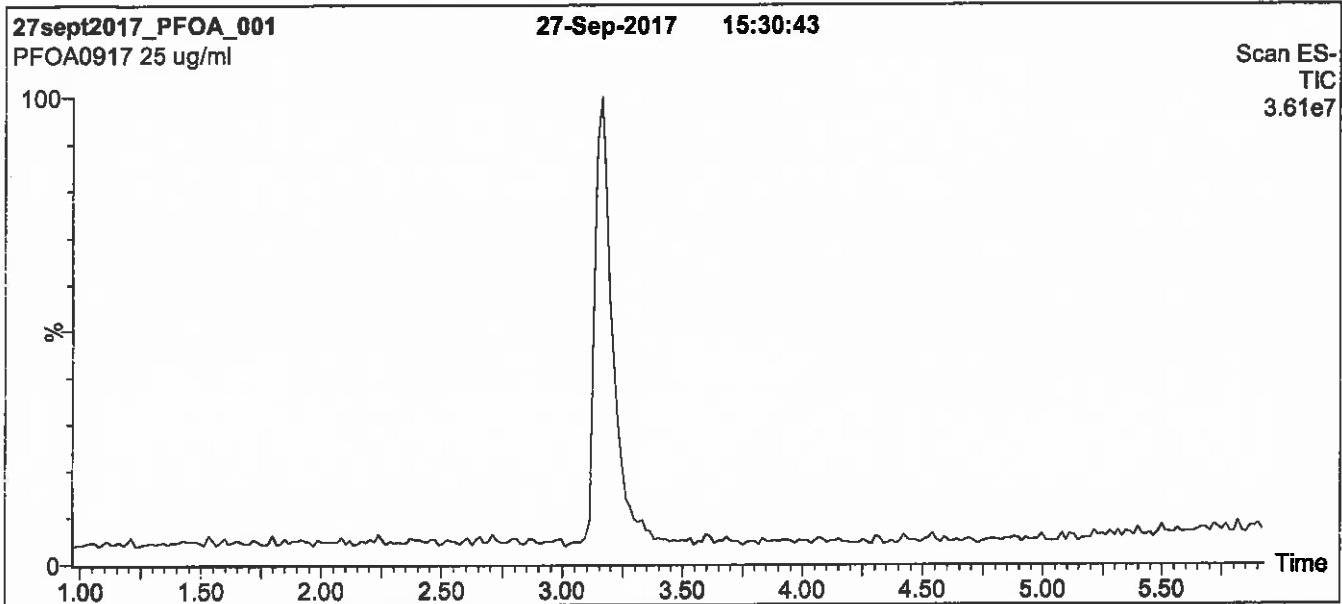
QUALITY MANAGEMENT:

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 or contact us directly at 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 RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc 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

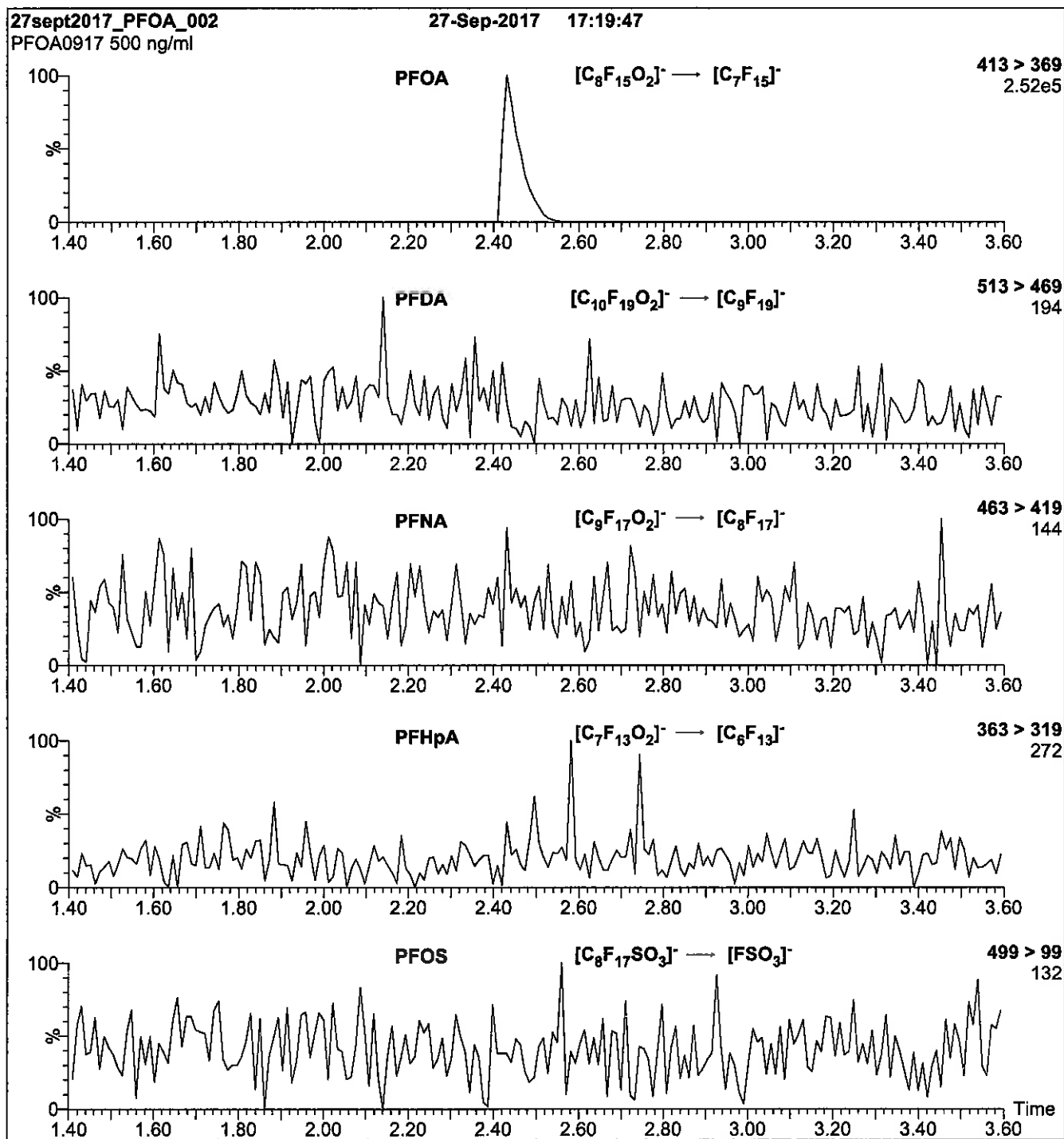
Flow: 300 μ l/min

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 μ l (500 ng/ml PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCPFOS-br_00005

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 ¹⁹F-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).

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

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:

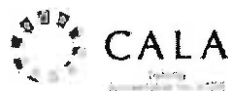
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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 ¹⁹F-NMR)*

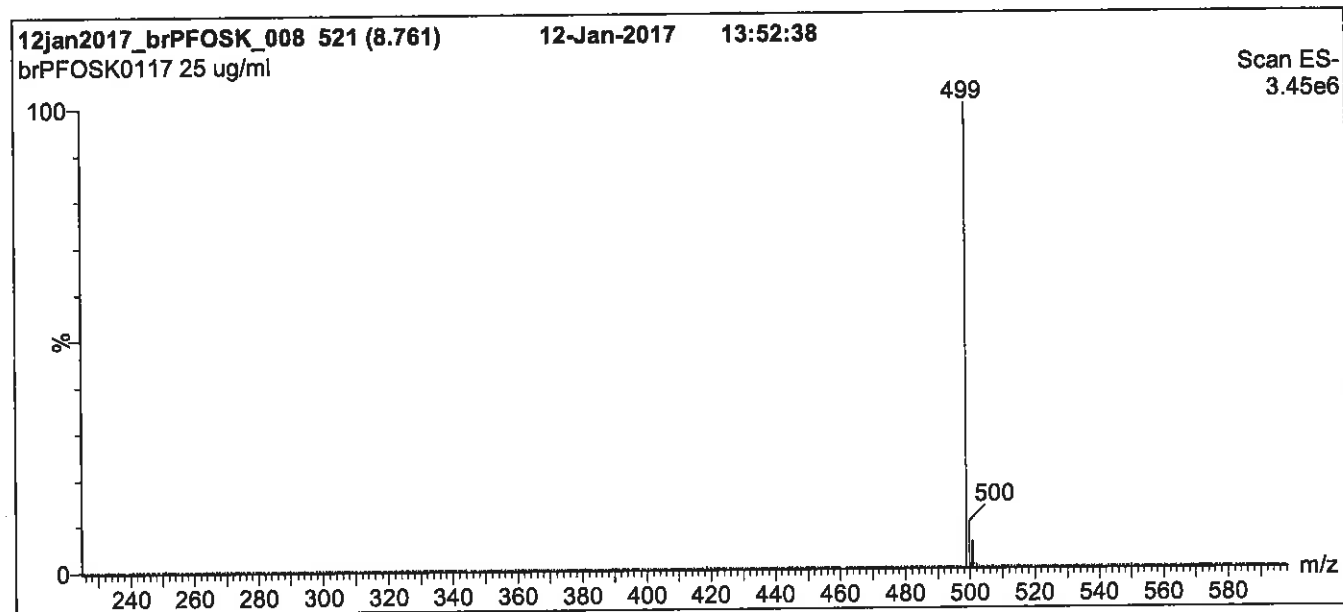
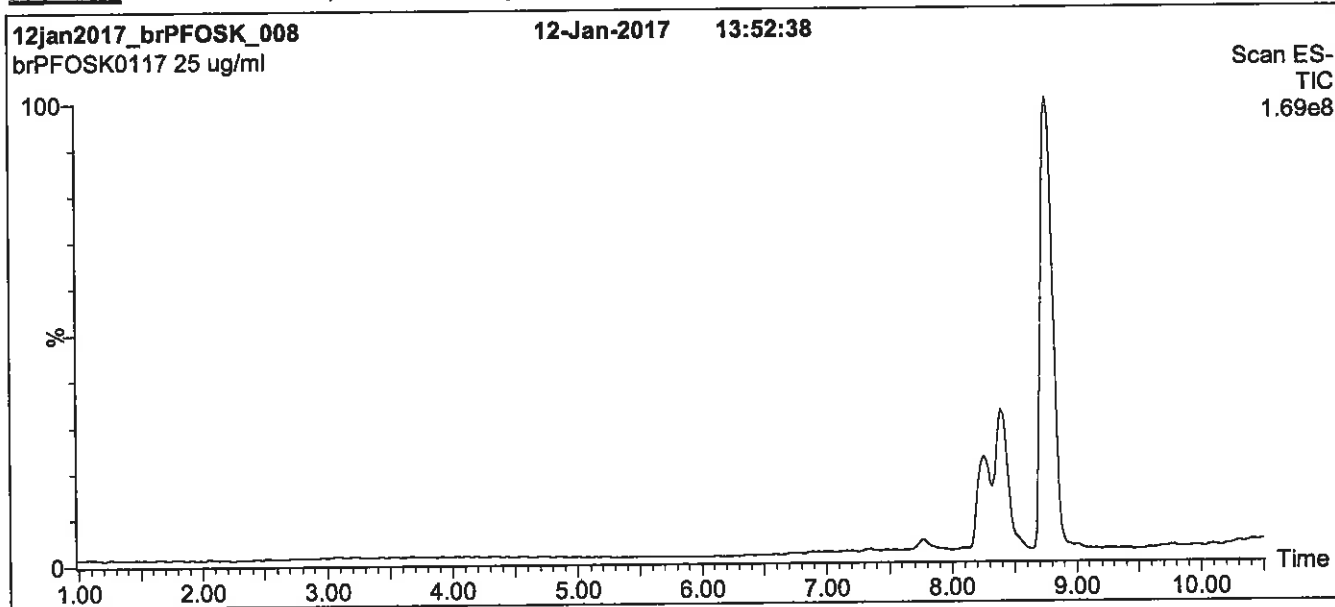
Isomer	Name	Structure	Percent Composition by ¹⁹ F-NMR
1	Potassium perfluoro-1-octanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺ CF ₃	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺ CF ₃	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺ CF ₃	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺ CF ₃	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺ CF ₃	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺ CF ₃	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺ CF ₃ CF ₃	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺ CF ₃ CF ₃	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺ CF ₃ CF ₃	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺ CF ₃ CF ₃	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 RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 45% (80:20 MeOH:ACN) / 55% H₂O
 (both with 10 mM NH₄OAc buffer)
 Ramp to 90% organic over 12 min and hold for 2 min.
 Return to initial conditions over 0.5 min.
 Time: 16 min

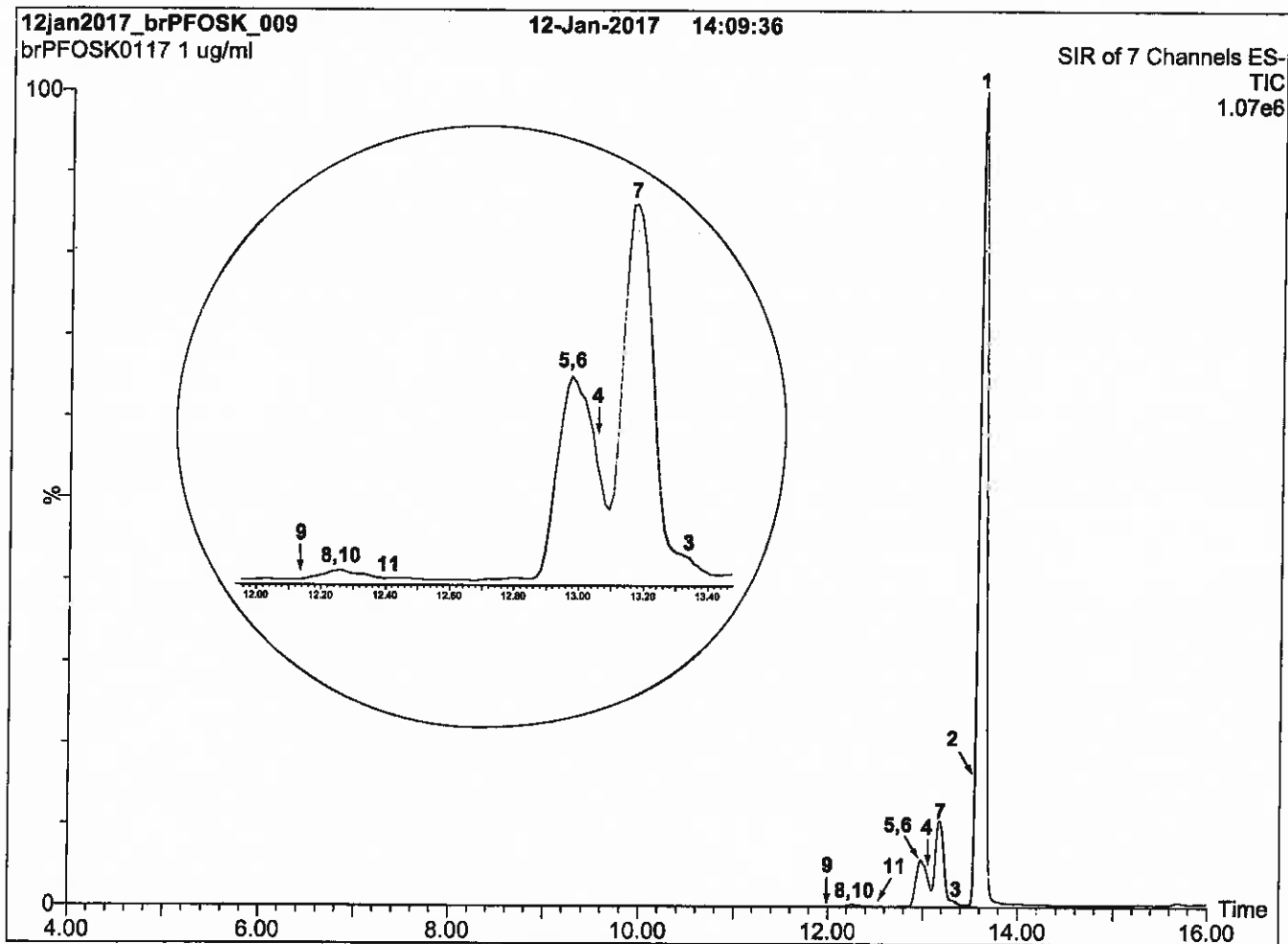
Flow: 300 μ l/min

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

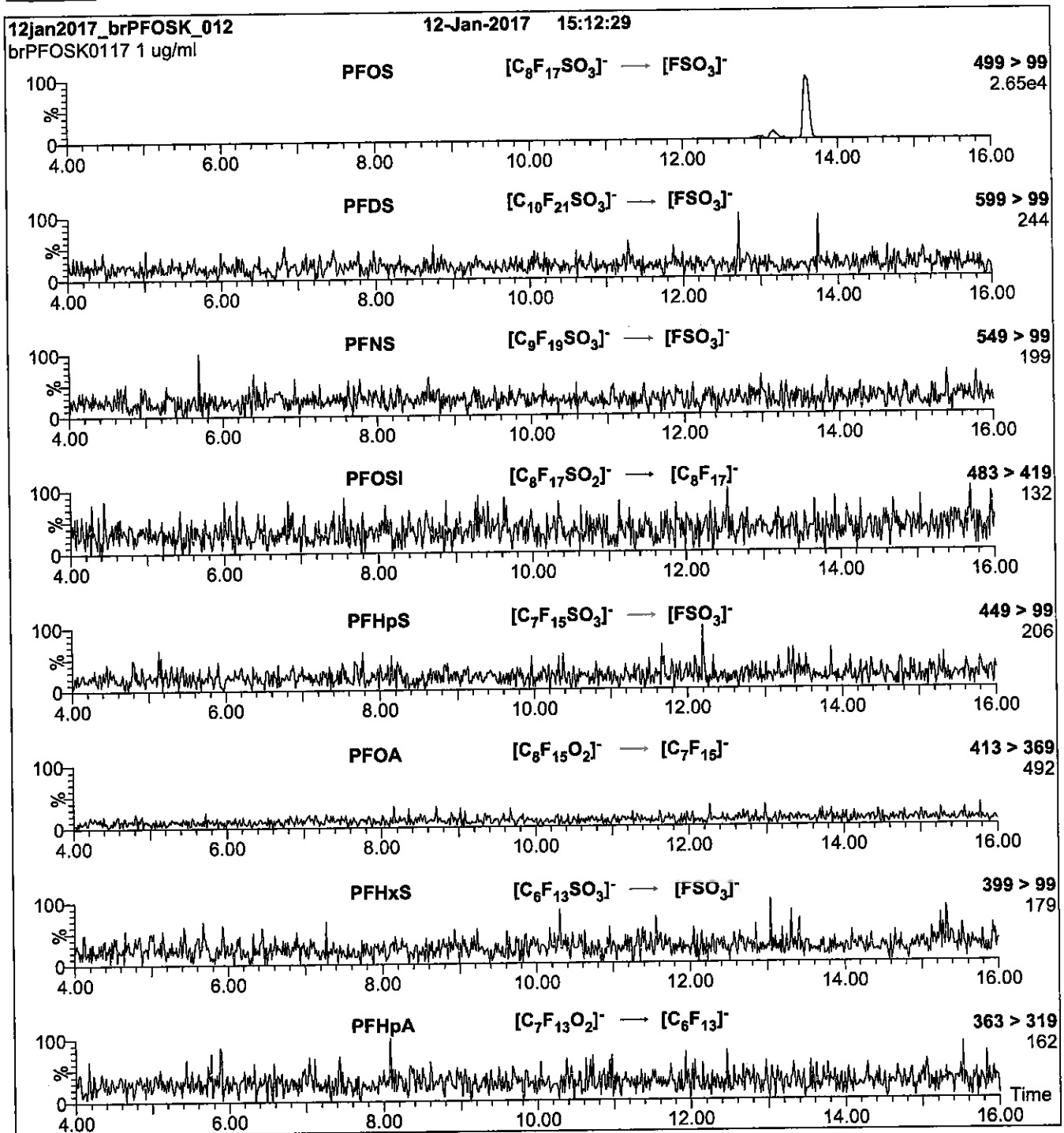
Chromatographic Conditions:

Column: Acquity UPLC BEH Shield RP₁₈ (1.7 μ m, 2.1 x 100 mm)
Injection: 1.0 μ g/ml of br-PFOSK
Mobile Phase: Gradient
45% (80:20 MeOH:ACN) / 55% H₂O (both with 10 mM NH₄OAc 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 μ 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 μ l/min

MS Parameters

Collision Gas (mbar) = 3.31e-3

Collision Energy (eV) = 11-50 (variable)

Method 537 DOD

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

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
NAWC-040918-RW-359	320-37999-1	86	81
NAWC-040918-FRB-359	320-37999-2	95	88
WGNA-040918-RW-4848	320-37999-3	96	91
WGNA-040918-FRB-4848	320-37999-4	95	85
	MB 320-218546/1-A	102	87
	LCS 320-218546/2-A	99	89
	LCSD 320-218546/3-A	98	88

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.: 320-37999-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 2018.04.21_537A_034.d
 Lab ID: LCS 320-218546/2-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	220	223	102	70-130	M
Perfluorooctanoic acid (PFOA)	110	105	95	70-130	
Perfluorononanoic acid (PFNA)	110	101	92	70-130	
Perfluorohexanesulfonic acid (PFHxS)	168	186	111	70-130	
Perfluoroheptanoic acid (PFHpA)	54.0	56.4	104	70-130	
Perfluorobutanesulfonic acid (PFBS)	500	499	100	70-130	

Column to be used to flag recovery and RPD values

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Matrix: Water Level: Low Lab File ID: 2018.04.21_537A_035.d

Lab ID: LCSD 320-218546/3-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LCSD CONCENTRATION (ng/L)	LCSD % REC	% RPD	QC LIMITS		#
					RPD	REC	
Perfluorooctanesulfonic acid (PFOS)	220	218	99	2	30	70-130	M
Perfluorooctanoic acid (PFOA)	110	112	102	7	30	70-130	
Perfluorononanoic acid (PFNA)	110	104	94	3	30	70-130	
Perfluorohexanesulfonic acid (PFHxS)	168	181	108	3	30	70-130	
Perfluoroheptanoic acid (PFHpA)	54.0	53.7	99	5	30	70-130	
Perfluorobutanesulfonic acid (PFBS)	500	483	96	3	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.: 320-37999-1
 SDG No.: _____
 Lab File ID: 2018.04.21_537A_033.d Lab Sample ID: MB 320-218546/1-A
 Matrix: Water Date Extracted: 04/18/2018 09:04
 Instrument ID: A8_N Date Analyzed: 04/21/2018 19:37
 Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-218546/2-A	2018.04.21_537A_034.d	04/21/2018 19:42
	LCSD 320-218546/3-A	2018.04.21_537A_035.d	04/21/2018 19:46
NAWC-040918-RW-359	320-37999-1	2018.04.21_537A_036.d	04/21/2018 19:51
NAWC-040918-FRB-359	320-37999-2	2018.04.21_537A_037.d	04/21/2018 19:56
WGNA-040918-RW-4848	320-37999-3	2018.04.21_537A_038.d	04/21/2018 20:00
WGNA-040918-FRB-4848	320-37999-4	2018.04.21_537A_039.d	04/21/2018 20:05

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Instrument ID: A8_N Calibration Start Date: 04/11/2018 11:45
 GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 04/11/2018 12:09
 Calibration ID: 38530

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
INITIAL CALIBRATION MEAN AREA AND MEAN RT	970041	1.86	2344935	2.10		
UPPER LIMIT	1455062	2.36	3517403	2.60		
LOWER LIMIT	485021	1.36	1172468	1.60		
LAB SAMPLE ID	CLIENT SAMPLE ID					
CCVL 320-217453/10		964533	1.87	2387973	2.10	
ICV 320-217453/12		1123391	1.86	2710764	2.10	
CCVL 320-219239/1		1010179	1.88	2295874	2.12	
CCV 320-219245/1 CCVIS		1030135	1.87	2347952	2.11	
MB 320-218546/1-A		976707	1.87	2334610	2.10	
LCS 320-218546/2-A		1002942	1.85	2286947	2.09	
LCSD 320-218546/3-A		1003363	1.87	2343654	2.10	
320-37999-1	NAWC-040918-RW-359	1073078	1.87	2431032	2.10	
320-37999-2	NAWC-040918-FRB-359	990154	1.86	2337066	2.09	
320-37999-3	WGNA-040918-RW-4848	1013538	1.86	2286536	2.10	
320-37999-4	WGNA-040918-FRB-4848	959793	1.86	2264068	2.10	
CCV 320-219245/10 CCVIS		971858	1.86	2296172	2.09	

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.: 320-37999-1
 SDG No.: _____
 Sample No.: CCV 320-219245/1 Date Analyzed: 04/21/2018 19:28
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2018.04.21_537A_031 Heated Purge: (Y/N) N
 Calibration ID: 38530

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	1030135	1.87	2347952	2.11		
UPPER LIMIT	1442189	2.37	3287133	2.61		
LOWER LIMIT	721095	1.37	1643566	1.61		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-218546/1-A		976707	1.87	2334610	2.10	
LCS 320-218546/2-A		1002942	1.85	2286947	2.09	
LCSD 320-218546/3-A		1003363	1.87	2343654	2.10	
320-37999-1	NAWC-040918-RW-359	1073078	1.87	2431032	2.10	
320-37999-2	NAWC-040918-FRB-359	990154	1.86	2337066	2.09	
320-37999-3	WGNA-040918-RW-4848	1013538	1.86	2286536	2.10	
320-37999-4	WGNA-040918-FRB-4848	959793	1.86	2264068	2.10	

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.: 320-37999-1
 SDG No.: _____
 Sample No.: CCV 320-219245/10 Date Analyzed: 04/21/2018 20:10
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2018.04.21_537A_040 Heated Purge: (Y/N) N
 Calibration ID: 38530

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	971858	1.86	2296172	2.09		
UPPER LIMIT	1360601	2.36	3214641	2.59		
LOWER LIMIT	680301	1.36	1607320	1.59		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-218546/1-A		976707	1.87	2334610	2.10	
LCS 320-218546/2-A		1002942	1.85	2286947	2.09	
LCSD 320-218546/3-A		1003363	1.87	2343654	2.10	
320-37999-1	NAWC-040918-RW-359	1073078	1.87	2431032	2.10	
320-37999-2	NAWC-040918-FRB-359	990154	1.86	2337066	2.09	
320-37999-3	WGNA-040918-RW-4848	1013538	1.86	2286536	2.10	
320-37999-4	WGNA-040918-FRB-4848	959793	1.86	2264068	2.10	

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.: 320-37999-1
 SDG No.: _____
 Client Sample ID: NAWC-040918-RW-359 Lab Sample ID: 320-37999-1
 Matrix: Water Lab File ID: 2018.04.21_537A_036.d
 Analysis Method: 537 Date Collected: 04/09/2018 09:10
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 254.2 (mL) Date Analyzed: 04/21/2018 19:51
 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.: 219245 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	91	M	39	16	6.7
335-67-1	Perfluorooctanoic acid (PFOA)	22		20	7.9	2.8
375-95-1	Perfluorononanoic acid (PFNA)	20	U	24	20	7.9
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	56		30	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	23		9.8	3.9	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	89	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	86		70-130
STL00996	13C2 PFDA	81		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_036.d
 Lims ID: 320-37999-A-1-A
 Client ID: NAWC-040918-RW-359
 Sample Type: Client
 Inject. Date: 21-Apr-2018 19:51:34 ALS Bottle#: 32 Worklist Smp#: 6
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-37999-a-1-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK022

First Level Reviewer: barnettj Date: 23-Apr-2018 10:39:52

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.396	1.396	0.0	1.000	169808	1.90		61.6	
298.90 > 99.00	1.396	1.396	0.0	1.000	118943		1.43(0.00-0.00)	108	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.525	1.525	0.0	1.000	976896	8.56		7159	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.677	1.677	0.0	1.000	1966090	14.1		488	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.677	1.677	0.0	1.000	681912	5.92		73.2	
* 6 13C2-PFOA									
415.00 > 370.00	1.866	1.866	0.0		1073078	10.0		5472	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.866	1.866	0.0	1.000	646560	5.67		95.5	
413.00 > 169.00	1.866	1.866	0.0	1.000	369355		1.75(0.00-0.00)	286	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.102	2.102	0.0	1.000	2093388	23.2		391	a
499.00 > 99.00	2.102	2.102	0.0	1.000	458668		4.56(0.00-0.00)	610	a
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.109	-0.007		2431032	28.7		1034	
9 Perfluorononanoic acid									
463.00 > 419.00	2.109	2.117	-0.008	1.000	160152	1.77		30.0	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.269	0.0	1.000	741951	8.13		8172	

QC Flag Legend

Review Flags

a - User Assigned ID

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_036.d

Injection Date: 21-Apr-2018 19:51:34

Instrument ID: A8_N

Lims ID: 320-37999-A-1-A

Lab Sample ID: 320-37999-1

Client ID: NAWC-040918-RW-359

Operator ID: SACINSTLCMS01

ALS Bottle#: 32

Worklist Smp#: 6

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

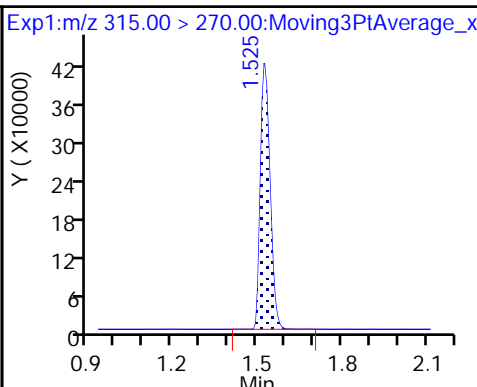
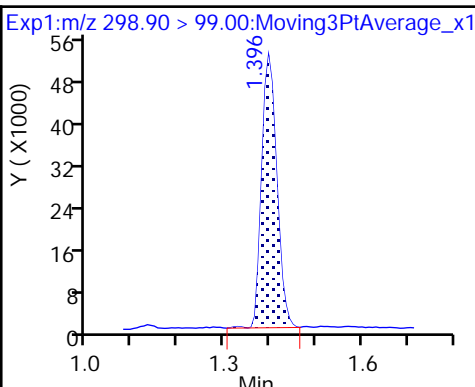
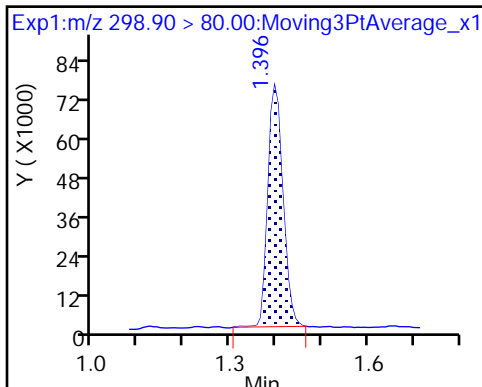
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

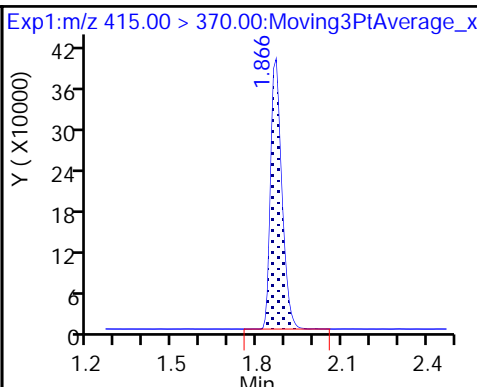
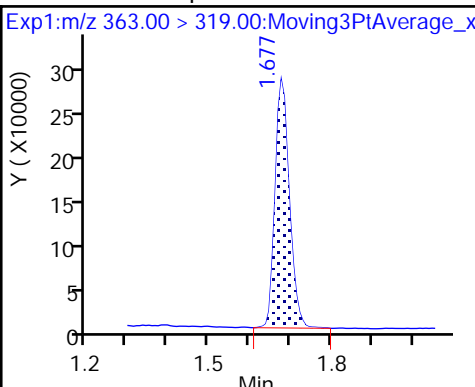
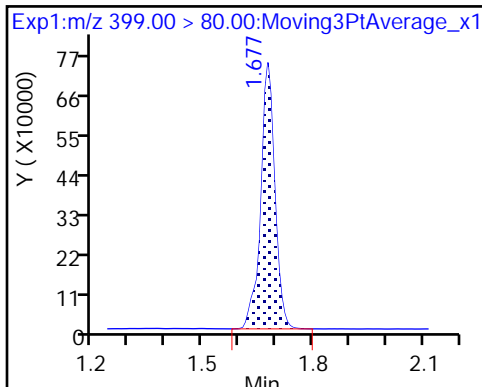
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

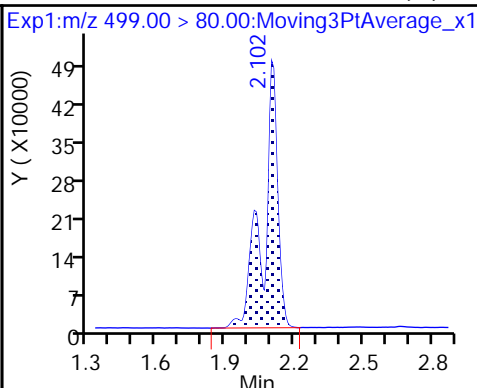
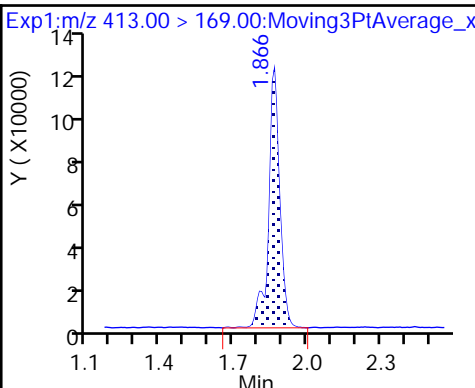
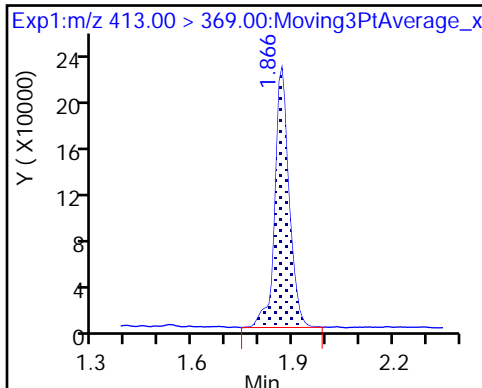
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

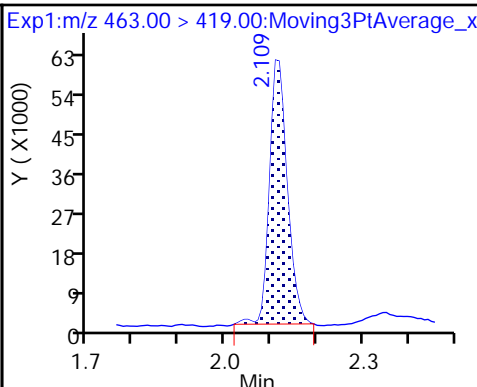
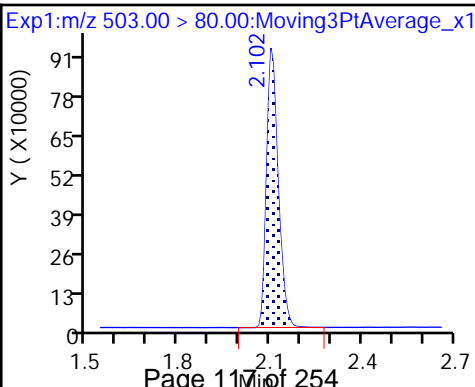
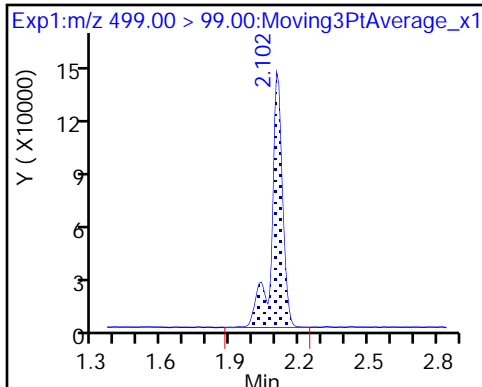
8 Perfluorooctane sulfonic acid (M)



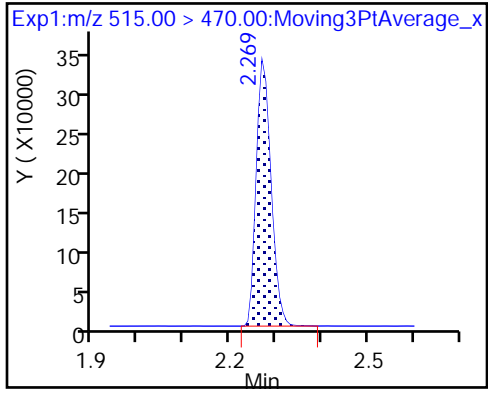
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_036.d
 Lims ID: 320-37999-A-1-A
 Client ID: NAWC-040918-RW-359
 Sample Type: Client
 Inject. Date: 21-Apr-2018 19:51:34 ALS Bottle#: 32 Worklist Smp#: 6
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-37999-a-1-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK022

First Level Reviewer: barnettj Date: 23-Apr-2018 10:39:52

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	8.56	85.63
\$ 10 13C2 PFDA	10.0	8.13	81.30

TestAmerica Sacramento

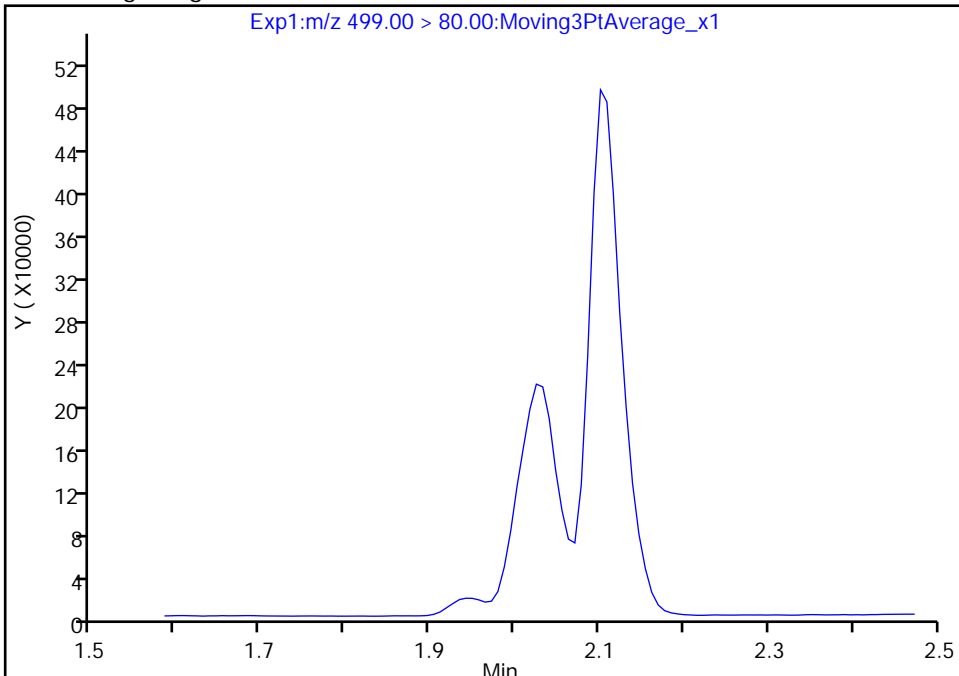
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_036.d
Injection Date: 21-Apr-2018 19:51:34 Instrument ID: A8_N
Lims ID: 320-37999-A-1-A Lab Sample ID: 320-37999-1
Client ID: NAWC-040918-RW-359
Operator ID: SACINSTLCMS01 ALS Bottle#: 32 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

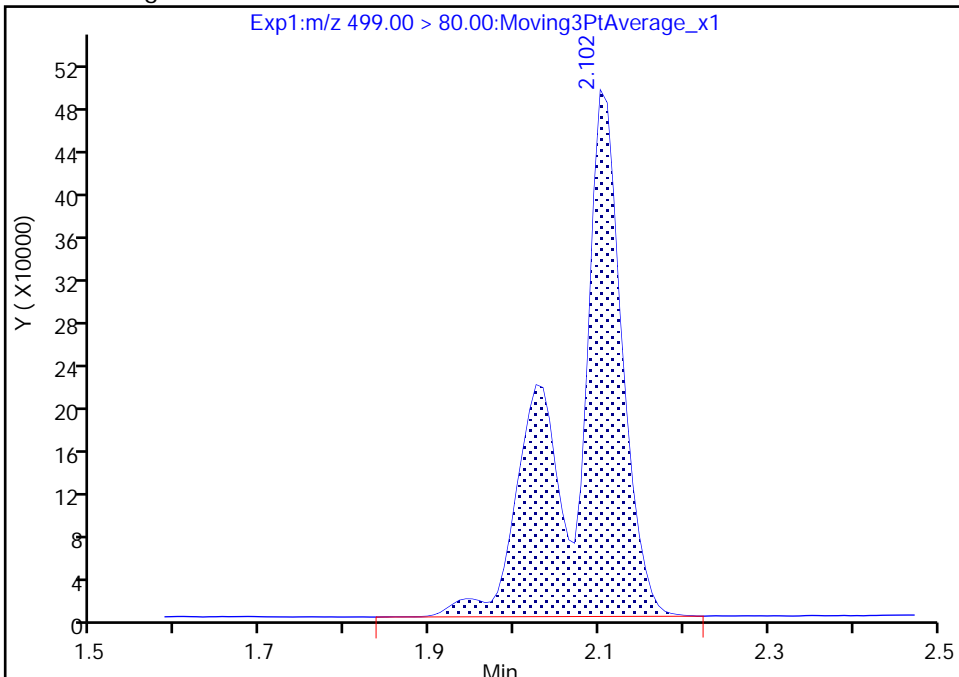
Not Detected
Expected RT: 2.10

Processing Integration Results



RT: 2.10
Area: 2093388
Amount: 23.166014
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 23-Apr-2018 10:39:38
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: NAWC-040918-FRB-359 Lab Sample ID: 320-37999-2
 Matrix: Water Lab File ID: 2018.04.21_537A_037.d
 Analysis Method: 537 Date Collected: 04/09/2018 09:05
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 261.8(mL) Date Analyzed: 04/21/2018 19:56
 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.: 219245 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	38	15	6.5
335-67-1	Perfluorooctanoic acid (PFOA)	7.6	U	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	29	11	5.3
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.8	U	9.5	3.8	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	34	U	86	34	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	95		70-130
STL00996	13C2 PFDA	88		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_037.d
 Lims ID: 320-37999-A-2-A
 Client ID: NAWC-040918-FRB-359
 Sample Type: Client
 Inject. Date: 21-Apr-2018 19:56:13 ALS Bottle#: 33 Worklist Smp#: 7
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-37999-a-2-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
 Process Host: XAWRK022

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
\$ 2 13C2 PFHxA	315.00 > 270.00	1.517	1.525	-0.008	1.000	1003485	9.53	8141	
* 6 13C2-PFOA	415.00 > 370.00	1.859	1.866	-0.007		990154	10.0	5416	
* 7 13C4 PFOS	503.00 > 80.00	2.094	2.109	-0.015		2337066	28.7	1278	
\$ 10 13C2 PFDA	515.00 > 470.00	2.269	2.269	0.0	1.000	742649	8.82	7355	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_037.d

Injection Date: 21-Apr-2018 19:56:13

Instrument ID: A8_N

Lims ID: 320-37999-A-2-A

Lab Sample ID: 320-37999-2

Client ID: NAWC-040918-FRB-359

Operator ID: SACINSTLCMS01

ALS Bottle#: 33

Worklist Smp#: 7

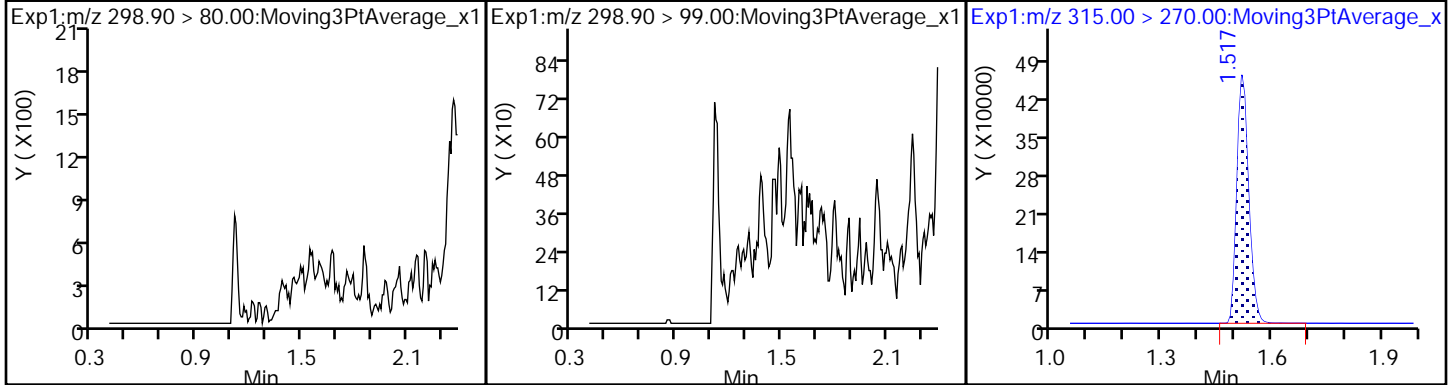
Injection Vol: 2.0 ul

Dil. Factor: 1.0000

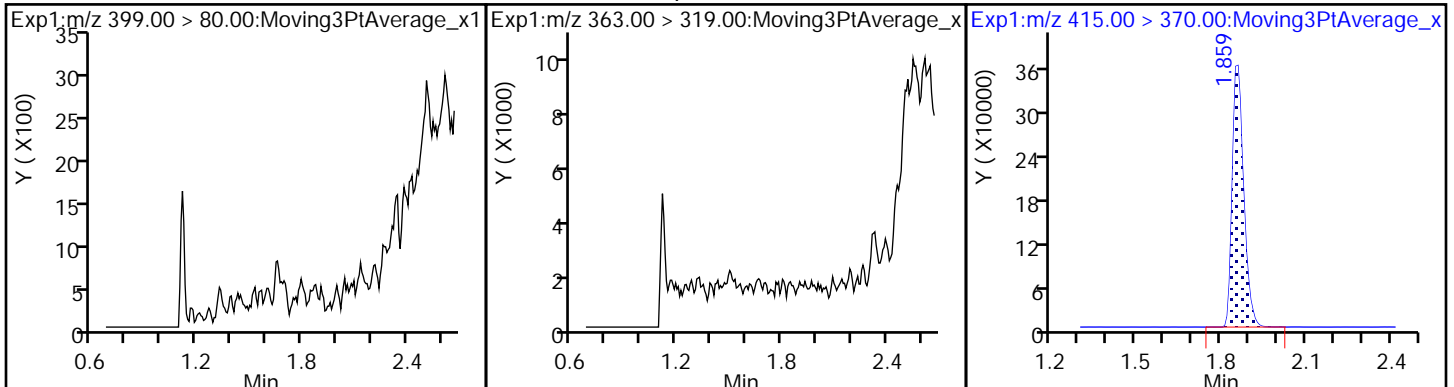
Method: 537_A8_N

Limit Group: LC 537 ICAL

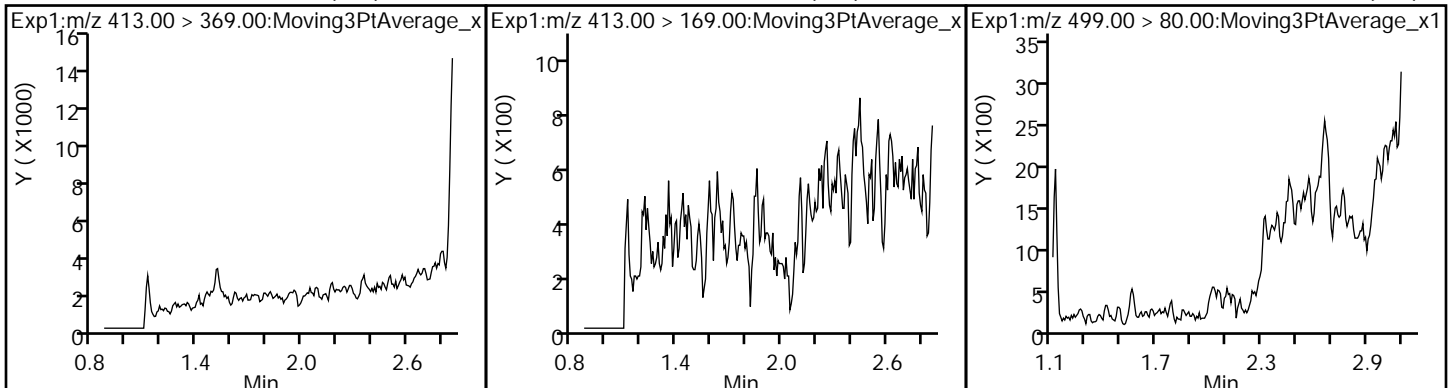
1 Perfluorobutanesulfonic acid (ND) 1 Perfluorobutanesulfonic acid (ND) \$ 2 13C2 PFHxA



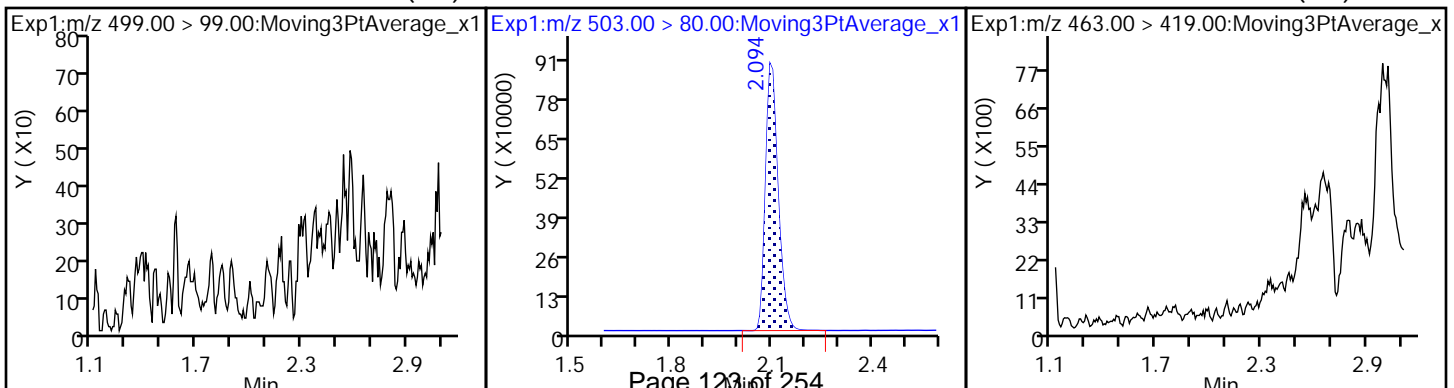
3 Perfluorohexanesulfonic acid (ND) 4 Perfluoroheptanoic acid (ND) * 6 13C2-PFOA



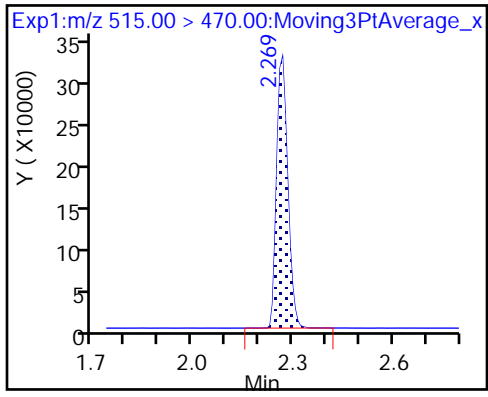
5 Perfluorooctanoic acid (ND) 5 Perfluorooctanoic acid (ND) 8 Perfluorooctane sulfonic acid (ND)



8 Perfluorooctane sulfonic acid (ND) * 7 13C4 PFOS 9 Perfluorononanoic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_037.d
 Lims ID: 320-37999-A-2-A
 Client ID: NAWC-040918-FRB-359
 Sample Type: Client
 Inject. Date: 21-Apr-2018 19:56:13 ALS Bottle#: 33 Worklist Smp#: 7
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-37999-a-2-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
 Process Host: XAWRK022

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.53	95.32
\$ 10 13C2 PFDA	10.0	8.82	88.19

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: WGNA-040918-RW-4848 Lab Sample ID: 320-37999-3
 Matrix: Water Lab File ID: 2018.04.21_537A_038.d
 Analysis Method: 537 Date Collected: 04/09/2018 16:10
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 248.7(mL) Date Analyzed: 04/21/2018 20:00
 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.: 219245 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	16	U M	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 M	30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.0	U M	10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36	U M	90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	96		70-130
STL00996	13C2 PFDA	91		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_038.d
 Lims ID: 320-37999-A-3-A
 Client ID: WGNA-040918-RW-4848
 Sample Type: Client
 Inject. Date: 21-Apr-2018 20:00:54 ALS Bottle#: 34 Worklist Smp#: 8
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-37999-a-3-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK022

First Level Reviewer: barnettj Date: 23-Apr-2018 10:41:08

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									M
298.90 > 80.00	1.388	1.396	-0.008	1.000	12674	0.1511		7.2	M
298.90 > 99.00	1.388	1.396	-0.008	1.000	10761		1.18(0.00-0.00)	10.6	M
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.517	1.525	-0.008	1.000	1035925	9.61		7827	
3 Perfluorohexanesulfonic acid									M
399.00 > 80.00	1.669	1.677	-0.008	1.000	35295	0.2696		8.7	M
4 Perfluoroheptanoic acid									M
363.00 > 319.00	1.669	1.677	-0.008	1.000	26649	0.2449		2.7	M
* 6 13C2-PFOA									
415.00 > 370.00	1.859	1.866	-0.007		1013538	10.0		5742	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.859	1.866	-0.007	1.000	54178	0.5032		6.9	
413.00 > 169.00	1.859	1.866	-0.007	1.000	32777		1.65(0.00-0.00)	22.2	
8 Perfluorooctane sulfonic acid									Ma
499.00 > 80.00	2.102	2.102	0.0	1.000	46904	0.5519		6.6	a
499.00 > 99.00	2.102	2.102	0.0	1.000	7903		5.93(0.00-0.00)	10.5	M
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.109	-0.007		2286536	28.7		1051	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.269	0.0	1.000	786412	9.12		8688	

QC Flag Legend

Review Flags

M - Manually Integrated

a - User Assigned ID

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_038.d

Injection Date: 21-Apr-2018 20:00:54

Instrument ID: A8_N

Lims ID: 320-37999-A-3-A

Lab Sample ID: 320-37999-3

Client ID: WGNA-040918-RW-4848

Operator ID: SACINSTLCMS01

ALS Bottle#: 34

Worklist Smp#: 8

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

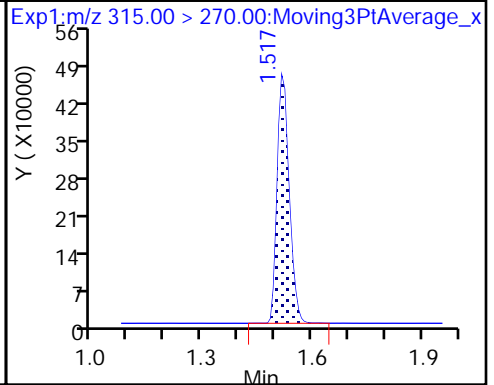
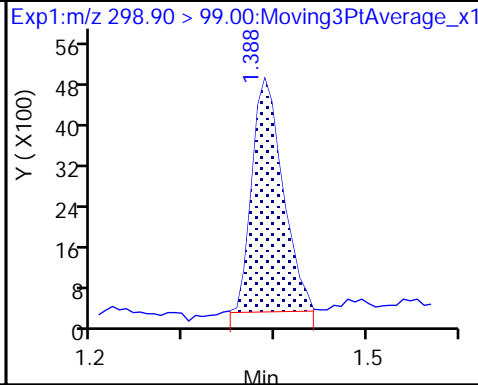
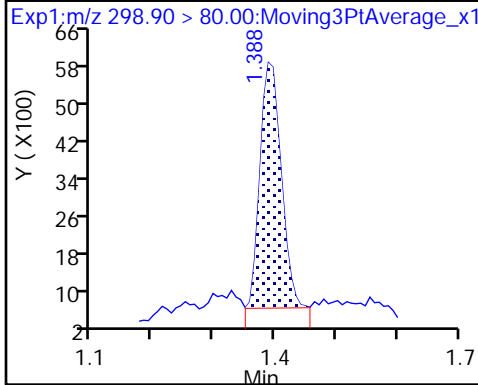
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid (M)

1 Perfluorobutanesulfonic acid (M)

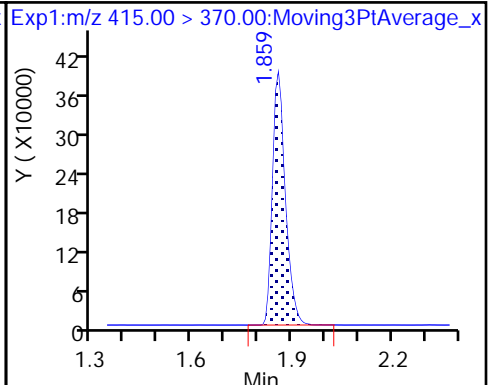
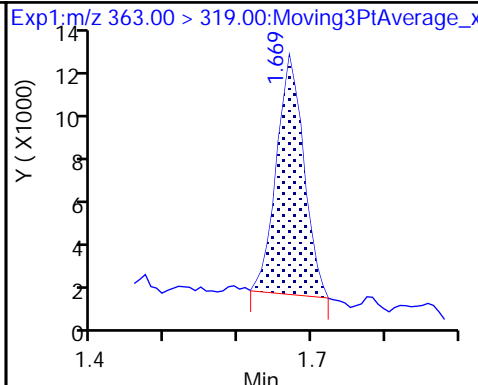
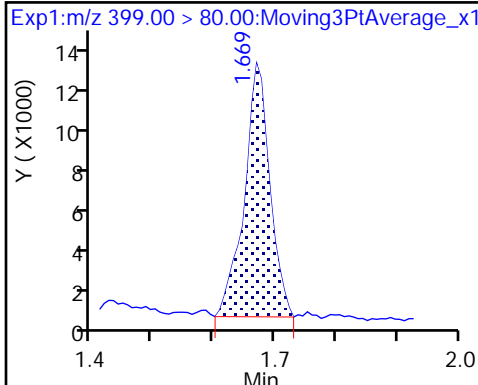
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid (M)

4 Perfluoroheptanoic acid (M)

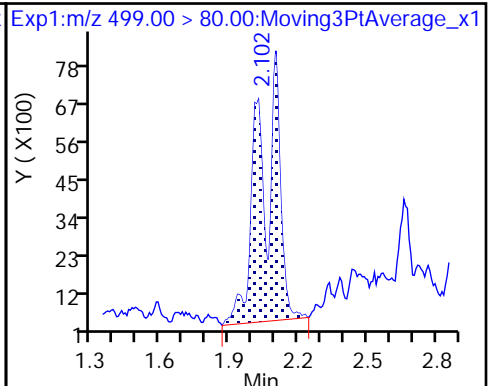
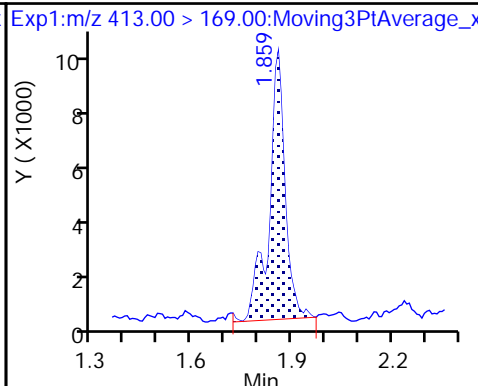
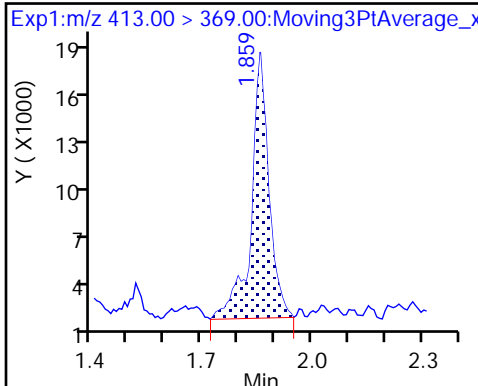
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

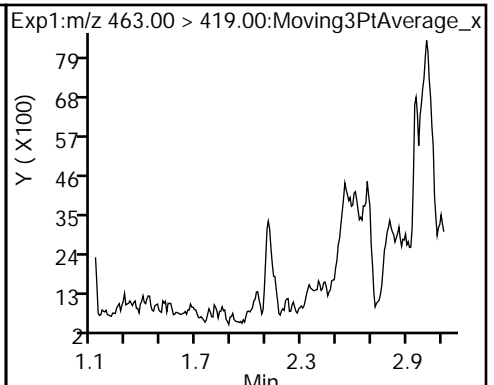
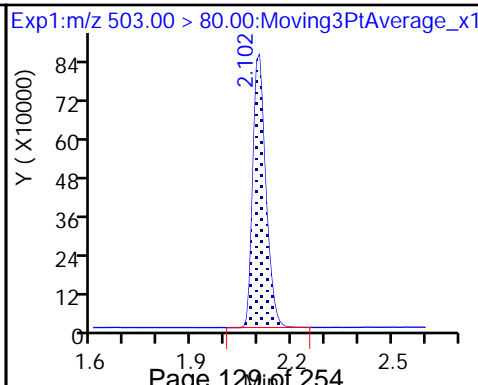
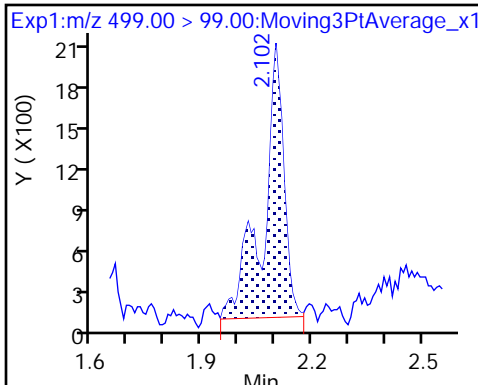
8 Perfluorooctane sulfonic acid (M)



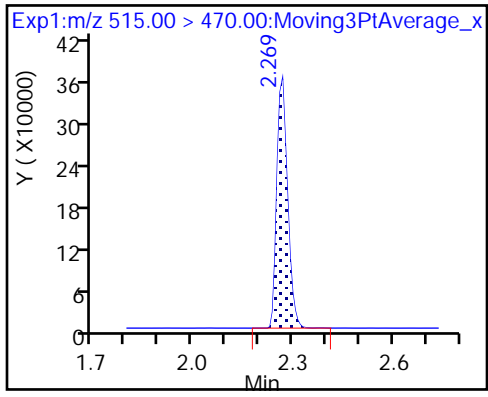
8 Perfluorooctane sulfonic acid (M)

* 7 13C4 PFOS

9 Perfluorononanoic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_038.d
 Lims ID: 320-37999-A-3-A
 Client ID: WGNA-040918-RW-4848
 Sample Type: Client
 Inject. Date: 21-Apr-2018 20:00:54 ALS Bottle#: 34 Worklist Smp#: 8
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-37999-a-3-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
 Process Host: XAWRK022

First Level Reviewer: barnettj Date: 23-Apr-2018 10:41:08

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.61	96.14
\$ 10 13C2 PFDA	10.0	9.12	91.23

TestAmerica Sacramento

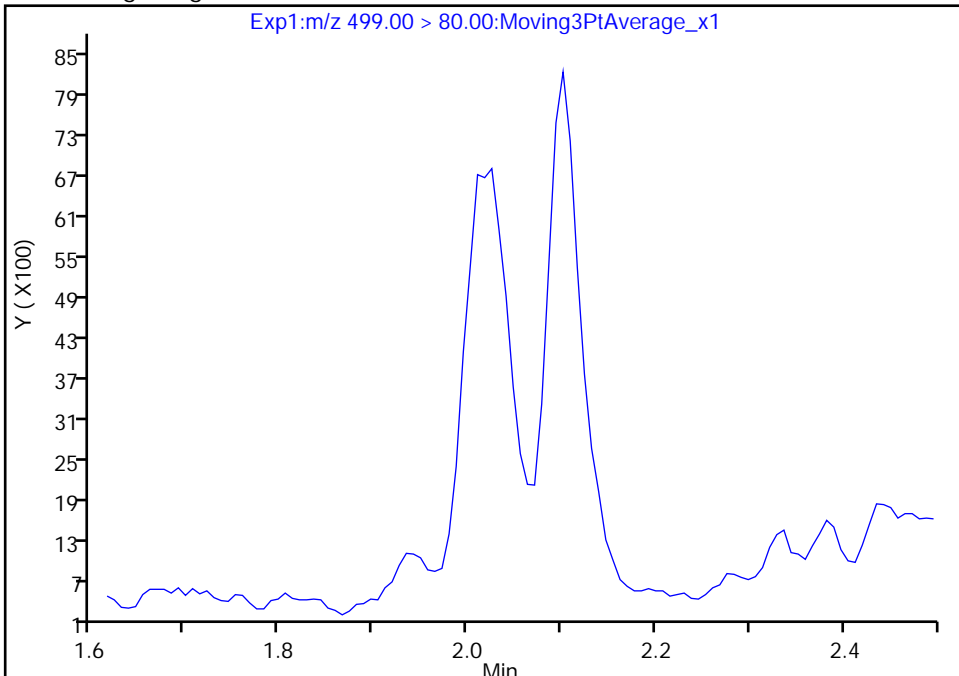
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_038.d
Injection Date: 21-Apr-2018 20:00:54 Instrument ID: A8_N
Lims ID: 320-37999-A-3-A Lab Sample ID: 320-37999-3
Client ID: WGNA-040918-RW-4848
Operator ID: SACINSTLCMS01 ALS Bottle#: 34 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

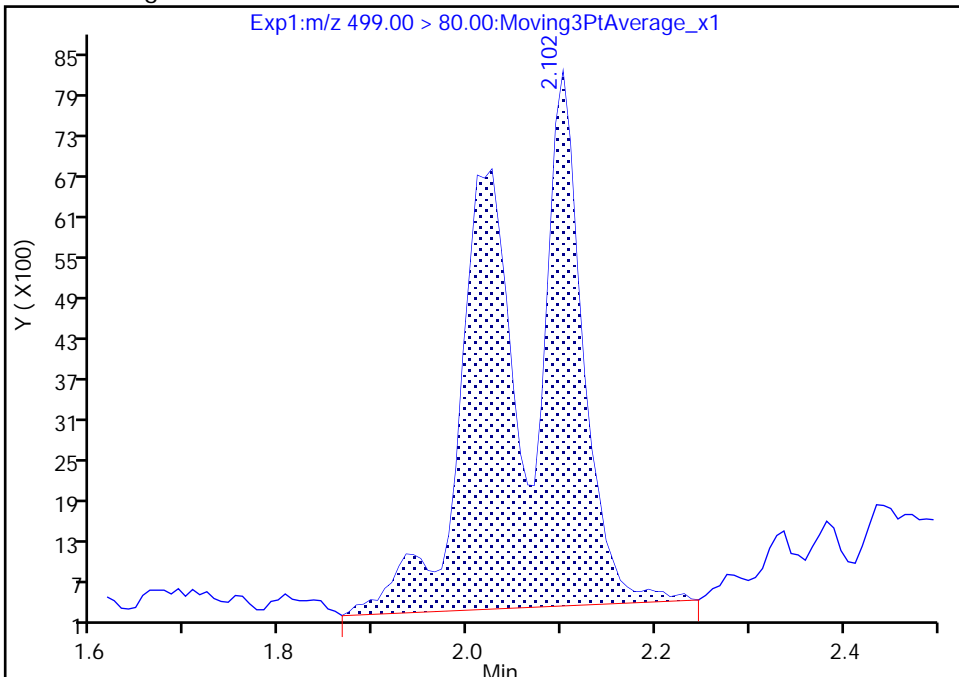
Not Detected
Expected RT: 2.10

Processing Integration Results



RT: 2.10
Area: 46904
Amount: 0.551854
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 23-Apr-2018 10:40:10
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

TestAmerica Sacramento

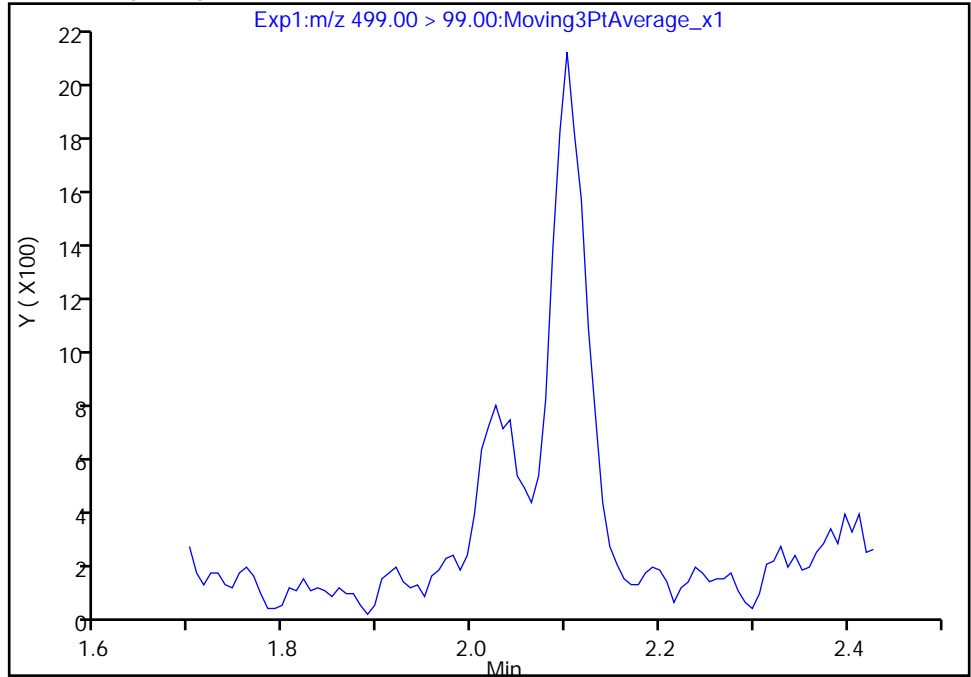
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_038.d
Injection Date: 21-Apr-2018 20:00:54 Instrument ID: A8_N
Lims ID: 320-37999-A-3-A Lab Sample ID: 320-37999-3
Client ID: WGNA-040918-RW-4848
Operator ID: SACINSTLCMS01 ALS Bottle#: 34 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

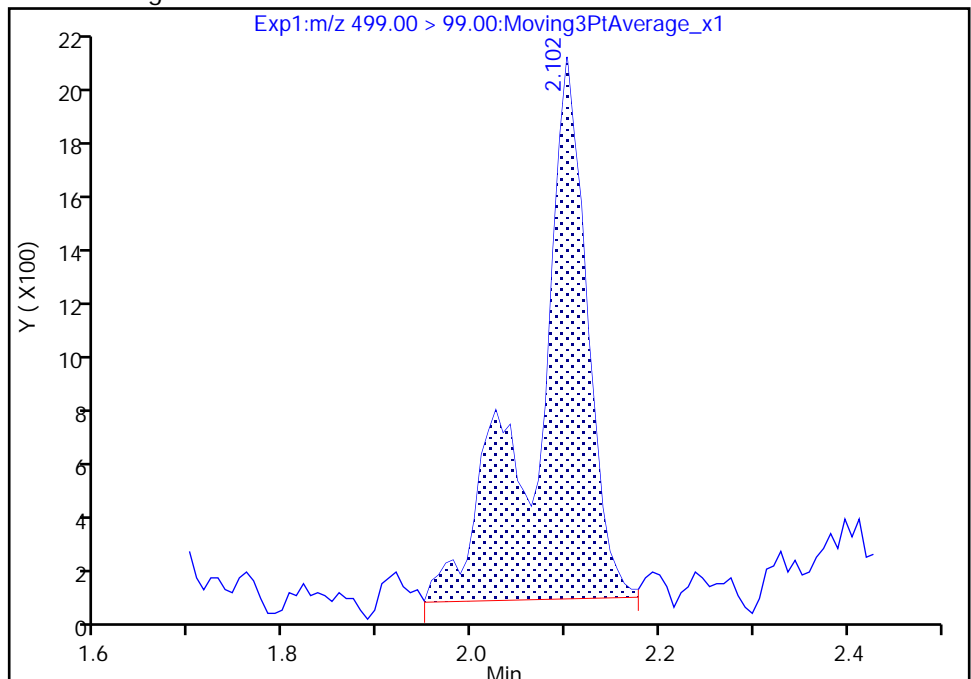
Not Detected
Expected RT: 2.10

Processing Integration Results



Manual Integration Results

RT: 2.10
Area: 7903
Amount: 0.551854
Amount Units: ng/ml



TestAmerica Sacramento

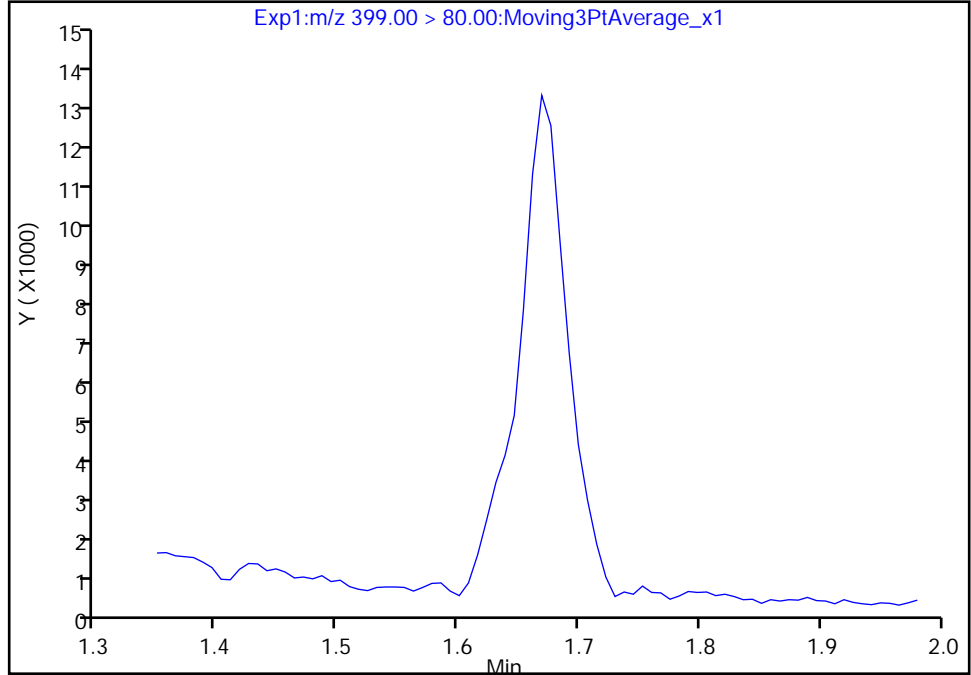
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_038.d
Injection Date: 21-Apr-2018 20:00:54 Instrument ID: A8_N
Lims ID: 320-37999-A-3-A Lab Sample ID: 320-37999-3
Client ID: WGNA-040918-RW-4848
Operator ID: SACINSTLCMS01 ALS Bottle#: 34 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

3 Perfluorohexanesulfonic acid, CAS: 355-46-4

Signal: 1

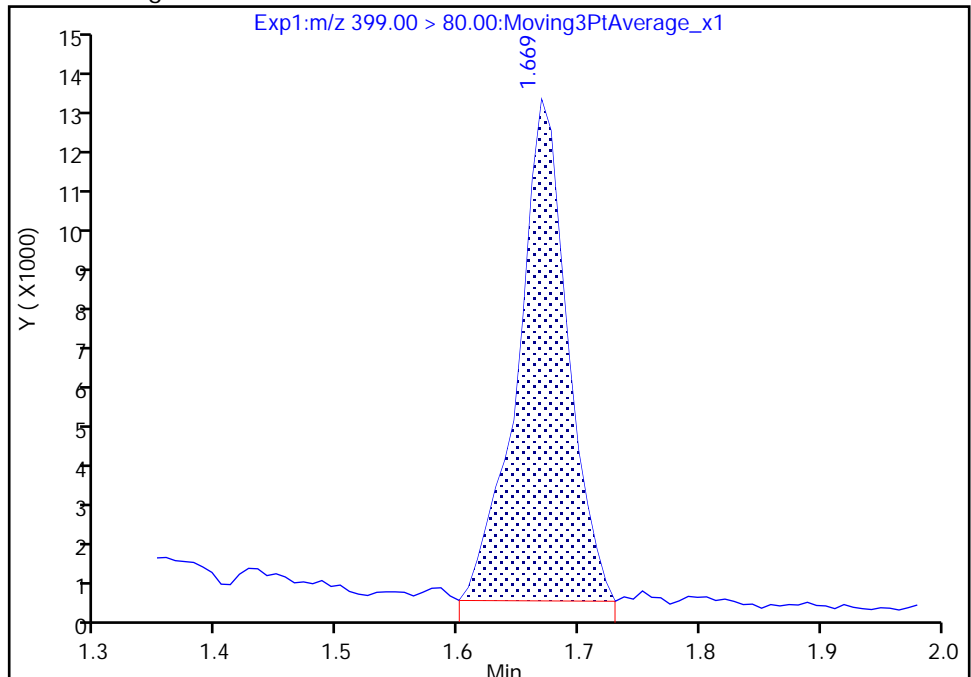
Not Detected
Expected RT: 1.68

Processing Integration Results



Manual Integration Results

RT: 1.67
Area: 35295
Amount: 0.269575
Amount Units: ng/ml



Reviewer: barnettj, 23-Apr-2018 10:40:49
Audit Action: Manually Integrated

Audit Reason: Missed Peak

TestAmerica Sacramento

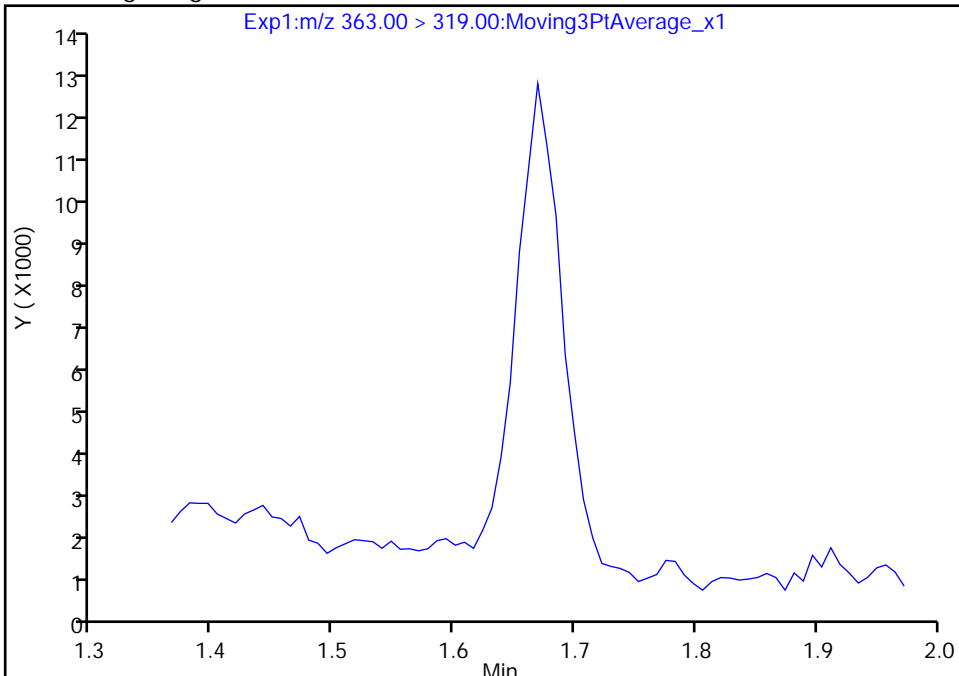
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_038.d
Injection Date: 21-Apr-2018 20:00:54 Instrument ID: A8_N
Lims ID: 320-37999-A-3-A Lab Sample ID: 320-37999-3
Client ID: WGNA-040918-RW-4848
Operator ID: SACINSTLCMS01 ALS Bottle#: 34 Worklist Smp#: 8
Injection Vol: 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

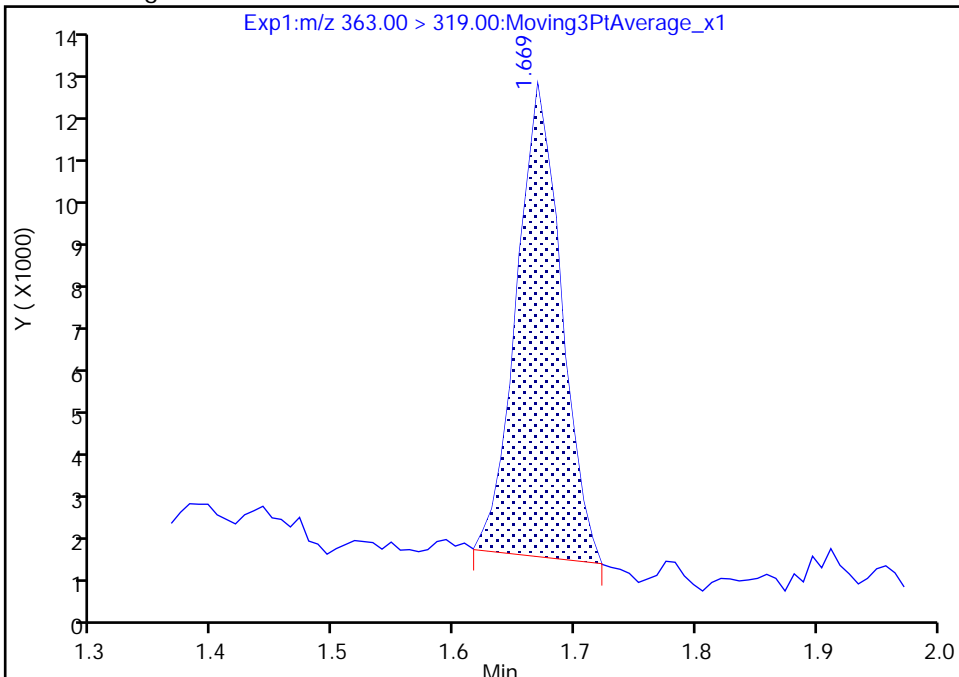
Not Detected
Expected RT: 1.68

Processing Integration Results



Manual Integration Results

RT: 1.67
Area: 26649
Amount: 0.244886
Amount Units: ng/ml



Reviewer: barnettj, 23-Apr-2018 10:40:58
Audit Action: Manually Integrated

Audit Reason: Missed Peak

TestAmerica Sacramento

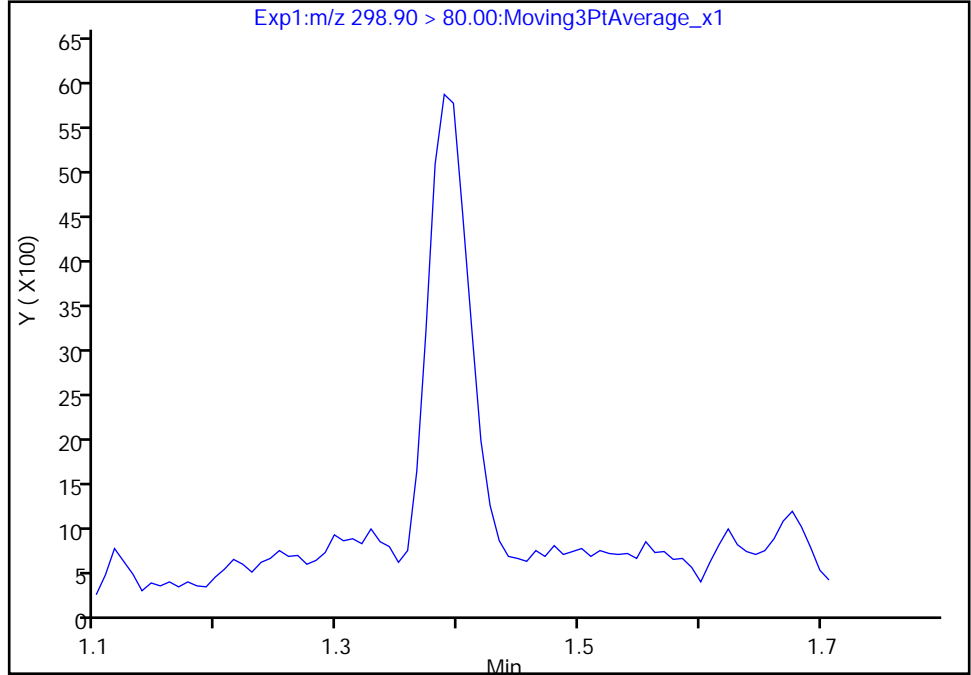
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_038.d
Injection Date: 21-Apr-2018 20:00:54 Instrument ID: A8_N
Lims ID: 320-37999-A-3-A Lab Sample ID: 320-37999-3
Client ID: WGNA-040918-RW-4848
Operator ID: SACINSTLCMS01 ALS Bottle#: 34 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

1 Perfluorobutanesulfonic acid, CAS: 375-73-5

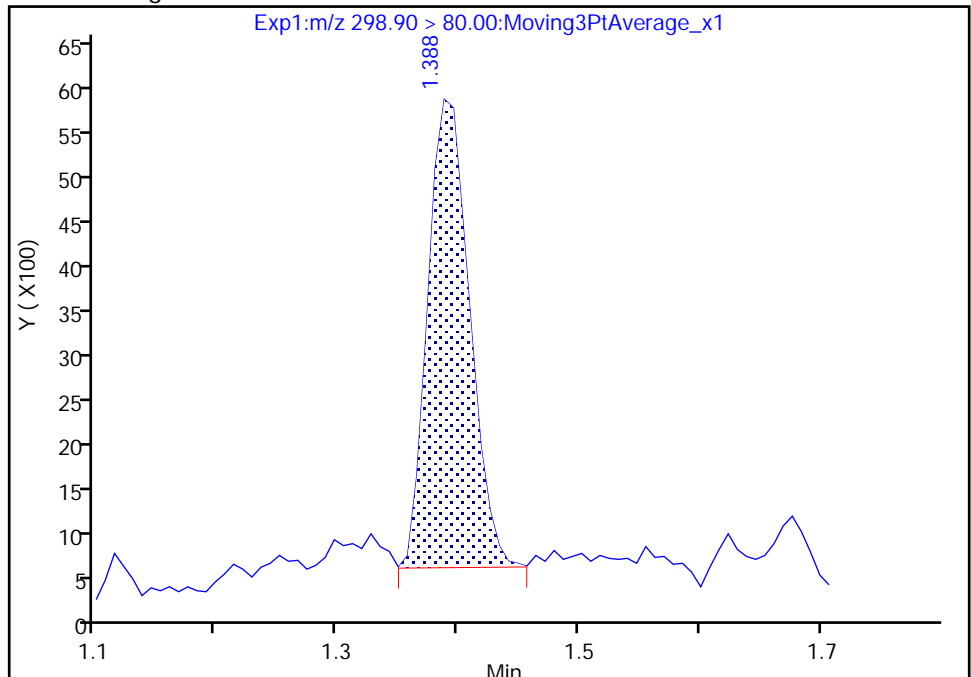
Signal: 1

Not Detected
Expected RT: 1.40

Processing Integration Results



Manual Integration Results



RT: 1.39
Area: 12674
Amount: 0.151122
Amount Units: ng/ml

Reviewer: barnettj, 23-Apr-2018 10:40:34
Audit Action: Manually Integrated

Audit Reason: Missed Peak

TestAmerica Sacramento

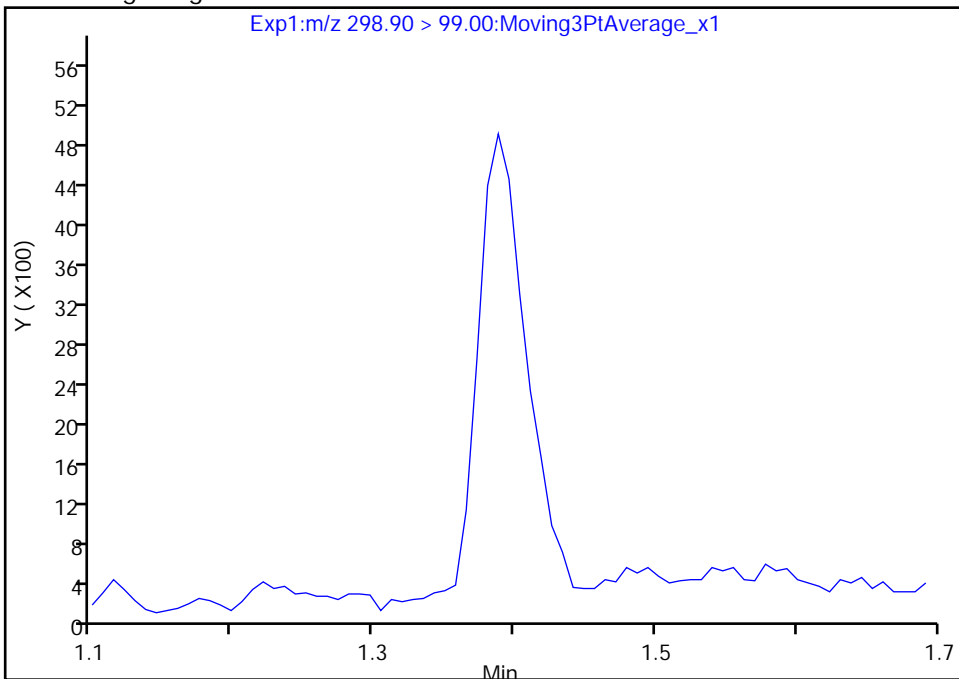
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_038.d
Injection Date: 21-Apr-2018 20:00:54 Instrument ID: A8_N
Lims ID: 320-37999-A-3-A Lab Sample ID: 320-37999-3
Client ID: WGNA-040918-RW-4848
Operator ID: SACINSTLCMS01 ALS Bottle#: 34 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

1 Perfluorobutanesulfonic acid, CAS: 375-73-5

Signal: 2

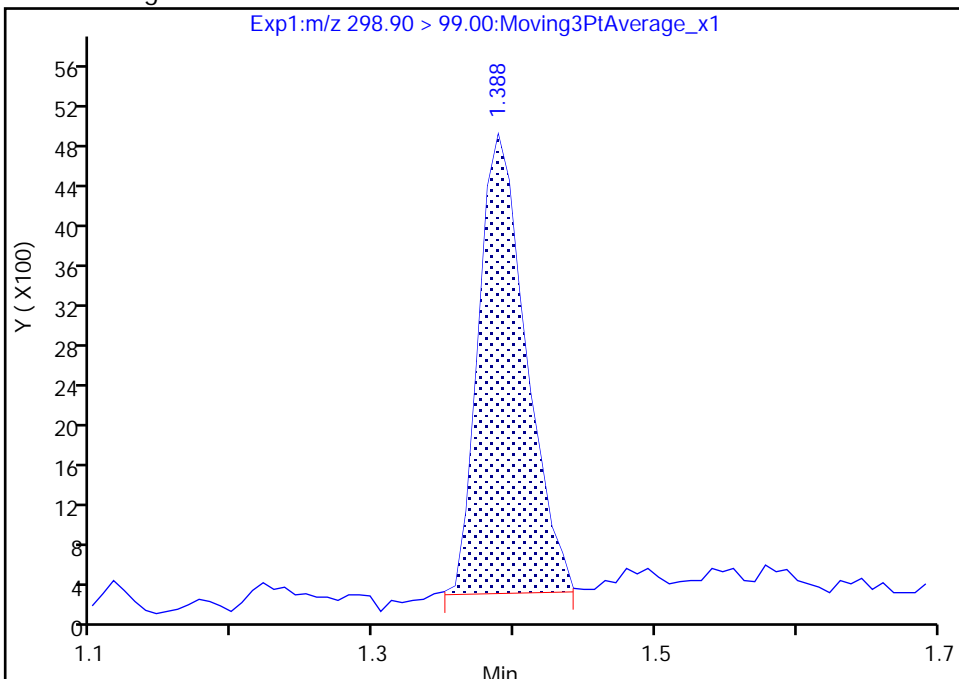
Not Detected
Expected RT: 1.40

Processing Integration Results



Manual Integration Results

RT: 1.39
Area: 10761
Amount: 0.151122
Amount Units: ng/ml



Reviewer: barnettj, 23-Apr-2018 10:40:40
Audit Action: Manually Integrated

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: WGNA-040918-FRB-4848 Lab Sample ID: 320-37999-4
 Matrix: Water Lab File ID: 2018.04.21_537A_039.d
 Analysis Method: 537 Date Collected: 04/09/2018 16:05
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 249.9(mL) Date Analyzed: 04/21/2018 20:05
 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.: 219245 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	95		70-130
STL00996	13C2 PFDA	85		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_039.d
 Lims ID: 320-37999-A-4-A
 Client ID: WGNA-040918-FRB-4848
 Sample Type: Client
 Inject. Date: 21-Apr-2018 20:05:34 ALS Bottle#: 35 Worklist Smp#: 9
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-37999-a-4-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK022

First Level Reviewer: barnettj Date: 23-Apr-2018 10:41:46

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
\$ 2 13C2 PFHxA	315.00 > 270.00	1.525	1.525	0.0	1.000	965086	9.46	6759	
* 6 13C2-PFOA	415.00 > 370.00	1.859	1.866	-0.007		959793	10.0	5520	
* 7 13C4 PFOS	503.00 > 80.00	2.102	2.109	-0.007		2264068	28.7	1188	
\$ 10 13C2 PFDA	515.00 > 470.00	2.269	2.269	0.0	1.000	693138	8.49	7045	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_039.d

Injection Date: 21-Apr-2018 20:05:34

Instrument ID: A8_N

Lims ID: 320-37999-A-4-A

Lab Sample ID: 320-37999-4

Client ID: WGNA-040918-FRB-4848

Operator ID: SACINSTLCMS01

ALS Bottle#: 35

Worklist Smp#: 9

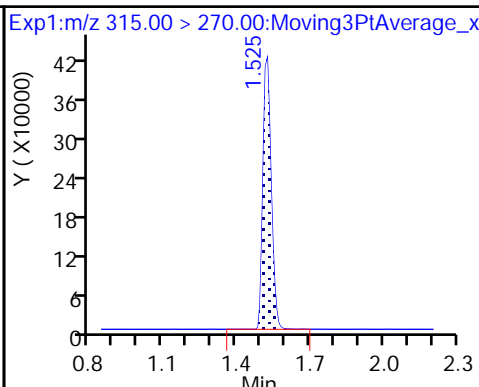
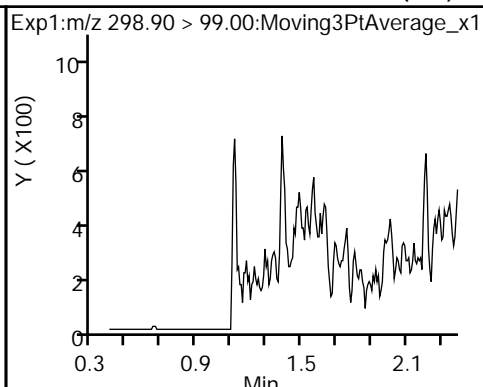
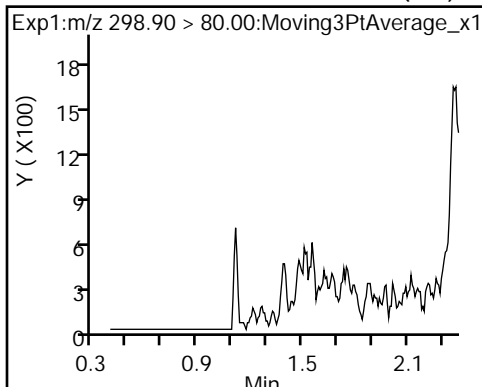
Injection Vol: 2.0 ul

Dil. Factor: 1.0000

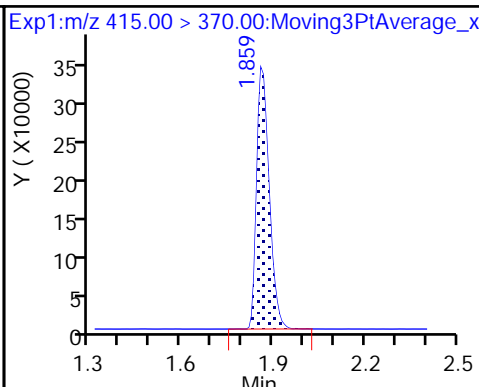
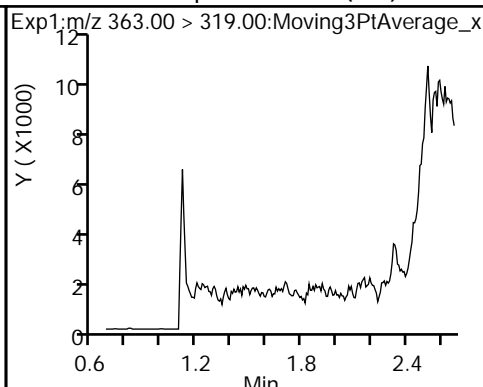
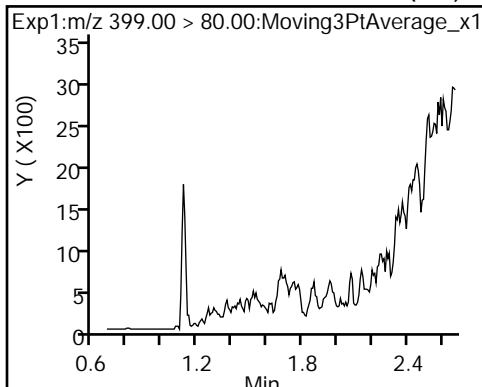
Method: 537_A8_N

Limit Group: LC 537 ICAL

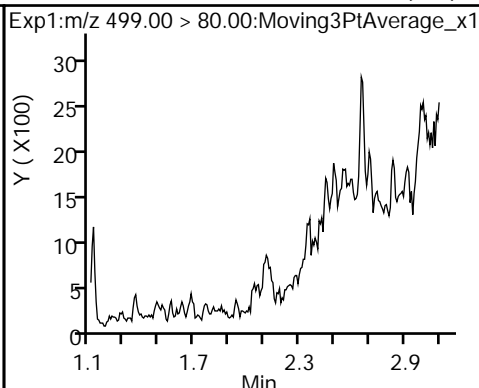
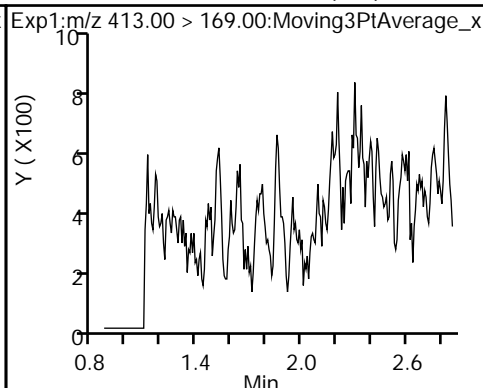
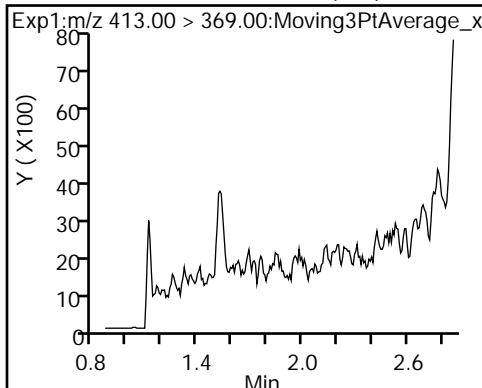
1 Perfluorobutanesulfonic acid (ND) 1 Perfluorobutanesulfonic acid (ND) \$ 2 13C2 PFHxA



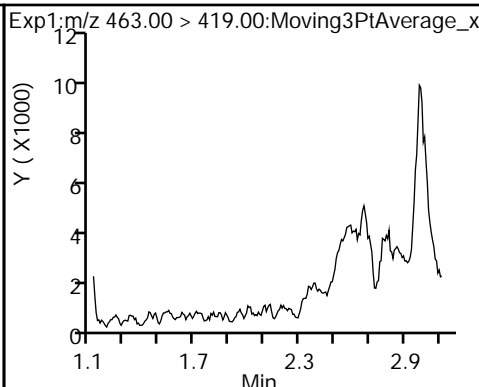
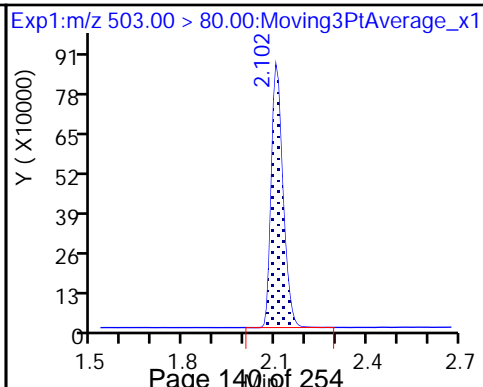
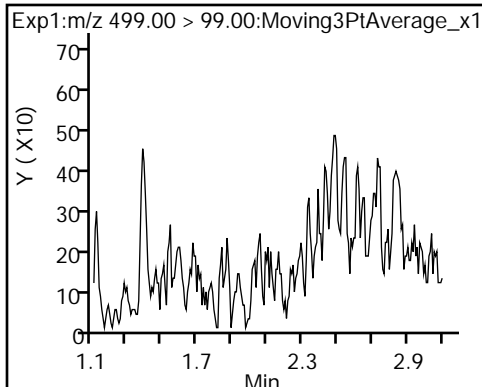
3 Perfluorohexanesulfonic acid (ND) 4 Perfluoroheptanoic acid (ND) * 6 13C2-PFOA



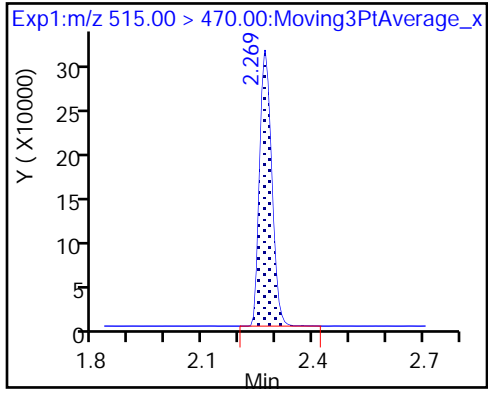
5 Perfluorooctanoic acid (ND) 5 Perfluorooctanoic acid (ND) 8 Perfluorooctane sulfonic acid (ND)



8 Perfluorooctane sulfonic acid (ND) * 7 13C4 PFOS 9 Perfluorononanoic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_039.d
 Lims ID: 320-37999-A-4-A
 Client ID: WGNA-040918-FRB-4848
 Sample Type: Client
 Inject. Date: 21-Apr-2018 20:05:34 ALS Bottle#: 35 Worklist Smp#: 9
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-37999-a-4-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
 Process Host: XAWRK022

First Level Reviewer: barnettj Date: 23-Apr-2018 10:41:46

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.46	94.58
\$ 10 13C2 PFDA	10.0	8.49	84.91

FORM VI
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
CURVE EVALUATION

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1 Analy Batch No.: 217453

SDG No.: _____

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 04/11/2018 11:45 Calibration End Date: 04/11/2018 12:09 Calibration ID: 38530

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-217453/3	2018.04.11_537ICALB_004.d
Level 2	IC 320-217453/4	2018.04.11_537ICALB_005.d
Level 3	IC 320-217453/5	2018.04.11_537ICALB_006.d
Level 4	IC 320-217453/6	2018.04.11_537ICALB_007.d
Level 5	IC 320-217453/7	2018.04.11_537ICALB_008.d
Level 6	IC 320-217453/8	2018.04.11_537ICALB_009.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)	1.1422 0.9535	1.0952	1.0744	1.0454	1.0008	Ave		1.0519			6.4		30.0				
Perfluoroheptanoic acid (PFHpA)	1.0850 1.0447	1.0991	1.0649	1.0783	1.0702	Ave		1.0737			1.7		30.0				
Perfluorohexanesulfonic acid (PFHxS)	1.6457 1.6837	1.5988	1.6030	1.6384	1.6838	Ave		1.6422			2.3		30.0				
Perfluorooctanoic acid (PFOA)	1.0599 1.0325	1.0296	1.0703	1.0516	1.1300	Ave		1.0623			3.5		30.0				
Perfluorooctanesulfonic acid (PFOS)	1.0432 1.0989	1.0519	1.0326	1.0935	1.0764	Ave		1.0661			2.6		30.0				
Perfluorononanoic acid (PFNA)	0.8261 0.8363	0.8133	0.8488	0.8818	0.8480	Ave		0.8424			2.8		30.0				
13C2 PFHxA	1.0447 1.0648	1.0532	1.0875	1.0687	1.0602	Ave		1.0632			1.4		30.0				
13C2 PFDA	0.8513 0.8262	0.8714	0.8533	0.8487	0.8519	Ave		0.8505			1.7		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.: 320-37999-1 Analy Batch No.: 217453

SDG No.: _____

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 04/11/2018 11:45 Calibration End Date: 04/11/2018 12:09 Calibration ID: 38530

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-217453/3	2018.04.11_537ICALB_004.d
Level 2	IC 320-217453/4	2018.04.11_537ICALB_005.d
Level 3	IC 320-217453/5	2018.04.11_537ICALB_006.d
Level 4	IC 320-217453/6	2018.04.11_537ICALB_007.d
Level 5	IC 320-217453/7	2018.04.11_537ICALB_008.d
Level 6	IC 320-217453/8	2018.04.11_537ICALB_009.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	870696 13871852	1696932	4015148	8010147	10764182	9.00 180	20.0	45.0	90.1	135
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	108741 1996261	218860	489075	1044752	1450463	0.960 19.4	2.16	4.86	9.72	14.6
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	418640 8226588	831963	2012030	4216387	6082352	3.00 60.5	6.72	15.1	30.2	45.4
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	219100 4019004	417632	1001316	2075568	3119787	1.98 39.6	4.40	9.90	19.8	29.7
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	349354 7016962	715378	1693810	3678059	5081660	3.95 79.1	8.79	19.8	39.5	59.3
Perfluorononanoic acid (PFNA)	13PF OA	Ave	170770 3255374	329904	794076	1740422	2341235	1.98 39.6	4.40	9.90	19.8	29.7
13C2 PFHxA	13PF OA	Ave	1090690 1046576	970942	1027706	1065262	985534	10.0 10.0	10.0	10.0	10.0	10.0
13C2 PFDA	13PF OA	Ave	888742 812112	803402	806360	845990	791901	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.: 320-37999-1 Analy Batch No.: 217453

SDG No.: _____

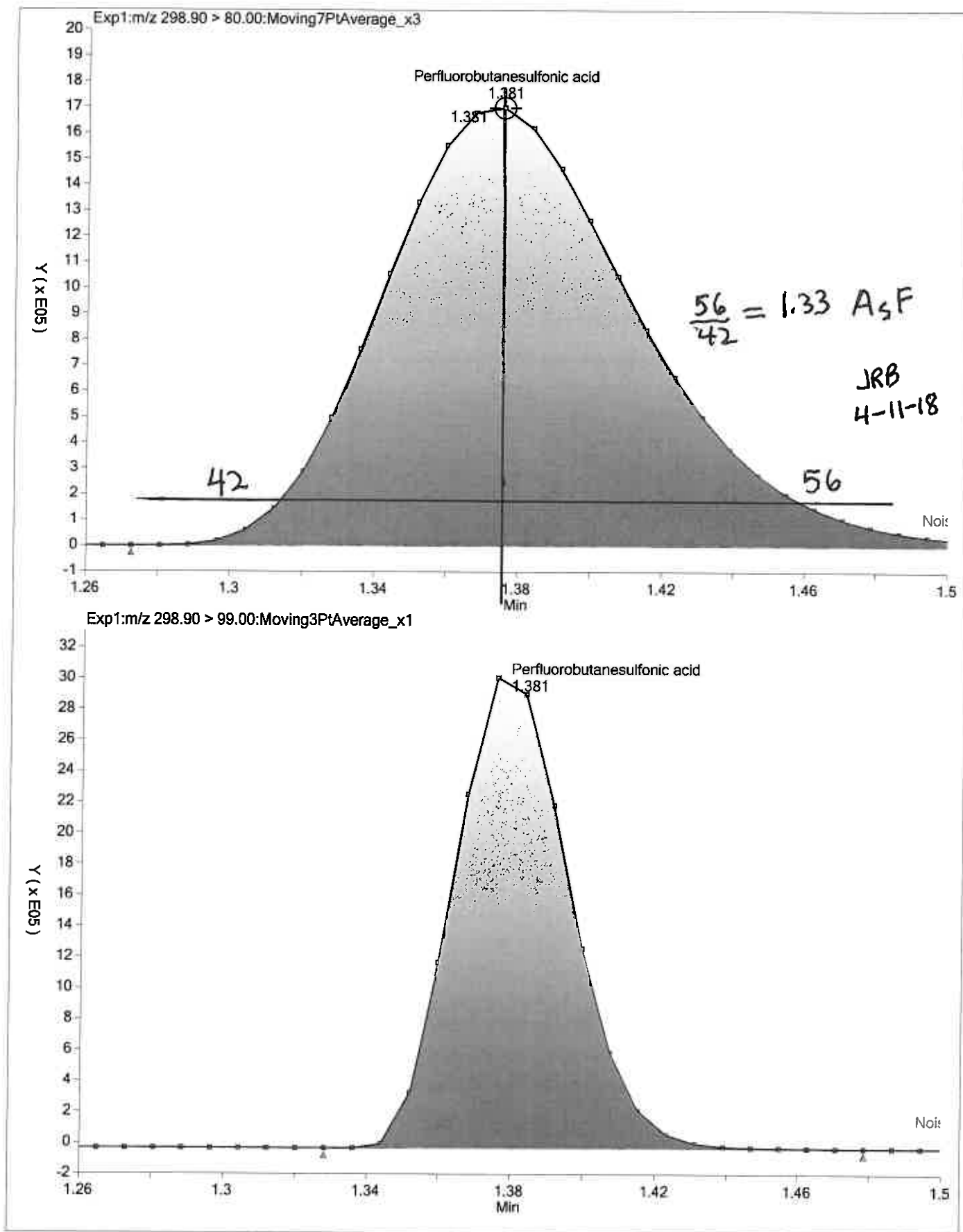
Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

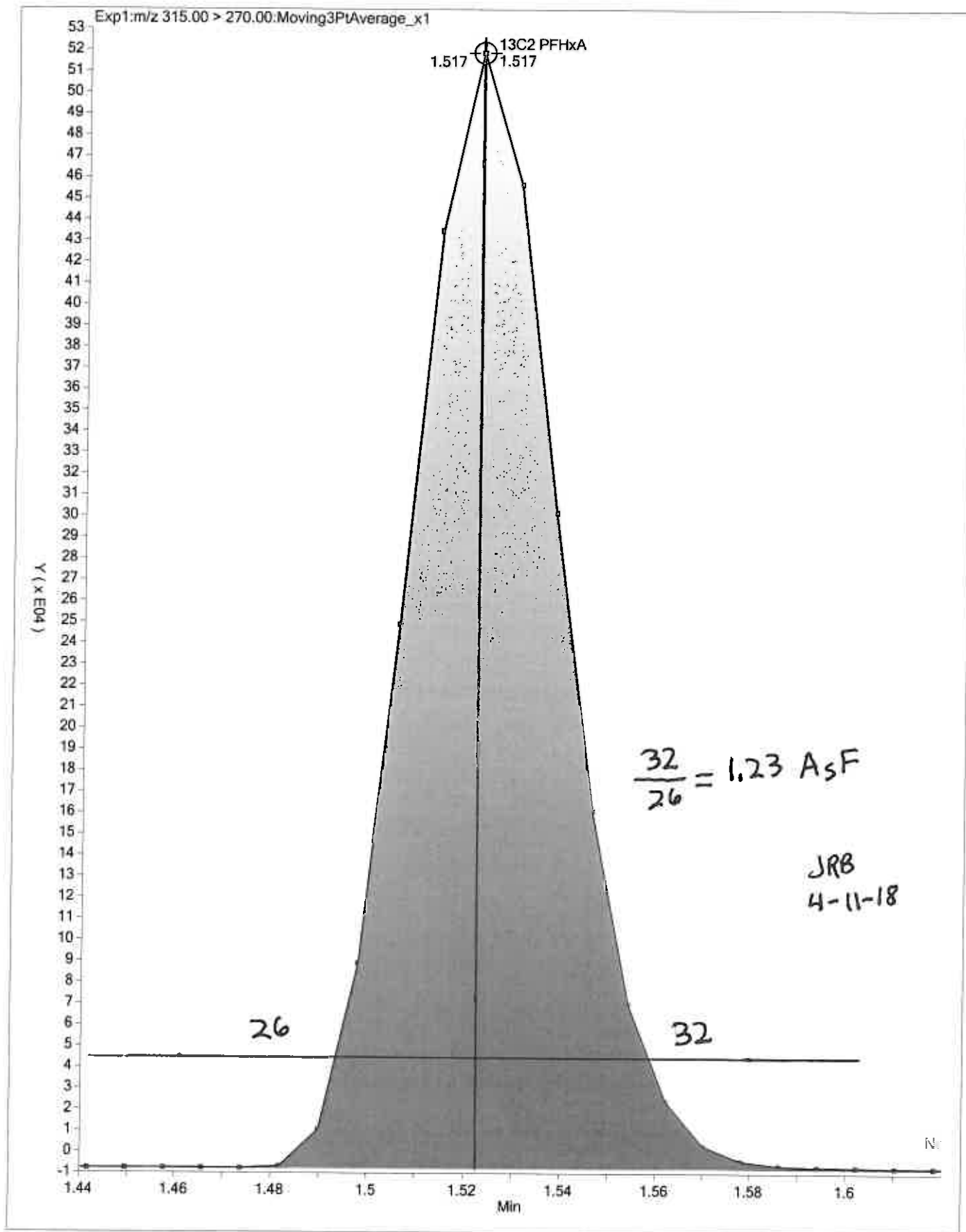
Calibration Start Date: 04/11/2018 11:45 Calibration End Date: 04/11/2018 12:09 Calibration ID: 38530

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-217453/3	2018.04.11_537ICALB_004.d
Level 2	IC 320-217453/4	2018.04.11_537ICALB_005.d
Level 3	IC 320-217453/5	2018.04.11_537ICALB_006.d
Level 4	IC 320-217453/6	2018.04.11_537ICALB_007.d
Level 5	IC 320-217453/7	2018.04.11_537ICALB_008.d
Level 6	IC 320-217453/8	2018.04.11_537ICALB_009.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)	8.6	4.1	2.1	-0.6	-4.9	-9.4	50	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	1.0	2.4	-0.8	0.4	-0.3	-2.7	50	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	0.2	-2.6	-2.4	-0.2	2.5	2.5	50	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	-0.2	-3.1	0.7	-1.0	6.4	-2.8	50	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	-2.1	-1.3	-3.1	2.6	1.0	3.1	50	30	30	30	30	30
Perfluorononanoic acid (PFNA)	-1.9	-3.5	0.8	4.7	0.7	-0.7	50	30	30	30	30	30
13C2 PFHxA	-1.7	-0.9	2.3	0.5	-0.3	0.1	30	30	30	30	30	30
13C2 PFDA	0.1	2.5	0.3	-0.2	0.2	-2.9	30	30	30	30	30	30





TestAmerica Laboratories
Istd/Surrogate Recovery Report

Worklist Name: 11APR2018A_537B_ICAL Worklist Num: 56557
 Instrument: A8_N Method: 537_A8_N
 Batch Directory: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b
 Limit Group: LC 537 ICAL
 Analysis Type: SemiVOA
 Inj Volume: 2.00 Inj Vol Units: ul

Lims Batch: 217453
 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				1027183 1.87	2580682 2.11
# 1 RB	11-Apr-2018 11:36:27			957389 93.2	2343443 90.8
# 2 RB	11-Apr-2018 11:41:06			937814 91.3	2225117 86.2
IS Std					
# 3 IC L1	11-Apr-2018 11:45:47	1.52 98.26	2.26 100.10	1044020> 100.0*	2429483> 100.0*
# 4 IC L2	11-Apr-2018 11:50:27	1.51 99.06	2.26 102.50	921915> 88.3*	2220259> 91.4*
# 5 IC L3	11-Apr-2018 11:55:08	1.52 102.30	2.26 100.30	945031> 90.5*	2380125> 98.0*
# 6 IC L4	11-Apr-2018 11:59:48	1.52 100.50	2.26 99.79	996809> 95.5*	2440107> 100.4*
# 7 IC L5	11-Apr-2018 12:04:29	1.52 99.72	2.26 100.20	929546> 89.0*	2283311> 94.0*
# 8 IC L6	11-Apr-2018 12:09:09	1.51 100.10	2.25 97.15	982926> 94.1*	2316327> 95.3*
IS Std				945031 1.87	2380125 2.11
# 9 RB	11-Apr-2018 12:13:50			919421 97.3	2344246 98.5
IS Std				996809 1.87	2440107 2.10
#10 CCVL	11-Apr-2018 12:18:29	1.52 97.44	2.26 103.40	964533 96.8	2387973 97.9
IS Std				964533 1.87	2387973 2.10
#11 ICB	11-Apr-2018 12:23:10			943600 97.8	2246875 94.1
IS Std				996809 1.87	2440107 2.10
#12 ICV	11-Apr-2018 12:27:50	1.51 92.99	2.25 91.91	1123391 112.7	2710764 111.1

13C2-PFOA

$$RPD = \frac{1044020 - 921915}{\frac{1044020 + 921915}{2}} \times 100 = 12.4$$

13C4-PFOS

$$RPD = \frac{2440107 - 2220259}{\frac{2440107 + 2220259}{2}} \times 100 = 9.43$$

JRB
4-11-18

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_004.d
 Lims ID: IC L1
 Client ID:
 Sample Type: IC Calib Level: 1
 Inject. Date: 11-Apr-2018 11:45:47 ALS Bottle#: 1 Worklist Smp#: 3
 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\20180411-56557.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 11-Apr-2018 12:35:27 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
 Process Host: XAWRK015

First Level Reviewer: westendorfc Date: 11-Apr-2018 12:31:32

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	1.382	-0.001	1.000	870696	9.77		690	
298.90 > 99.00	1.381	1.382	-0.001	1.000	638403		1.36(0.00-0.00)	875	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.517	1.515	0.002	1.000	1090690	9.83		11391	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.669	1.669	0.0	1.000	418640	3.01		133	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.669	1.669	0.0	1.000	108741	0.9701		13.9	
* 6 13C2-PFOA									
415.00 > 370.00	1.866	1.865	0.001		1044020	10.0		6295	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.866	1.866	0.0	1.000	219100	1.98		35.1	
413.00 > 169.00	1.866	1.866	0.0	1.000	116014		1.89(0.00-0.00)	128	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.102	2.094	0.008	1.000	349354	3.87		105	a
499.00 > 99.00	2.102	2.094	0.008	1.000	79188		4.41(0.00-0.00)	237	a
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.102	0.0		2429483	28.7		1437	
9 Perfluorononanoic acid									
463.00 > 419.00	2.109	2.109	0.0	1.000	170770	1.94		31.2	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.261	2.260	0.001	1.000	888742	10.0		8004	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L1_00022

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_004.d

Injection Date: 11-Apr-2018 11:45:47

Instrument ID: A8_N

Lims ID: IC L1

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 1

Worklist Smp#: 3

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

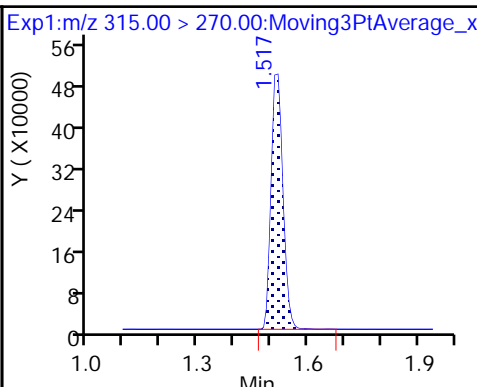
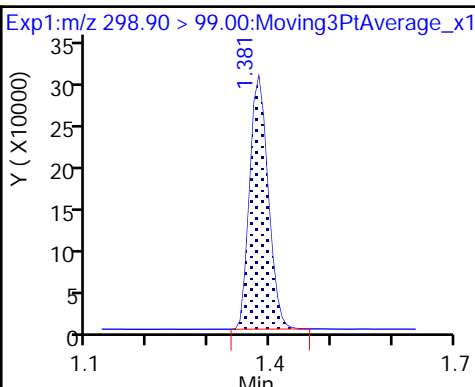
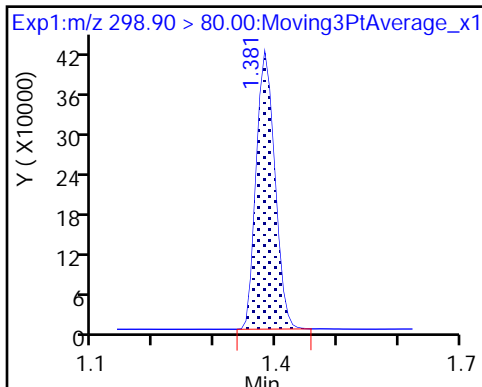
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

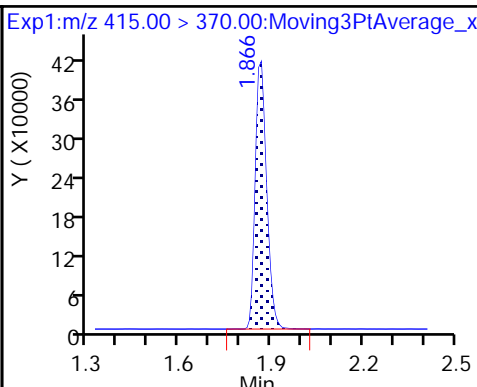
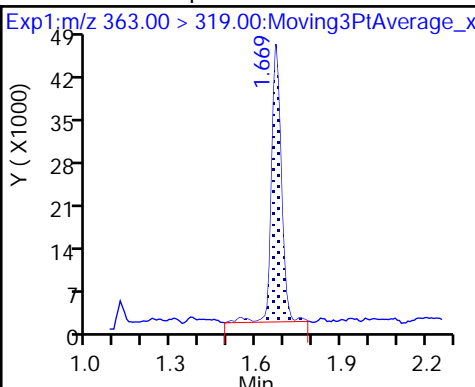
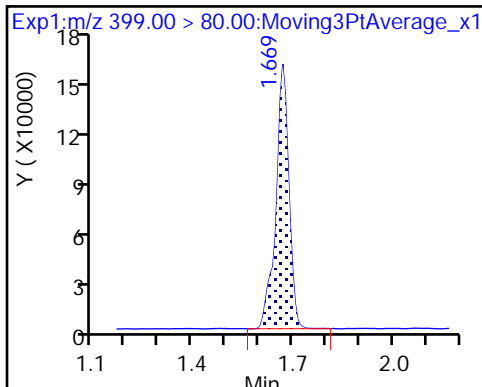
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

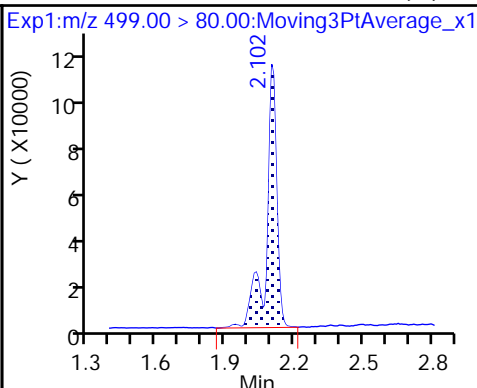
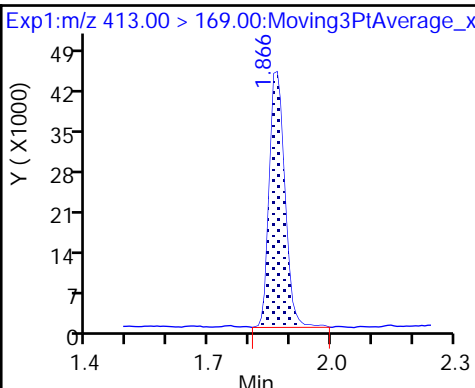
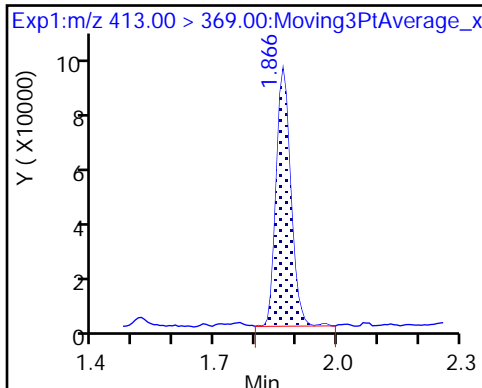
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

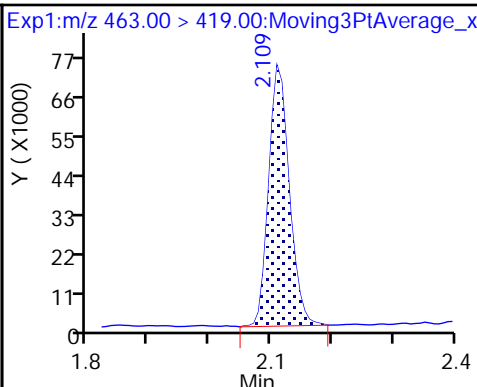
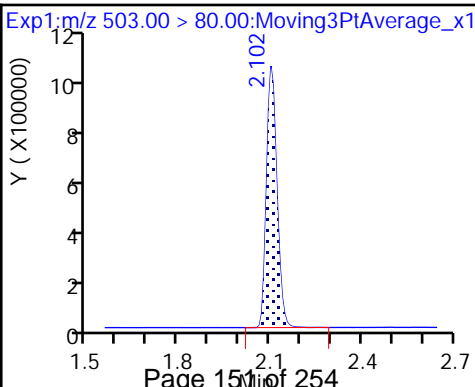
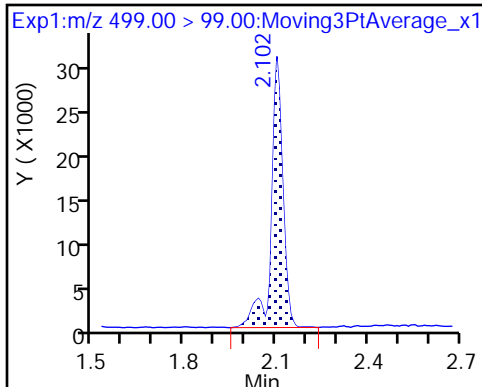
8 Perfluorooctane sulfonic acid (M)



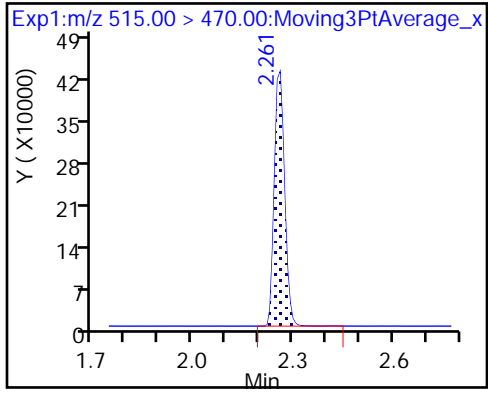
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

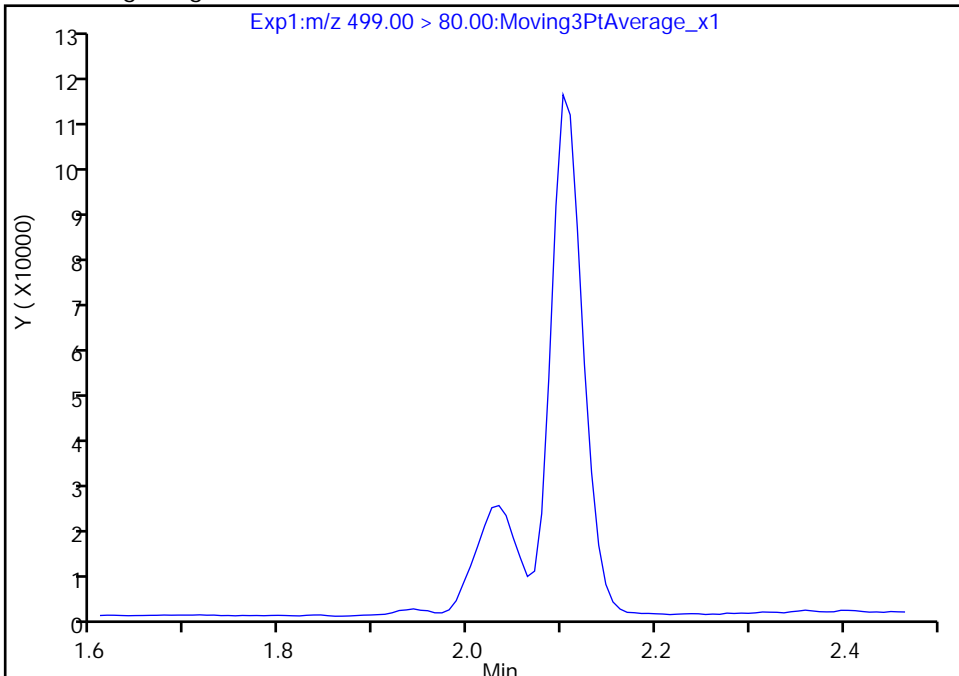
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_004.d
Injection Date: 11-Apr-2018 11:45:47 Instrument ID: A8_N
Lims ID: IC L1
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

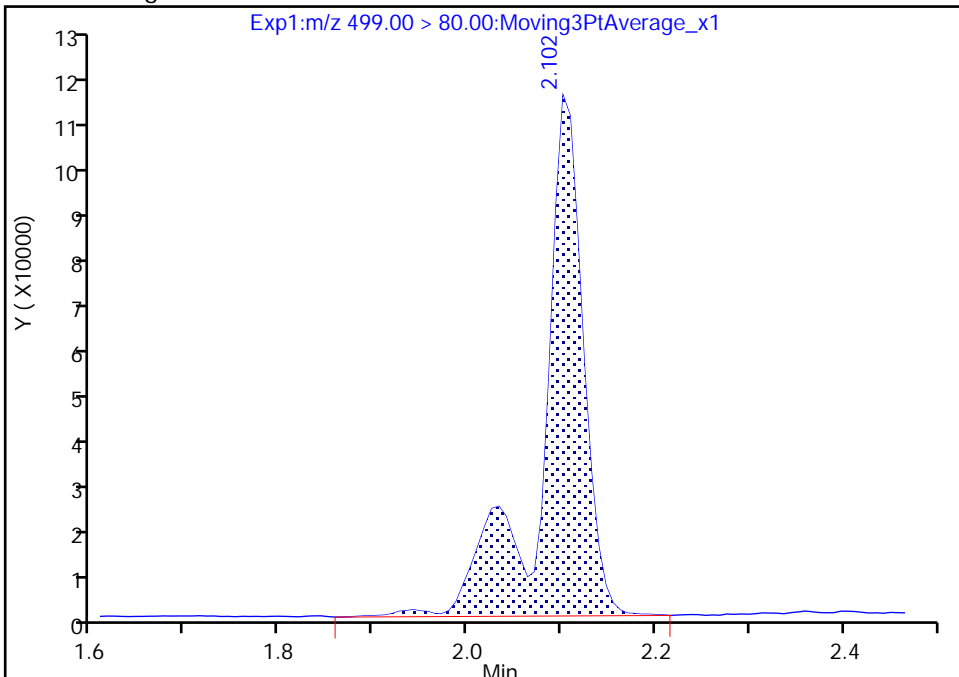
Not Detected
Expected RT: 2.09

Processing Integration Results



RT: 2.10
Area: 349354
Amount: 3.868513
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 11-Apr-2018 12:31:29
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_005.d
 Lims ID: IC L2
 Client ID:
 Sample Type: IC Calib Level: 2
 Inject. Date: 11-Apr-2018 11:50:27 ALS Bottle#: 2 Worklist Smp#: 4
 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\20180411-56557.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 11-Apr-2018 12:35:28 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
 Process Host: XAWRK015

First Level Reviewer: westendorfc Date: 11-Apr-2018 12:31:37

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	1.382	-0.001	1.000	1696932	20.8		1370	
298.90 > 99.00	1.381	1.382	-0.001	1.000	1238814		1.37(0.00-0.00)	1448	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.510	1.515	-0.005	1.000	970942	9.91		9056	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.669	1.669	0.0	1.000	218860	2.21		24.5	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.669	1.669	0.0	1.000	831963	6.54		251	
* 6 13C2-PFOA									
415.00 > 370.00	1.866	1.865	0.001		921915	10.0		5396	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.866	1.866	0.0	1.000	417632	4.26		64.6	
413.00 > 169.00	1.866	1.866	0.0	1.000	226435		1.84(0.00-0.00)	235	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.102	2.094	0.008	1.000	715378	8.67		193	a
499.00 > 99.00	2.102	2.094	0.008	1.000	153149		4.67(0.00-0.00)	389	a
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.102	0.0		2220259	28.7		1258	
9 Perfluorononanoic acid									
463.00 > 419.00	2.109	2.109	0.0	1.000	329904	4.25		54.3	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.261	2.260	0.001	1.000	803402	10.2		7224	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L2_00022

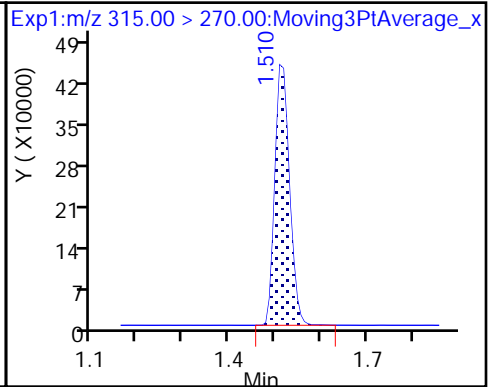
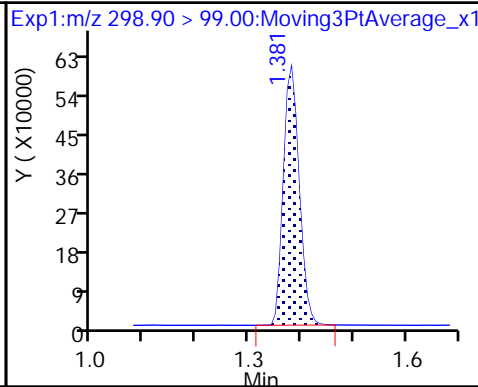
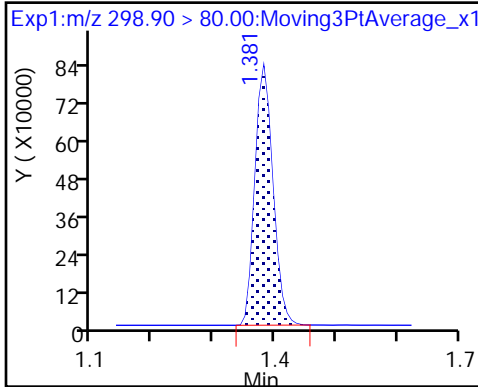
Amount Added: 1.00

Units: mL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

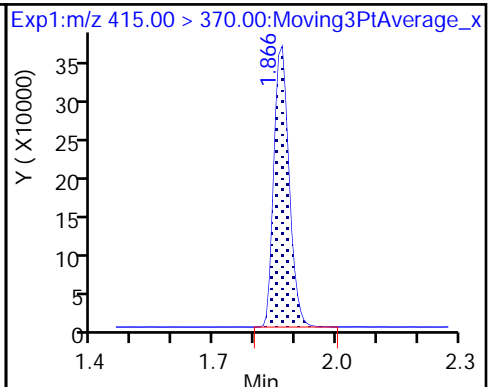
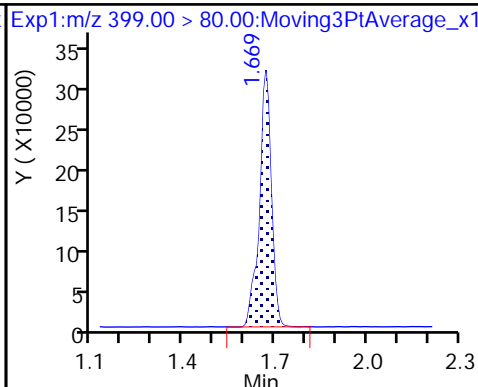
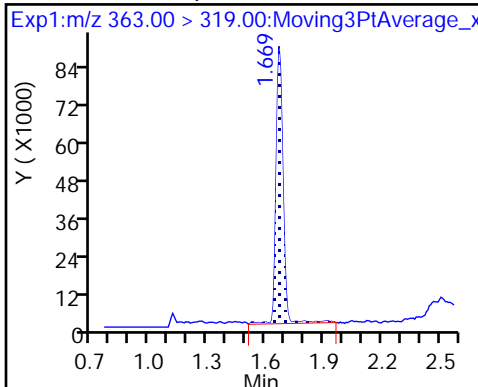
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

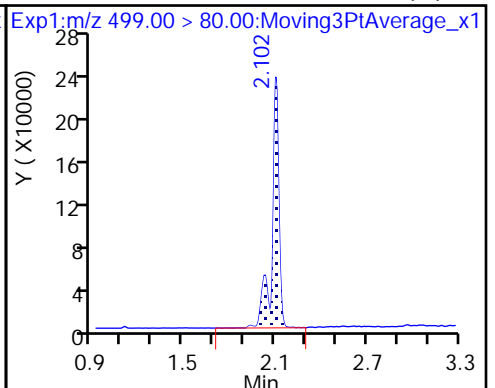
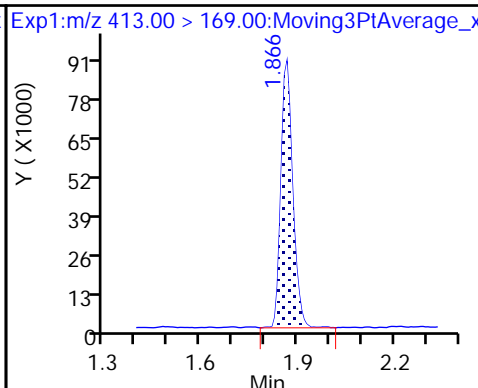
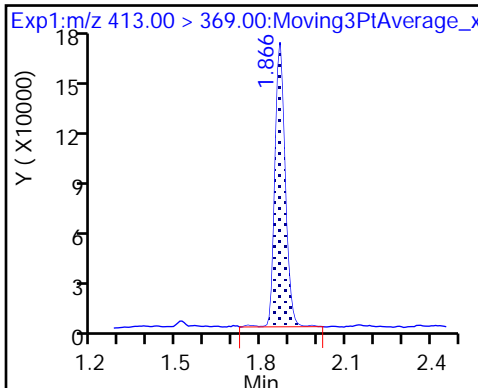
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

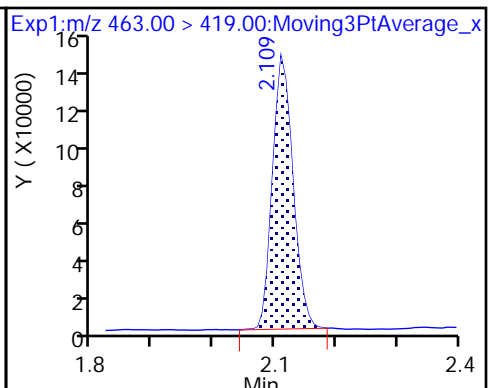
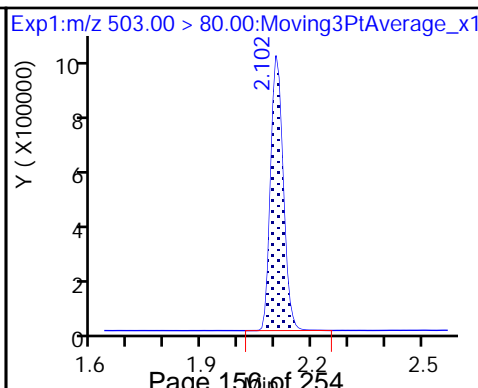
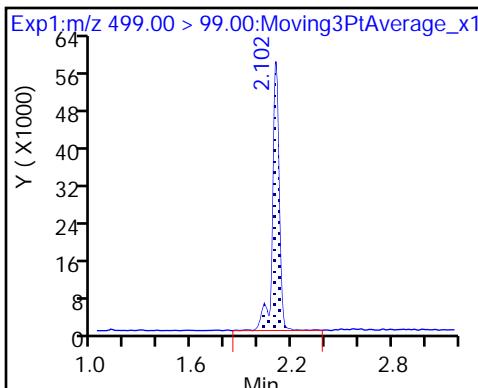
8 Perfluorooctane sulfonic acid (M)



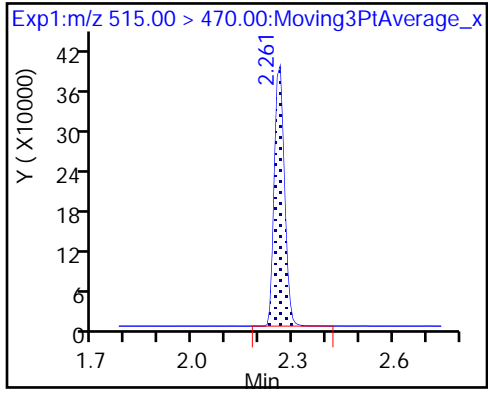
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

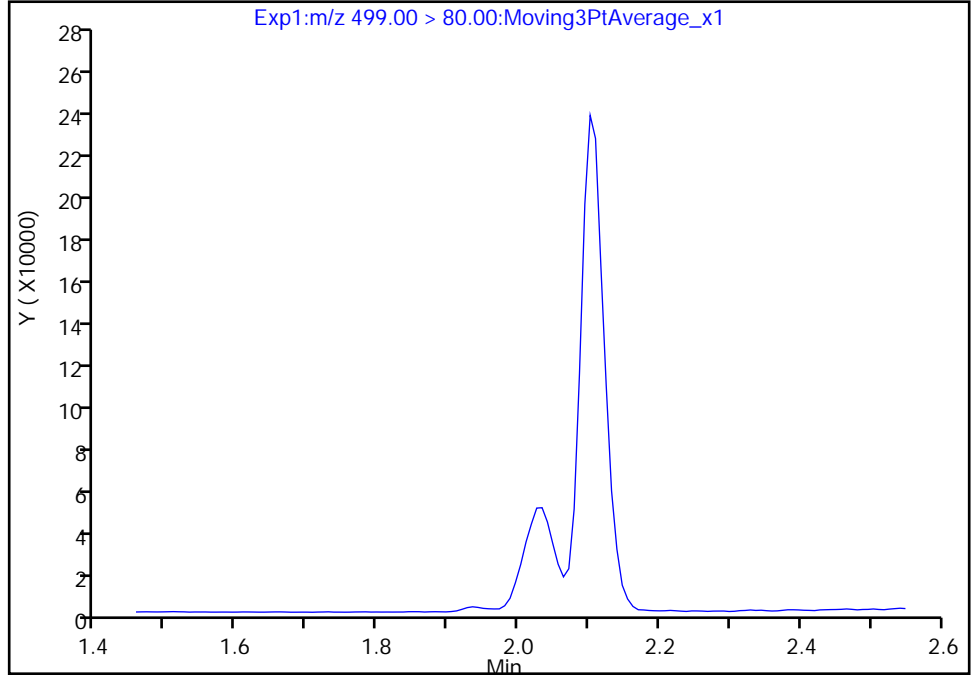
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_005.d
Injection Date: 11-Apr-2018 11:50:27 Instrument ID: A8_N
Lims ID: IC L2
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

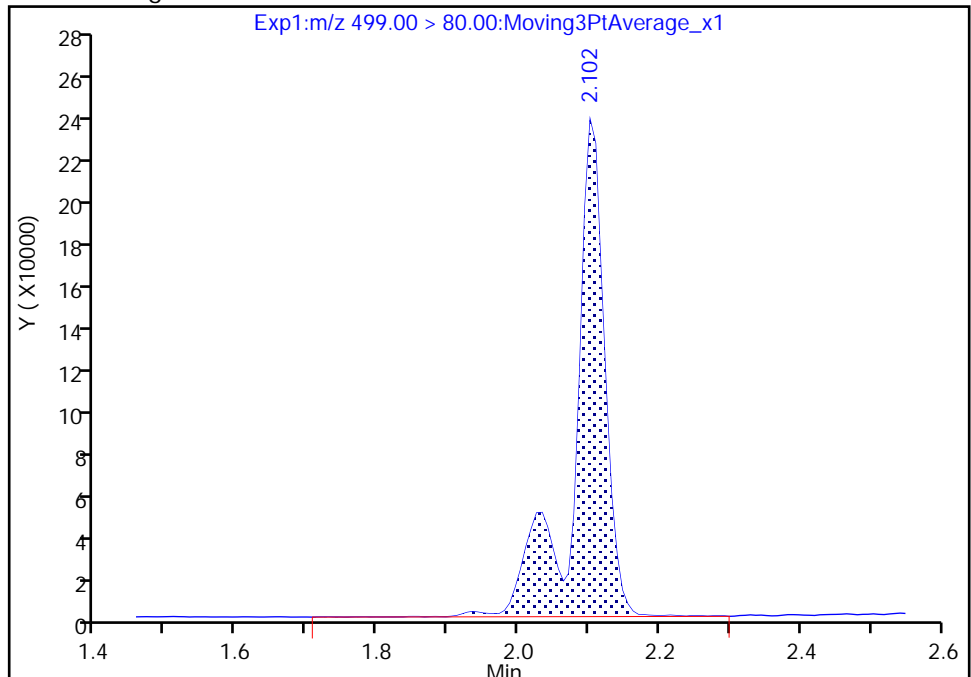
Not Detected
Expected RT: 2.09

Processing Integration Results



Manual Integration Results

RT: 2.10
Area: 715378
Amount: 8.668106
Amount Units: ng/ml



Reviewer: westendorfc, 11-Apr-2018 12:31:35
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_006.d
 Lims ID: IC L3
 Client ID:
 Sample Type: IC Calib Level: 3
 Inject. Date: 11-Apr-2018 11:55:08 ALS Bottle#: 3 Worklist Smp#: 5
 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\20180411-56557.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 11-Apr-2018 12:35:29 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
 Process Host: XAWRK015

First Level Reviewer: westendorfc Date: 11-Apr-2018 12:31:41

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	1.382	0.006	1.000	4015148	46.0		3087	
298.90 > 99.00	1.388	1.382	0.006	1.000	3101910		1.29(0.00-0.00)	3481	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.517	1.515	0.002	1.000	1027706	10.2		8913	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.677	1.669	0.008	1.000	2012030	14.8		618	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.677	1.669	0.008	1.000	489075	4.82		58.8	
* 6 13C2-PFOA									
415.00 > 370.00	1.866	1.865	0.001		945031	10.0		5639	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.874	1.866	0.008	1.000	1001316	9.97		149	
413.00 > 169.00	1.866	1.866	0.0	0.996	522184		1.92(0.00-0.00)	570	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.109	2.094	0.015	1.000	1693810	19.1		469	a
499.00 > 99.00	2.109	2.094	0.015	1.000	359496		4.71(0.00-0.00)	862	a
* 7 13C4 PFOS									
503.00 > 80.00	2.109	2.102	0.007		2380125	28.7		1348	
9 Perfluorononanoic acid									
463.00 > 419.00	2.117	2.109	0.008	1.000	794076	9.97		123	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.261	2.260	0.001	1.000	806360	10.0		7204	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L3_00025

Amount Added: 1.00

Units: mL

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_006.d

Injection Date: 11-Apr-2018 11:55:08

Instrument ID: A8_N

Lims ID: IC L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 5

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

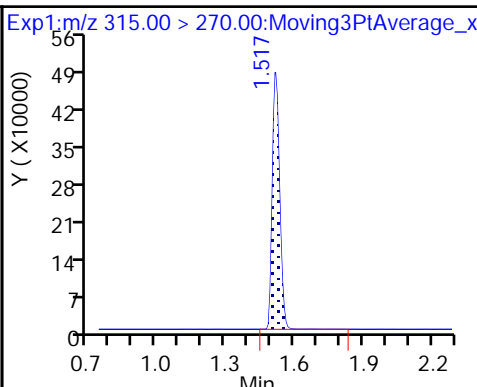
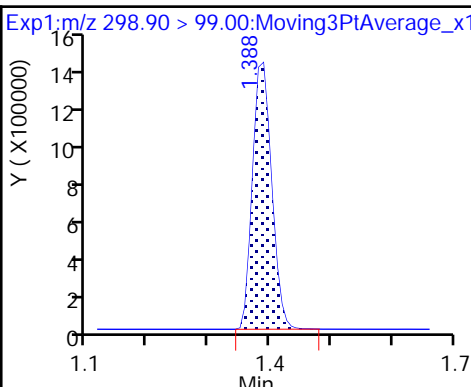
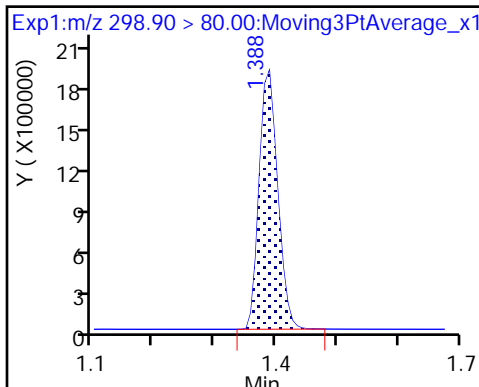
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

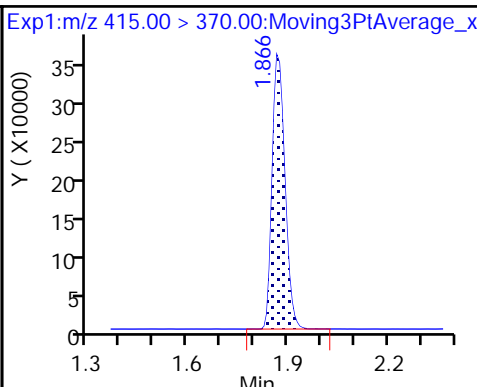
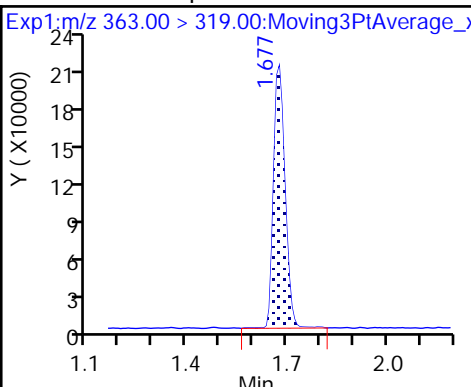
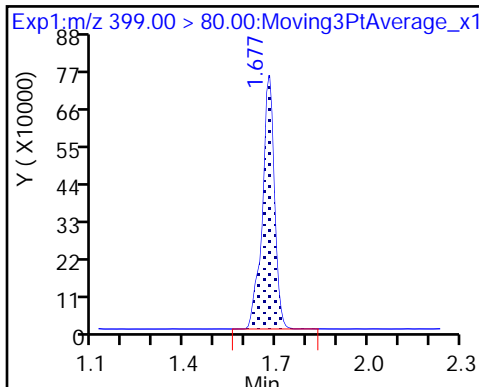
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

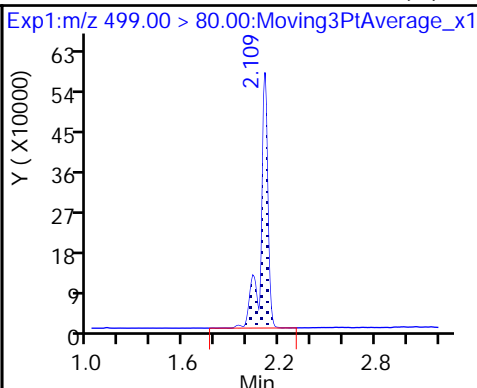
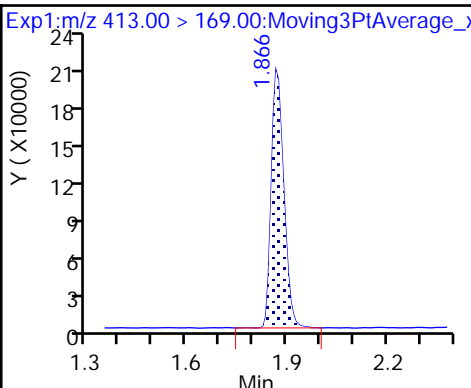
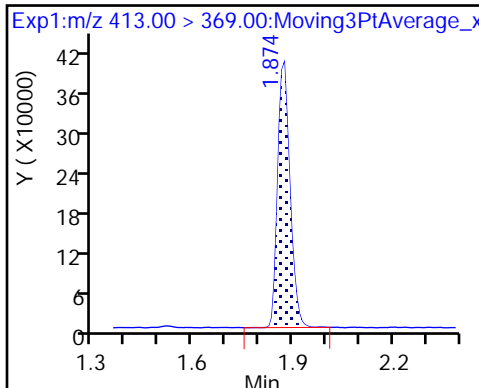
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

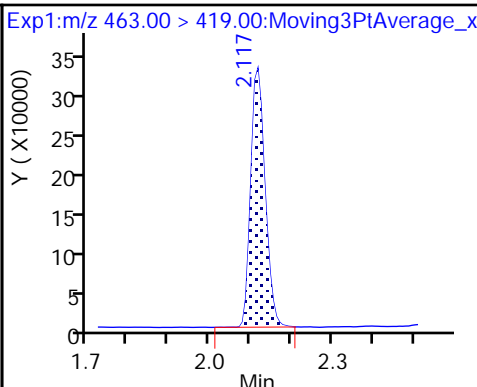
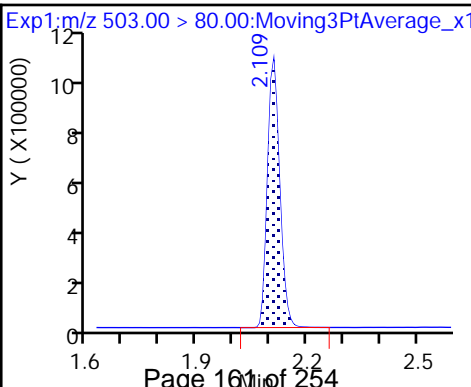
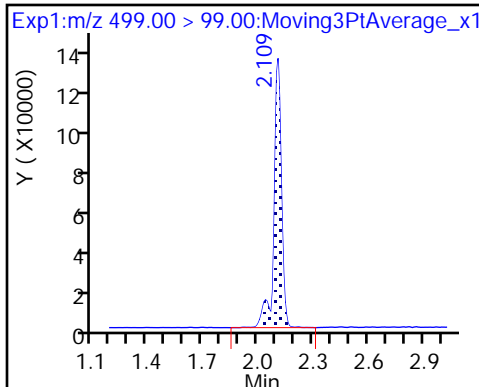
8 Perfluorooctane sulfonic acid (M)



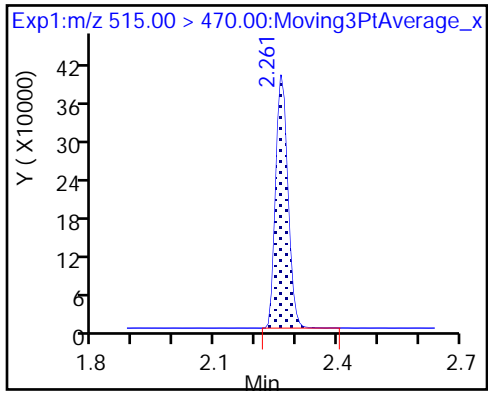
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

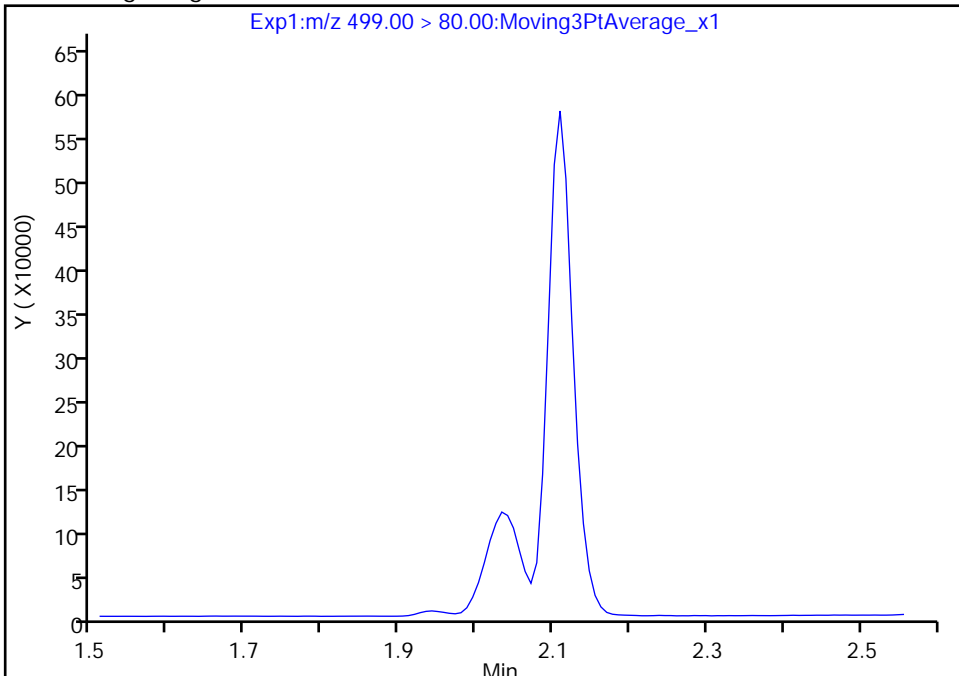
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_006.d
Injection Date: 11-Apr-2018 11:55:08 Instrument ID: A8_N
Lims ID: IC L3
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

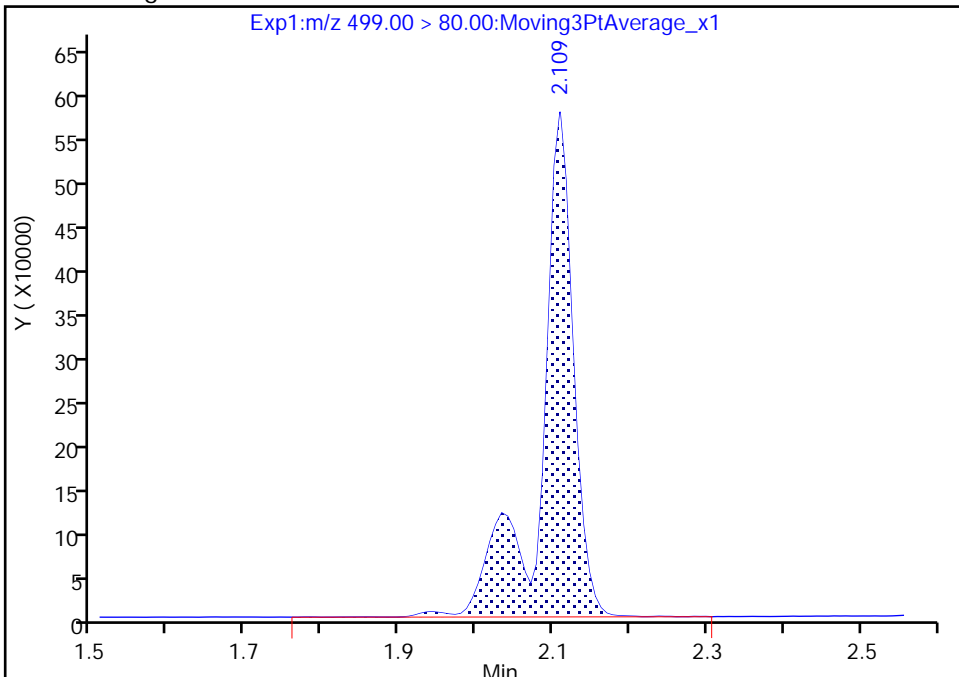
Not Detected
Expected RT: 2.09

Processing Integration Results



RT: 2.11
Area: 1693810
Amount: 19.145080
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 11-Apr-2018 12:31:39
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_007.d
 Lims ID: IC L4
 Client ID:
 Sample Type: ICISAV Calib Level: 4
 Inject. Date: 11-Apr-2018 11:59:48 ALS Bottle#: 4 Worklist Smp#: 6
 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\20180411-56557.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 11-Apr-2018 12:35:30 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
 Process Host: XAWRK015

First Level Reviewer: westendorfc Date: 11-Apr-2018 12:31:47

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.381	1.382	-0.001	1.000	8010147	89.5		5376	
298.90 > 99.00	1.381	1.382	-0.001	1.000	6369602		1.26(0.00-0.00)	6440	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.517	1.515	0.002	1.000	1065262	10.1		8514	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.669	1.669	0.0	1.000	1044752	9.76		122	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.669	1.669	0.0	1.000	4216387	30.2		1268	
* 6 13C2-PFOA									
415.00 > 370.00	1.866	1.865	0.001		996809	10.0		6544	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.866	1.866	0.0	1.000	2075568	19.6		309	
413.00 > 169.00	1.866	1.866	0.0	1.000	1142250		1.82(0.00-0.00)	1229	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.102	2.094	0.008	1.000	3678059	40.6		1000	a
499.00 > 99.00	2.102	2.094	0.008	1.000	748966		4.91(0.00-0.00)	1731	a
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.102	0.0		2440107	28.7		1331	
9 Perfluorononanoic acid									
463.00 > 419.00	2.109	2.109	0.0	1.000	1740422	20.7		274	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.261	2.260	0.001	1.000	845990	9.98		7531	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L4_00022

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_007.d

Injection Date: 11-Apr-2018 11:59:48

Instrument ID: A8_N

Lims ID: IC L4

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 4

Worklist Smp#: 6

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

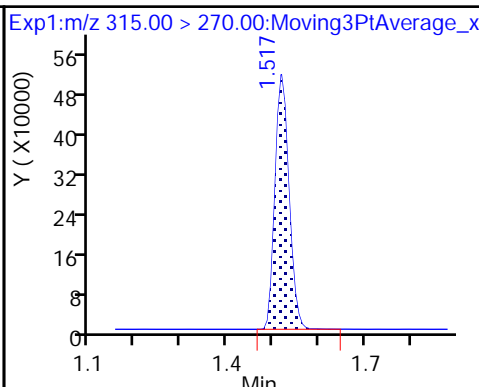
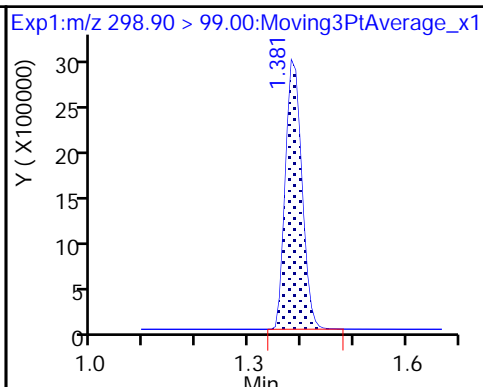
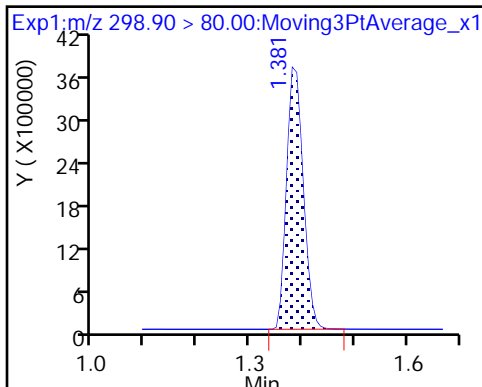
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

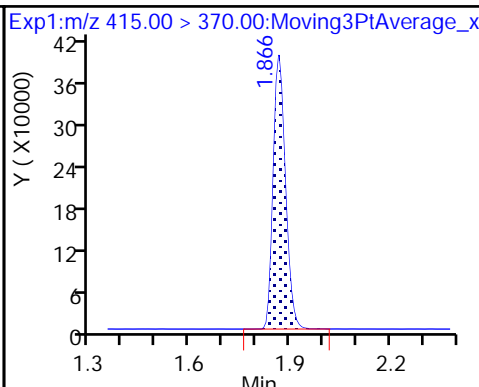
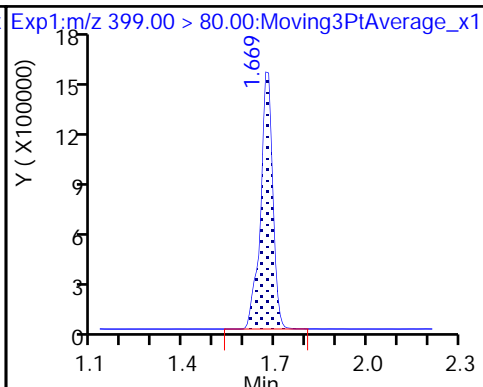
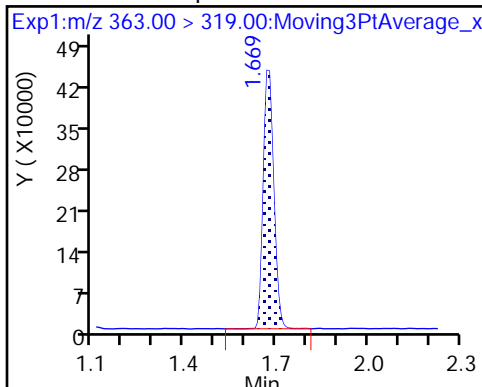
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

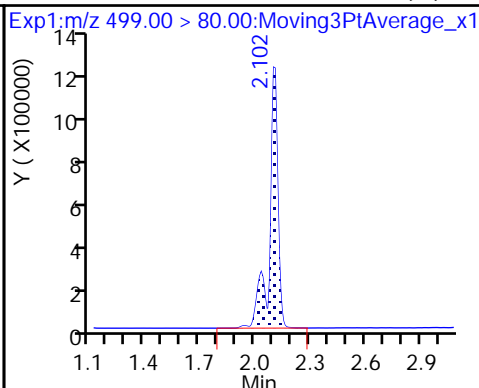
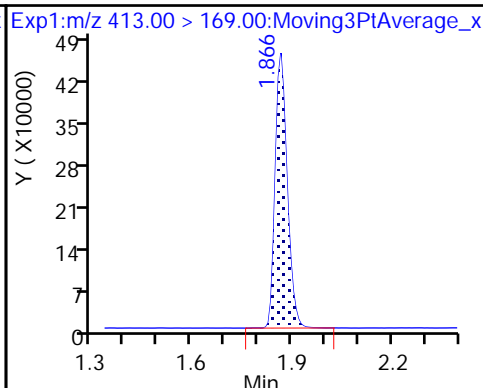
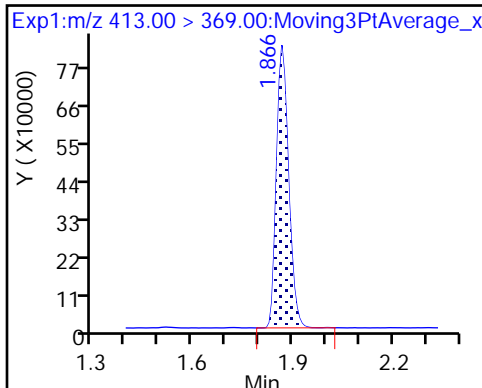
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

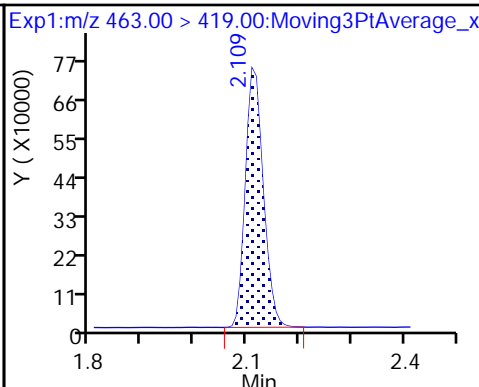
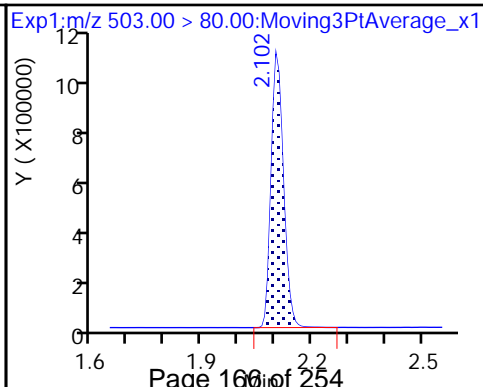
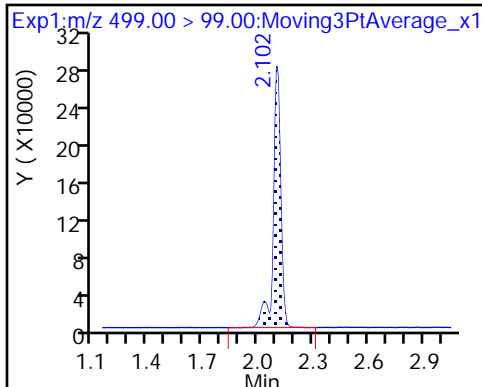
8 Perfluorooctane sulfonic acid (M)



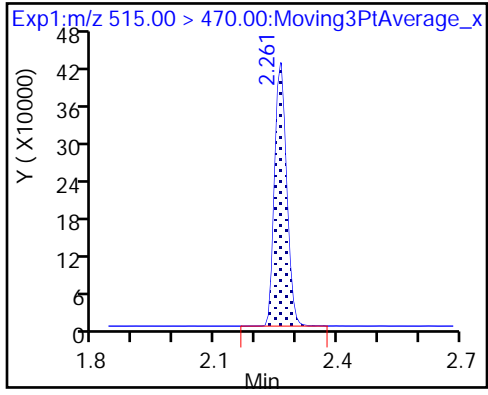
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

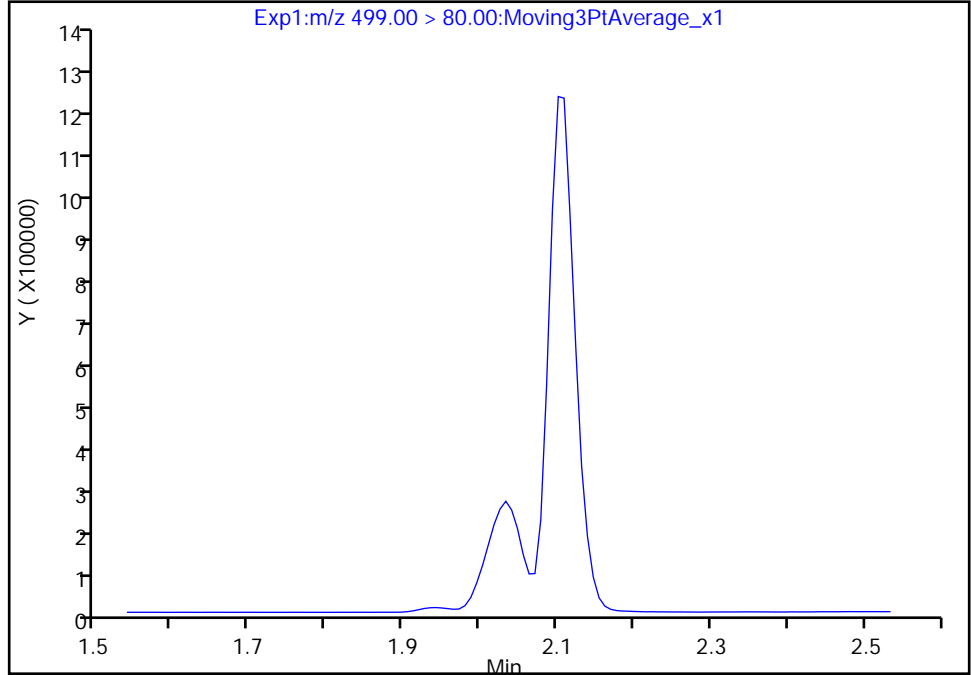
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_007.d
Injection Date: 11-Apr-2018 11:59:48 Instrument ID: A8_N
Lims ID: IC L4
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 4 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

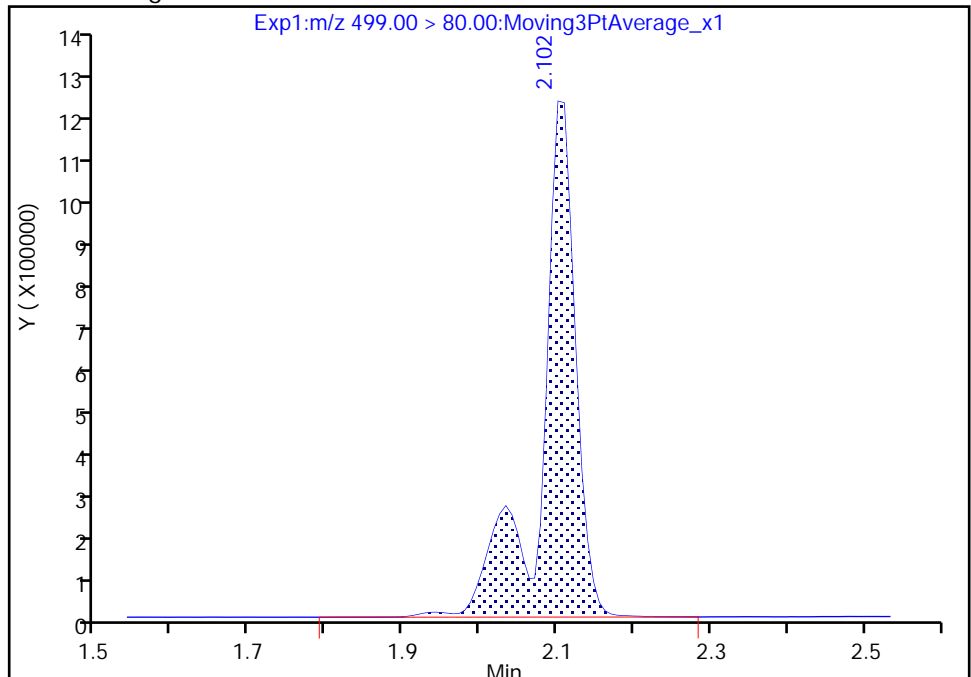
Not Detected
Expected RT: 2.09

Processing Integration Results



Manual Integration Results

RT: 2.10
Area: 3678059
Amount: 40.551047
Amount Units: ng/ml



Reviewer: westendorfc, 11-Apr-2018 12:31:45
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_008.d
 Lims ID: IC L5
 Client ID:
 Sample Type: IC Calib Level: 5
 Inject. Date: 11-Apr-2018 12:04:29 ALS Bottle#: 5 Worklist Smp#: 7
 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\20180411-56557.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 11-Apr-2018 12:35:32 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
 Process Host: XAWRK015

First Level Reviewer: westendorfc Date: 11-Apr-2018 12:31:52

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	1.382	-0.001	1.000	10764182	128.5		6999	
298.90 > 99.00	1.381	1.382	-0.001	1.000	8269613		1.30(0.00-0.00)	7836	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.517	1.515	0.002	1.000	985534	9.97		7814	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.669	1.669	0.0	1.000	6082352	46.5		1721	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.669	1.669	0.0	1.000	1450463	14.5		171	
* 6 13C2-PFOA									
415.00 > 370.00	1.866	1.865	0.001		929546	10.0		5174	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.866	1.866	0.0	1.000	3119787	31.6		475	
413.00 > 169.00	1.866	1.866	0.0	1.000	1555272		2.01(0.00-0.00)	1662	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.102	2.094	0.008	1.000	5081660	59.9		1317	a
499.00 > 99.00	2.102	2.094	0.008	1.000	1106855		4.59(0.00-0.00)	2490	a
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.102	0.0		2283311	28.7		1206	
9 Perfluorononanoic acid									
463.00 > 419.00	2.109	2.109	0.0	1.000	2341235	29.9		363	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.261	2.260	0.001	1.000	791901	10.0		6104	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L5_00026

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_008.d

Injection Date: 11-Apr-2018 12:04:29

Instrument ID: A8_N

Lims ID: IC L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 7

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

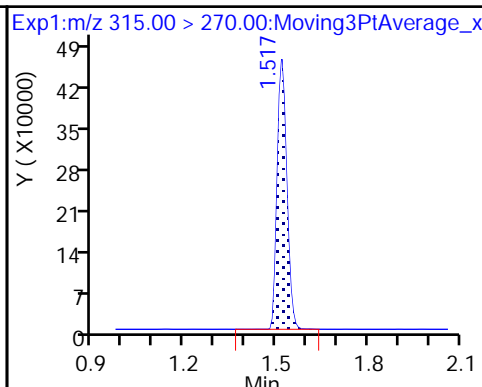
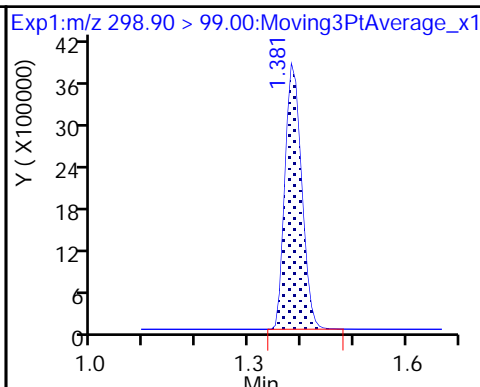
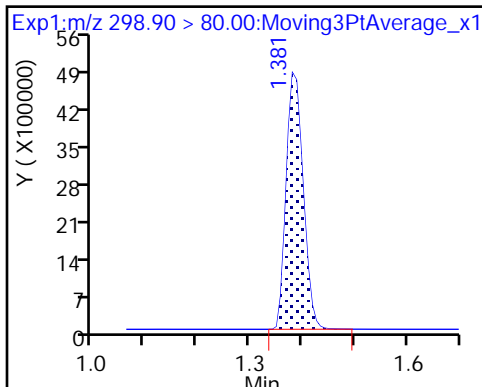
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

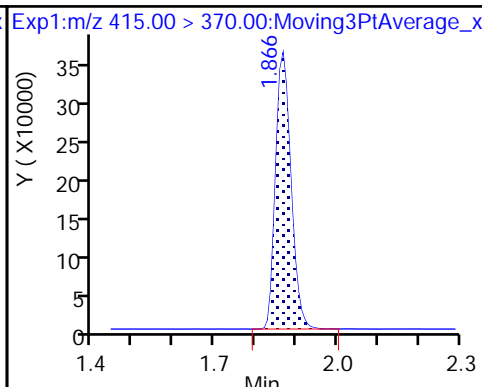
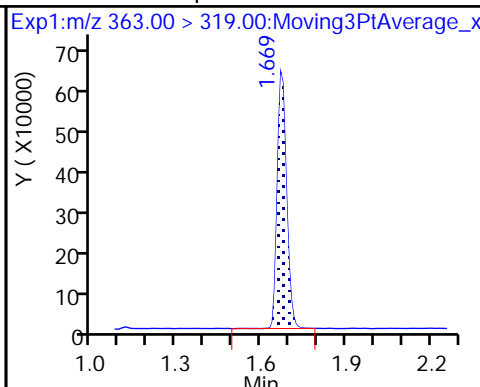
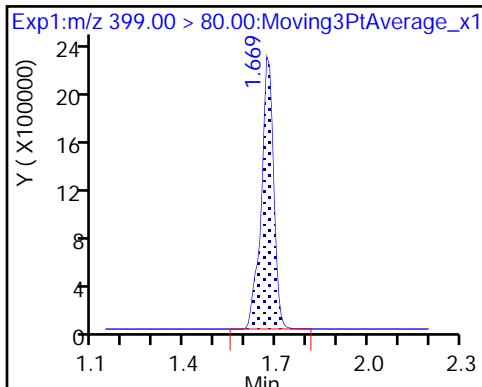
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

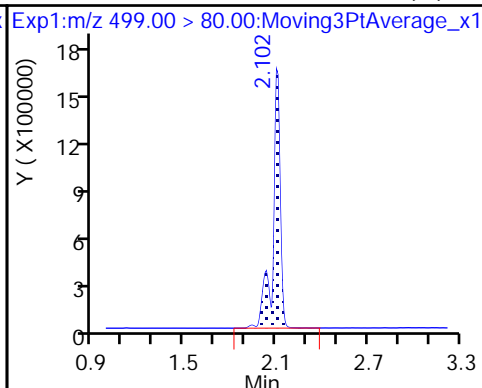
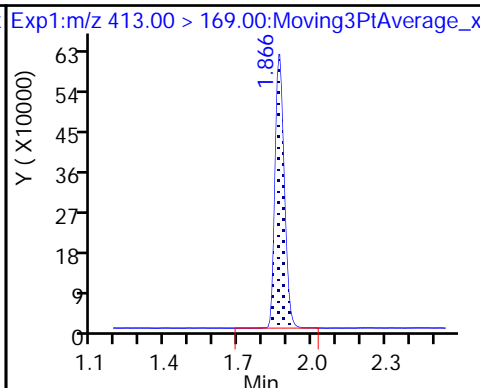
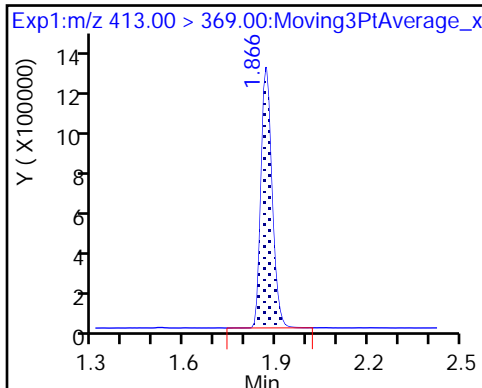
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

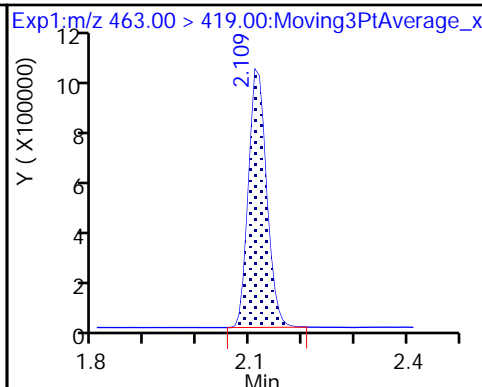
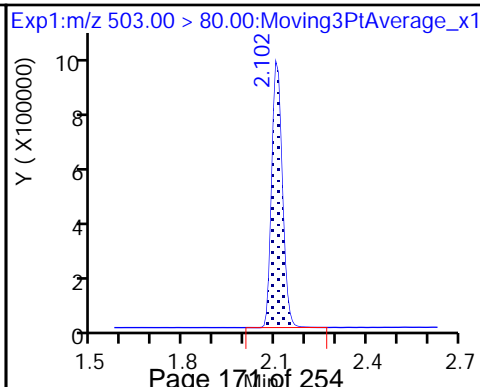
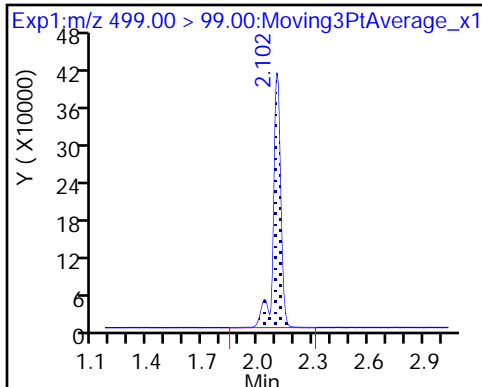
8 Perfluorooctane sulfonic acid (M)



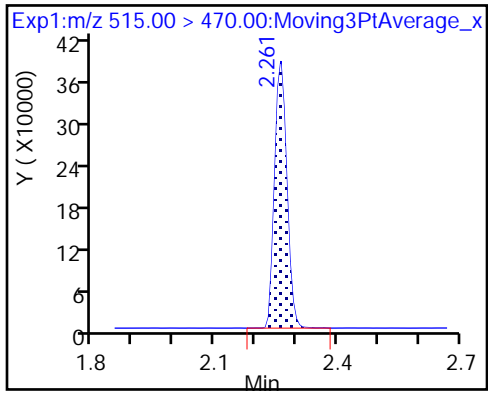
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

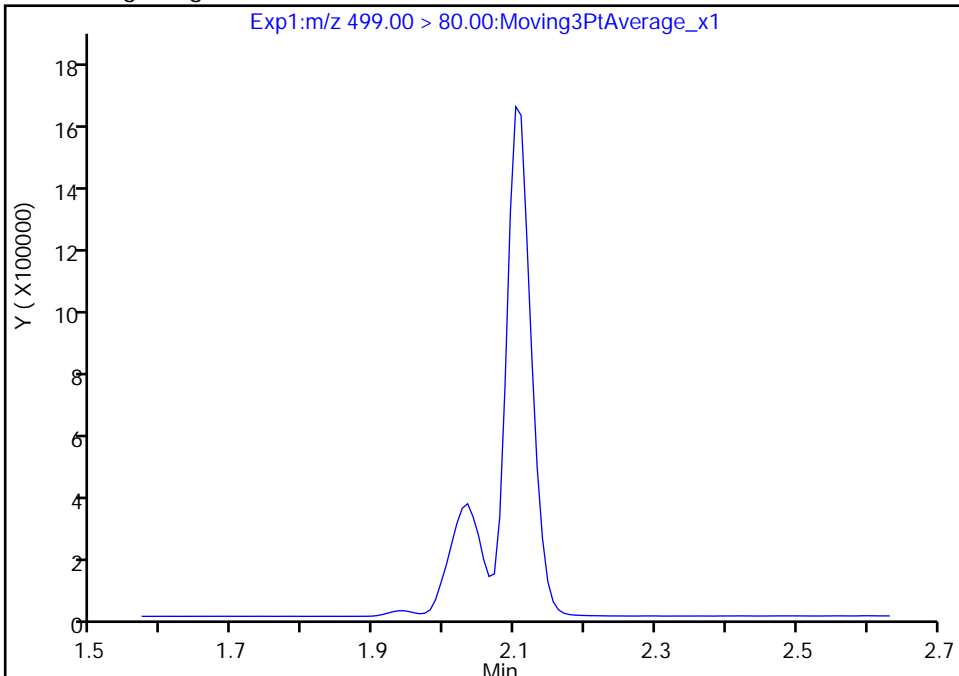
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_008.d
Injection Date: 11-Apr-2018 12:04:29 Instrument ID: A8_N
Lims ID: IC L5
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

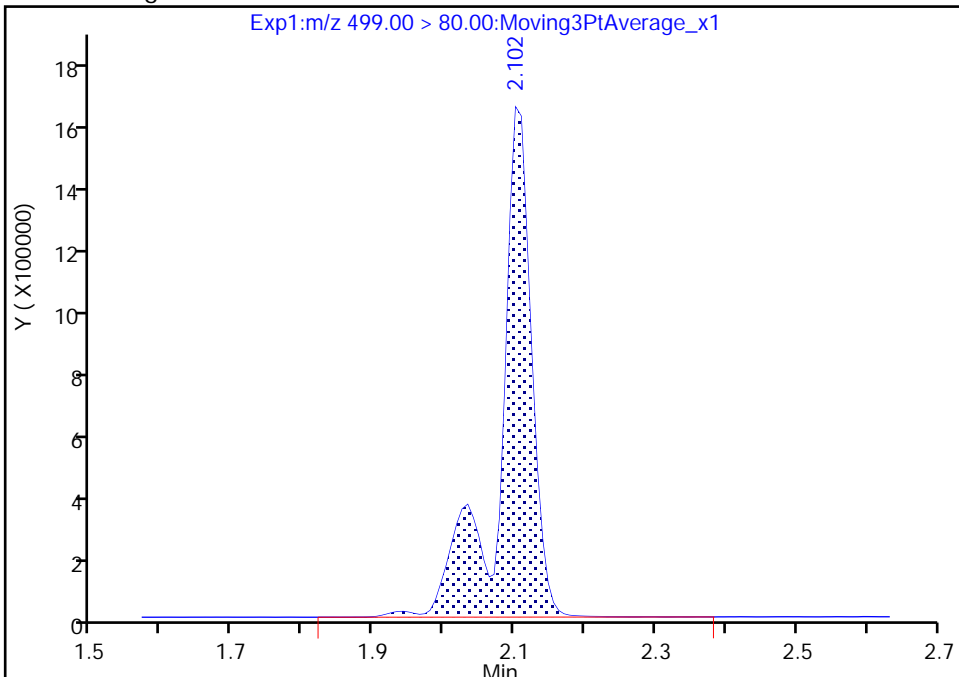
Not Detected
Expected RT: 2.09

Processing Integration Results



Manual Integration Results

RT: 2.10
Area: 5081660
Amount: 59.873244
Amount Units: ng/ml



Reviewer: westendorfc, 11-Apr-2018 12:31:49
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
 Lims ID: IC L6
 Client ID:
 Sample Type: IC Calib Level: 6
 Inject. Date: 11-Apr-2018 12:09:09 ALS Bottle#: 6 Worklist Smp#: 8
 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\20180411-56557.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 11-Apr-2018 12:35:33 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
 Process Host: XAWRK015

First Level Reviewer: westendorfc Date: 11-Apr-2018 12:31:59

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	1.382	-0.001	1.000	13871852	163.3		8258	
298.90 > 99.00	1.381	1.382	-0.001	1.000	10985181		1.26(0.00-0.00)	9440	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.510	1.515	-0.005	1.000	1046576	10.0		9565	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.662	1.669	-0.007	1.000	1996261	18.9		234	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.662	1.669	-0.007	1.000	8226588	62.0		2319	
* 6 13C2-PFOA									
415.00 > 370.00	1.859	1.865	-0.006		982926	10.0		5616	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.859	1.866	-0.007	1.000	4019004	38.5		570	
413.00 > 169.00	1.859	1.866	-0.007	1.000	2217251		1.81(0.00-0.00)	2465	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.094	2.094	0.0	1.000	7016962	81.5		1855	a
499.00 > 99.00	2.094	2.094	0.0	1.000	1468337		4.78(0.00-0.00)	3642	a
* 7 13C4 PFOS									
503.00 > 80.00	2.094	2.102	-0.008		2316327	28.7		1268	
9 Perfluorononanoic acid									
463.00 > 419.00	2.102	2.109	-0.007	1.000	3255374	39.3		485	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.253	2.260	-0.007	1.000	812112	9.71		7134	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L6_00022

Amount Added: 1.00

Units: mL

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Injection Date: 11-Apr-2018 12:09:09

Instrument ID: A8_N

Lims ID: IC L6

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 6

Worklist Smp#: 8

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

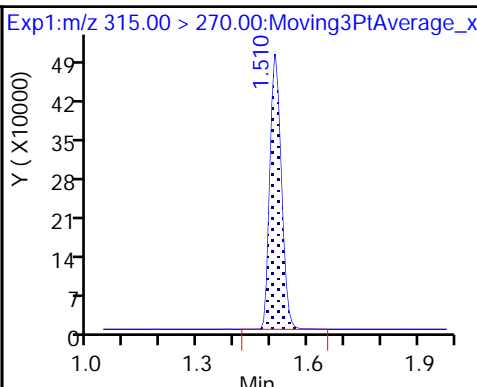
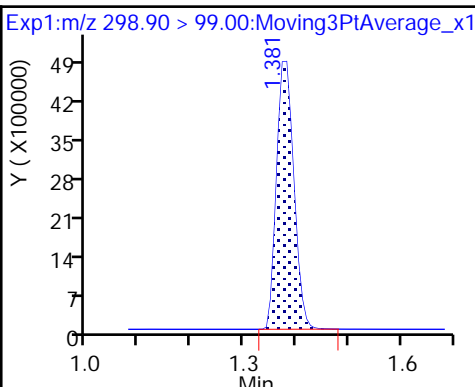
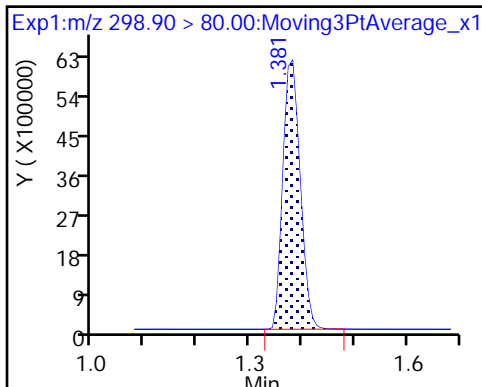
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

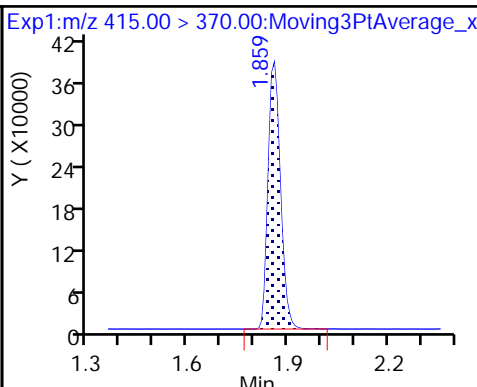
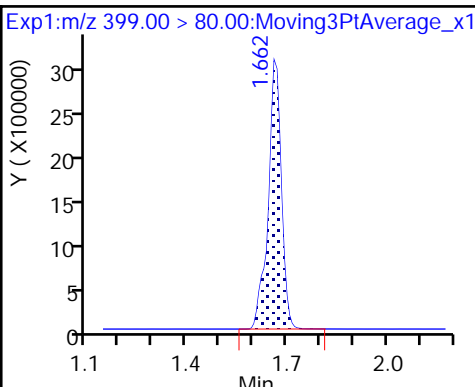
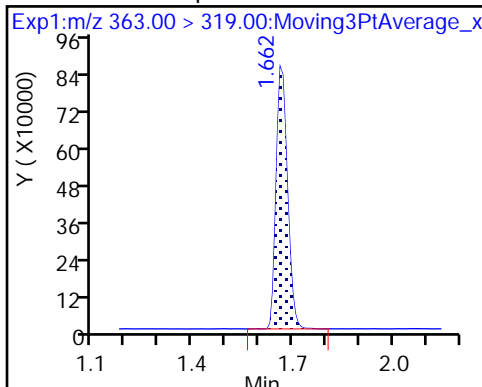
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

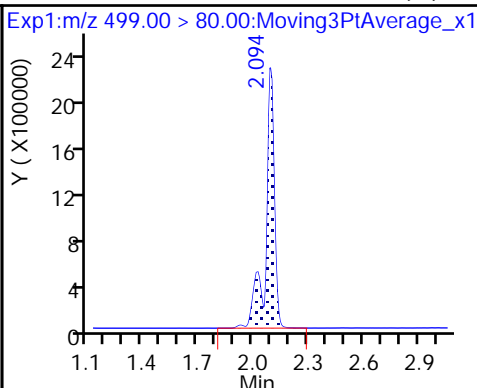
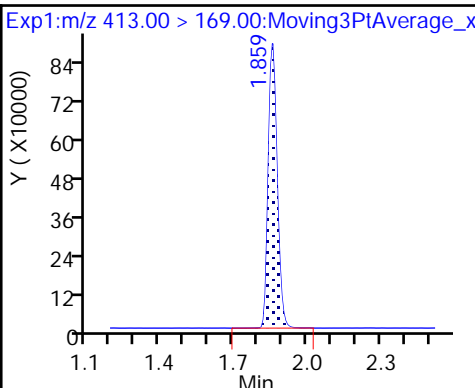
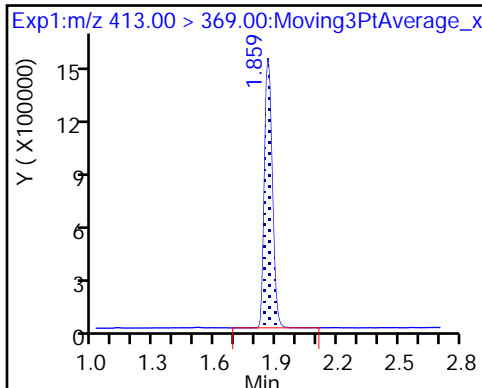
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

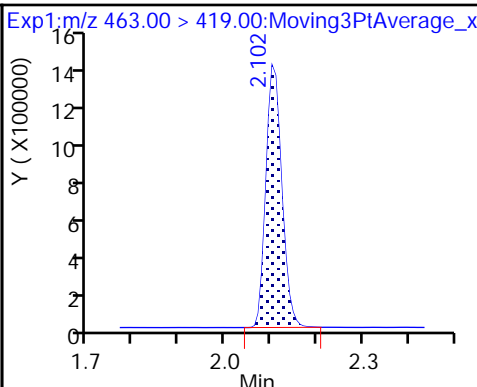
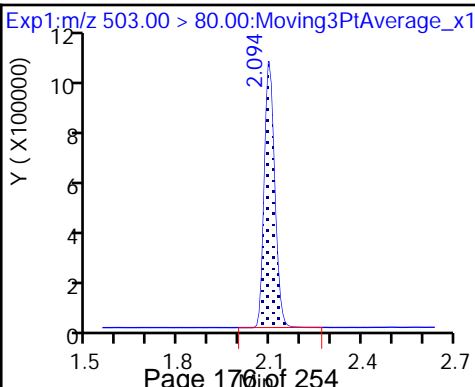
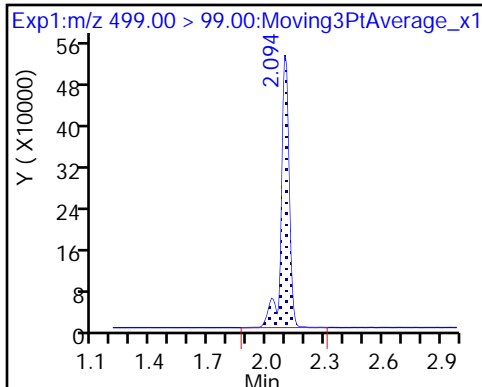
8 Perfluorooctane sulfonic acid (M)



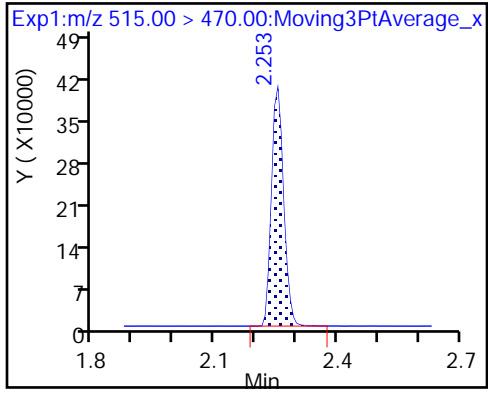
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

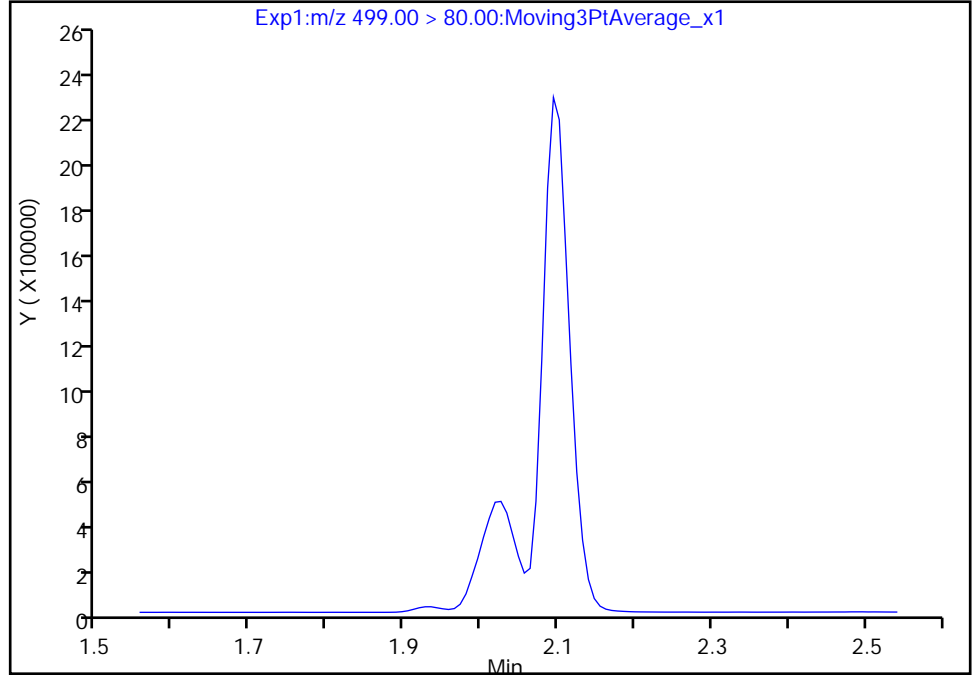
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
Injection Date: 11-Apr-2018 12:09:09 Instrument ID: A8_N
Lims ID: IC L6
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 6 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

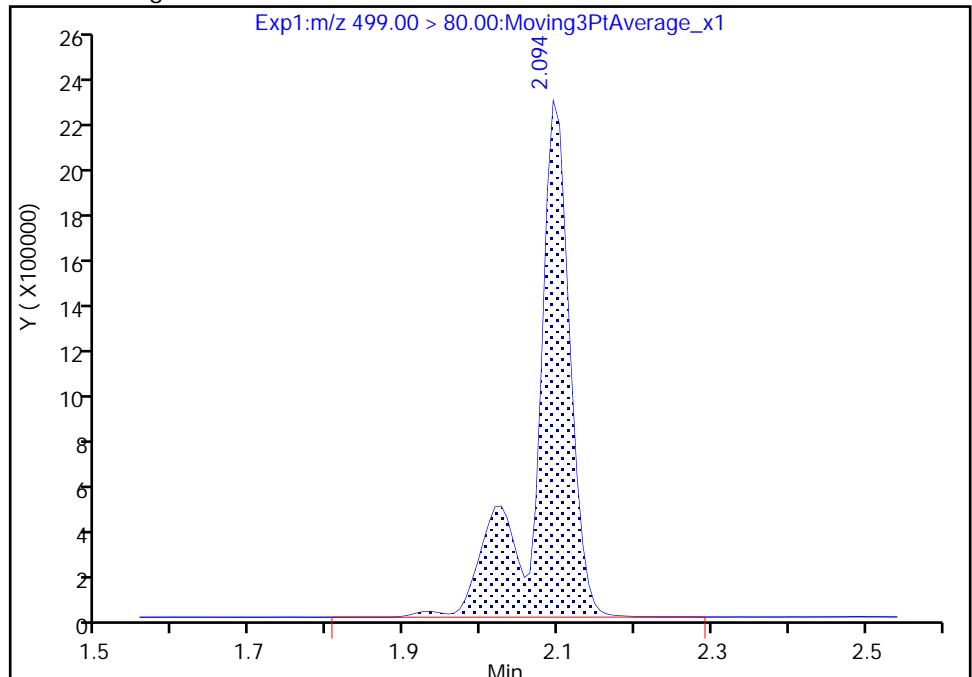
Not Detected
Expected RT: 2.09

Processing Integration Results



Manual Integration Results

RT: 2.09
Area: 7016962
Amount: 81.496978
Amount Units: ng/ml



Reviewer: westendorfc, 11-Apr-2018 12:31:55
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

Calibration

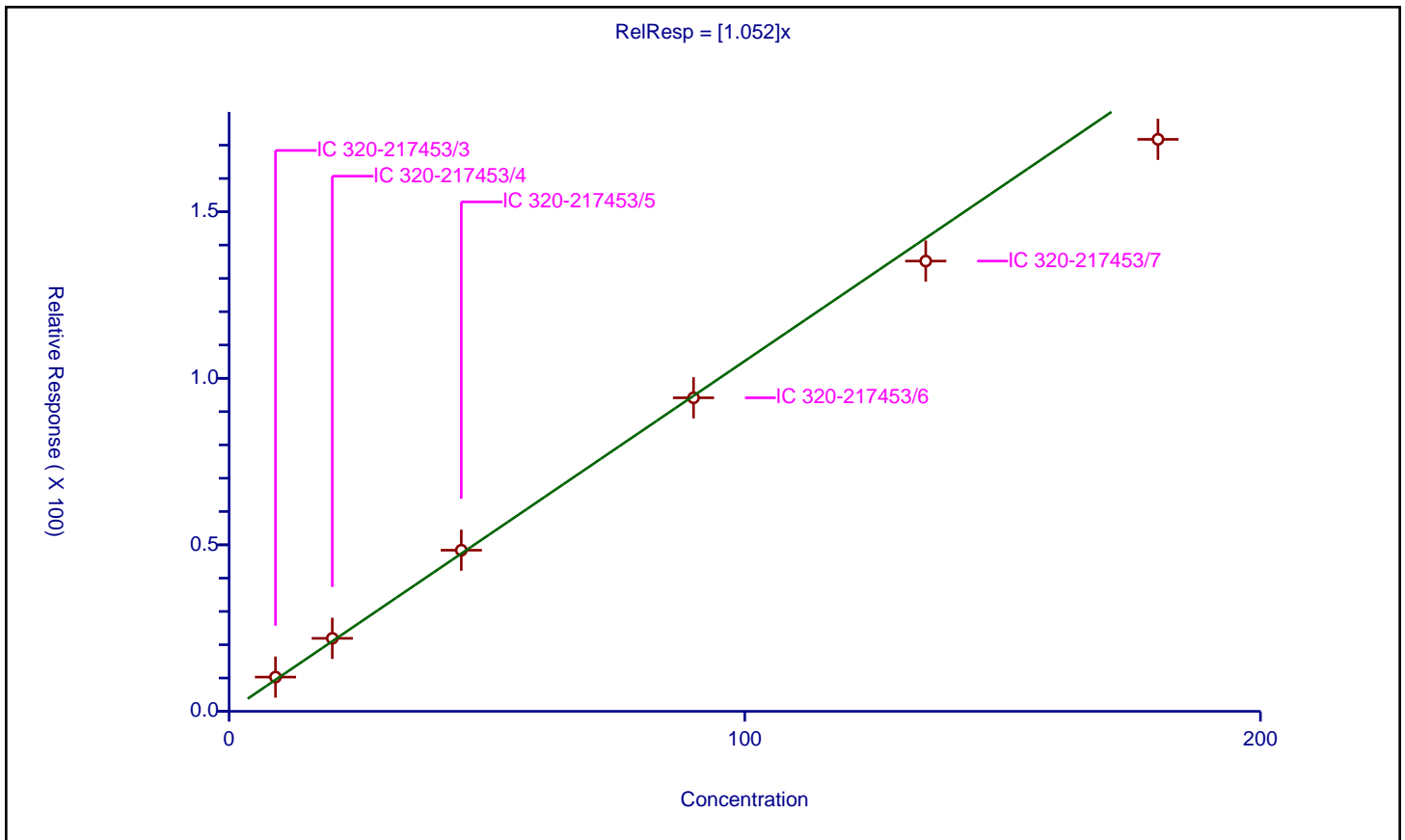
/ Perfluorobutanesulfonic acid

Curve Type: Average
 Weighting: Conc_Sq
 Origin: Force
 Dependency: Response
 Calib Mode: ISTD
 Response Base:
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.052

Error Coefficients	
Standard Error:	8860000
Relative Standard Error:	6.4
Correlation Coefficient:	0.995
Coefficient of Determination (Adjusted):	0.993

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-217453/3	8.99912	10.27855	28.68	2429483.0	1.142173	Y
2	IC 320-217453/4	20.01376	21.91997	28.68	2220259.0	1.095245	Y
3	IC 320-217453/5	45.03096	48.381679	28.68	2380125.0	1.074409	Y
4	IC 320-217453/6	90.06192	94.147927	28.68	2440107.0	1.045369	Y
5	IC 320-217453/7	135.09288	135.205734	28.68	2283311.0	1.000835	Y
6	IC 320-217453/8	180.12384	171.756715	28.68	2316327.0	0.953548	Y



Calibration

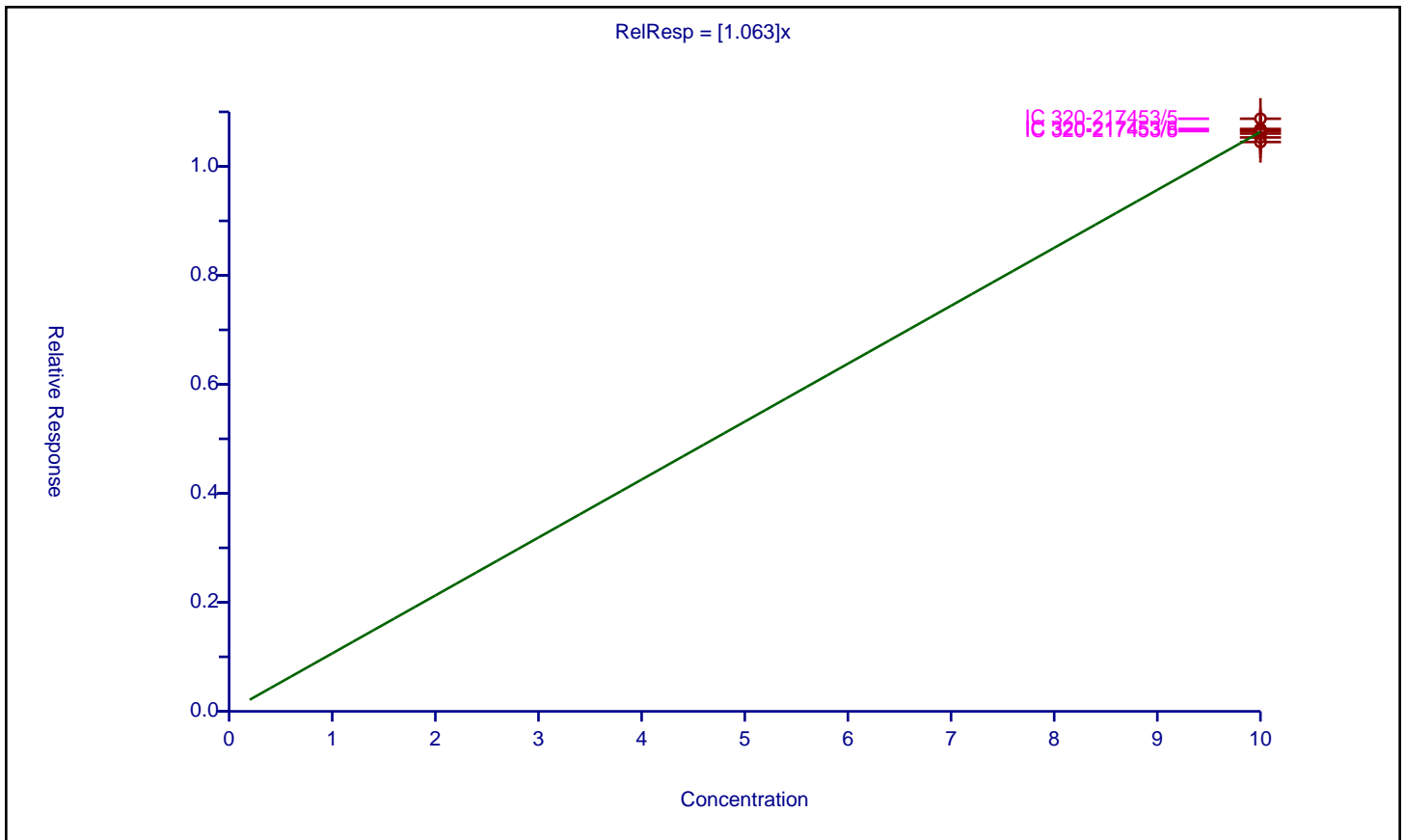
/ 13C2 PFHxA

Curve Type: Average
Weighting: Conc_Sq
Origin: Force
Dependency: Response
Calib Mode: ISTD
Response Base:
RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.063

Error Coefficients	
Standard Error:	1130000
Relative Standard Error:	1.4
Correlation Coefficient:	NA
Coefficient of Determination (Adjusted):	0

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-217453/3	10.0	10.447022	10.0	1044020.0	1.044702	Y
2	IC 320-217453/4	10.0	10.531795	10.0	921915.0	1.05318	Y
3	IC 320-217453/5	10.0	10.874839	10.0	945031.0	1.087484	Y
4	IC 320-217453/6	10.0	10.686721	10.0	996809.0	1.068672	Y
5	IC 320-217453/7	10.0	10.602316	10.0	929546.0	1.060232	Y
6	IC 320-217453/8	10.0	10.647556	10.0	982926.0	1.064756	Y



Calibration

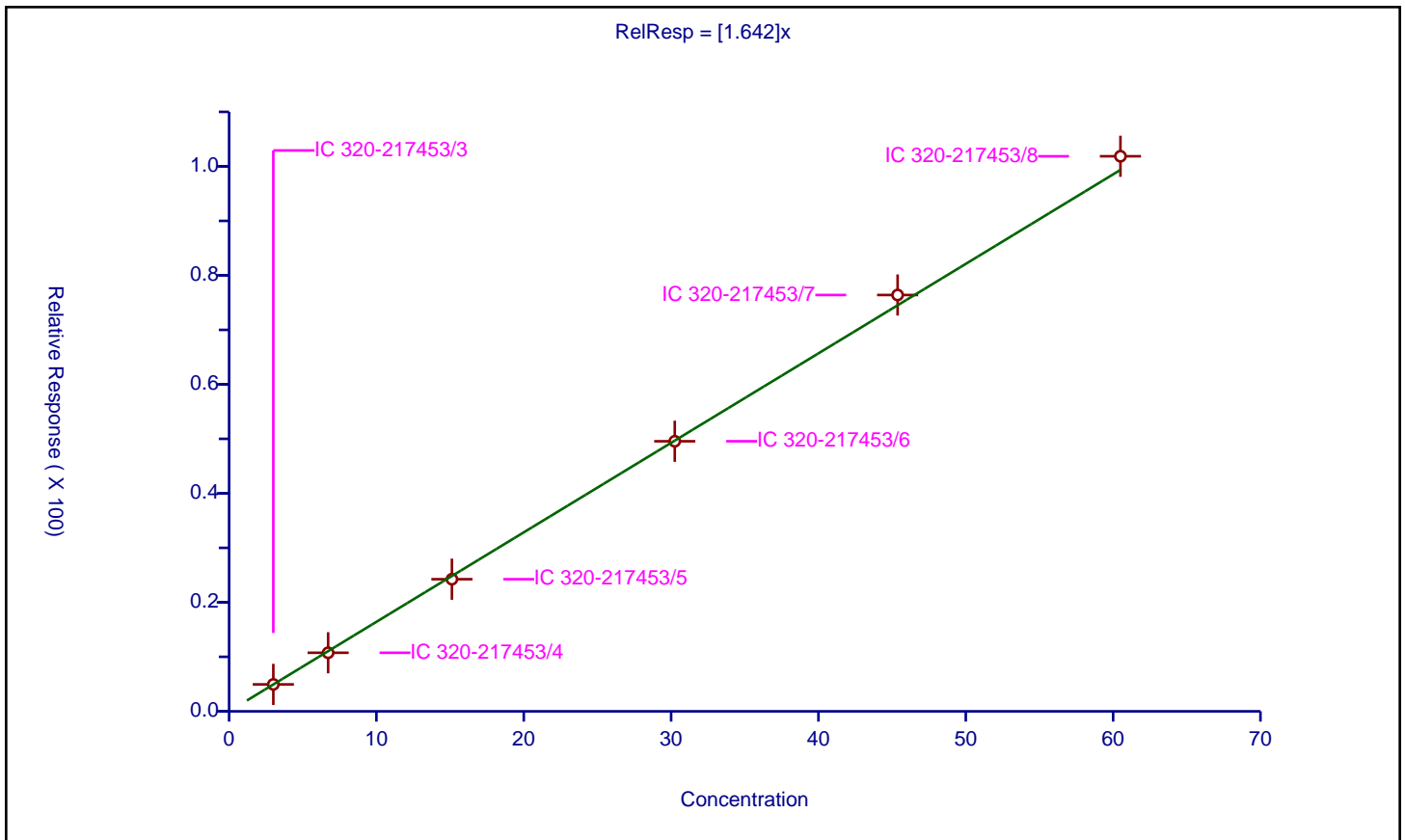
/ Perfluorohexanesulfonic acid

Curve Type: Average
 Weighting: Conc_Sq
 Origin: Force
 Dependency: Response
 Calib Mode: ISTD
 Response Base:
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.642

Error Coefficients	
Standard Error:	5050000
Relative Standard Error:	2.3
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.999

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-217453/3	3.003	4.942037	28.68	2429483.0	1.6457	Y
2	IC 320-217453/4	6.721867	10.746809	28.68	2220259.0	1.598783	Y
3	IC 320-217453/5	15.1242	24.244534	28.68	2380125.0	1.603029	Y
4	IC 320-217453/6	30.2484	49.557654	28.68	2440107.0	1.638356	Y
5	IC 320-217453/7	45.3726	76.39864	28.68	2283311.0	1.683806	Y
6	IC 320-217453/8	60.4968	101.85891	28.68	2316327.0	1.683707	Y



Calibration

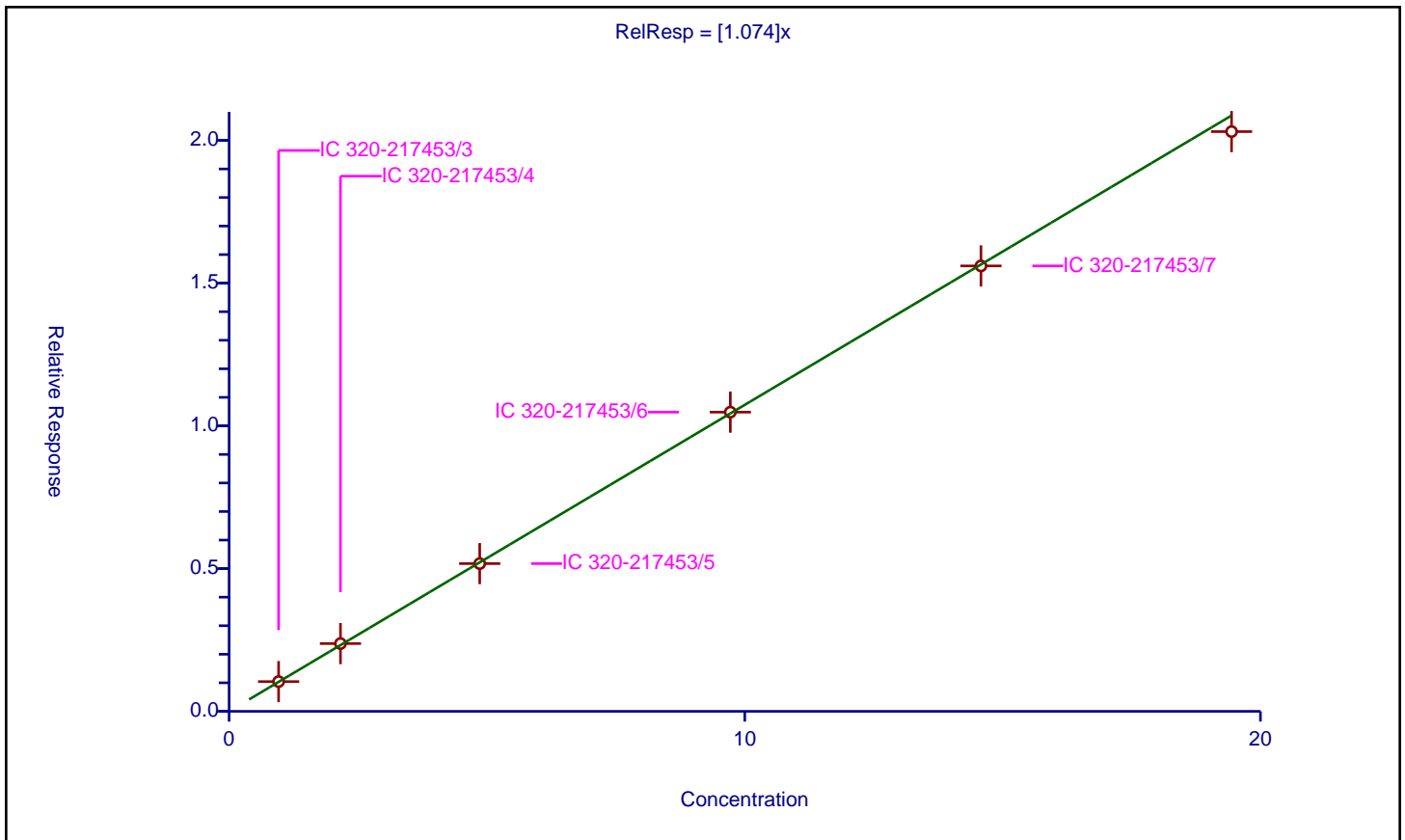
/ Perfluoroheptanoic acid

Curve Type: Average
 Weighting: Conc_Sq
 Origin: Force
 Dependency: Response
 Calib Mode: ISTD
 Response Base:
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.074

Error Coefficients	
Standard Error:	1220000
Relative Standard Error:	1.7
Correlation Coefficient:	0.998
Coefficient of Determination (Adjusted):	1.000

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-217453/3	0.96	1.041561	10.0	1044020.0	1.084959	Y
2	IC 320-217453/4	2.16	2.373972	10.0	921915.0	1.099061	Y
3	IC 320-217453/5	4.86	5.175227	10.0	945031.0	1.064862	Y
4	IC 320-217453/6	9.72	10.480965	10.0	996809.0	1.078289	Y
5	IC 320-217453/7	14.58	15.603994	10.0	929546.0	1.070233	Y
6	IC 320-217453/8	19.44	20.309372	10.0	982926.0	1.044721	Y



Calibration

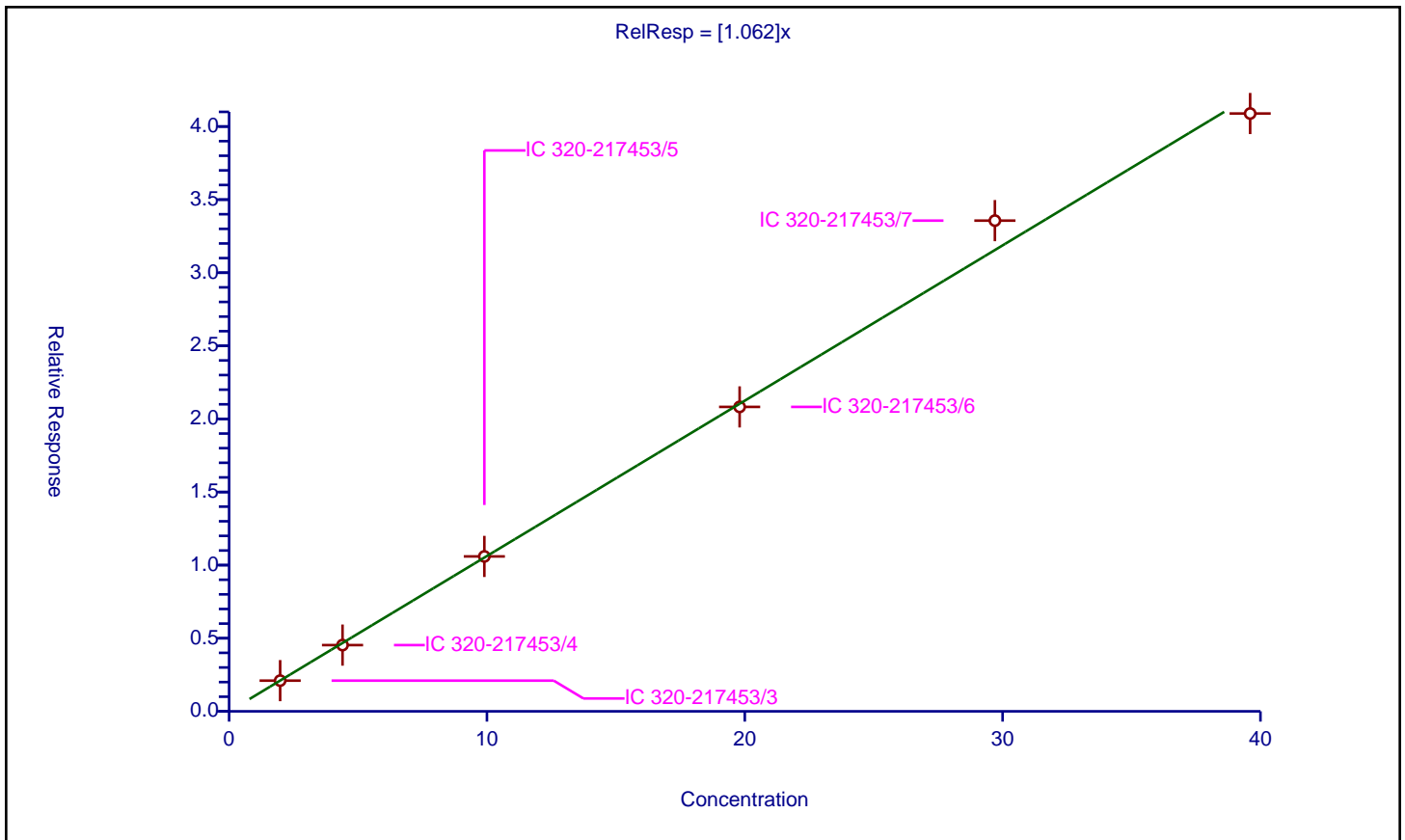
/ Perfluorooctanoic acid

Curve Type: Average
 Weighting: Conc_Sq
 Origin: Force
 Dependency: Response
 Calib Mode: ISTD
 Response Base:
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.062

Error Coefficients	
Standard Error:	2510000
Relative Standard Error:	3.5
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.998

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-217453/3	1.98	2.098619	10.0	1044020.0	1.059908	Y
2	IC 320-217453/4	4.4	4.530049	10.0	921915.0	1.029557	Y
3	IC 320-217453/5	9.9	10.595589	10.0	945031.0	1.070262	Y
4	IC 320-217453/6	19.8	20.822123	10.0	996809.0	1.051622	Y
5	IC 320-217453/7	29.7	33.562481	10.0	929546.0	1.13005	Y
6	IC 320-217453/8	39.6	40.888165	10.0	982926.0	1.032529	Y



Calibration

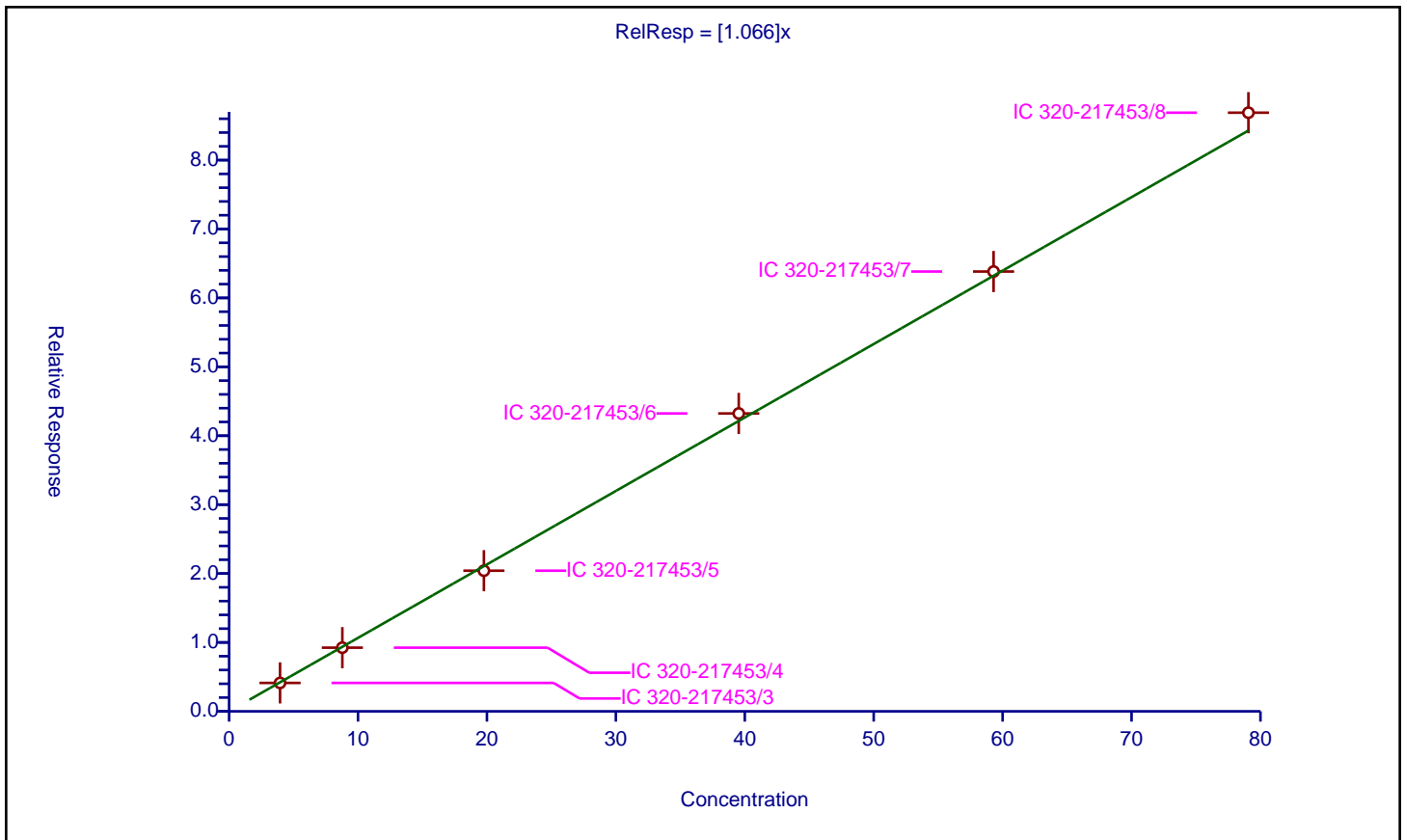
/ Perfluorooctane sulfonic acid

Curve Type: Average
 Weighting: Conc_Sq
 Origin: Force
 Dependency: Response
 Calib Mode: ISTD
 Response Base:
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	1.066

Error Coefficients	
Standard Error:	4290000
Relative Standard Error:	2.6
Correlation Coefficient:	0.998
Coefficient of Determination (Adjusted):	0.999

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-217453/3	3.95328	4.124117	28.68	2429483.0	1.043214	Y
2	IC 320-217453/4	8.785067	9.240832	28.68	2220259.0	1.05188	Y
3	IC 320-217453/5	19.7664	20.41005	28.68	2380125.0	1.032563	Y
4	IC 320-217453/6	39.5328	43.230372	28.68	2440107.0	1.093532	Y
5	IC 320-217453/7	59.2992	63.829241	28.68	2283311.0	1.076393	Y
6	IC 320-217453/8	79.0656	86.881718	28.68	2316327.0	1.098856	Y



Calibration

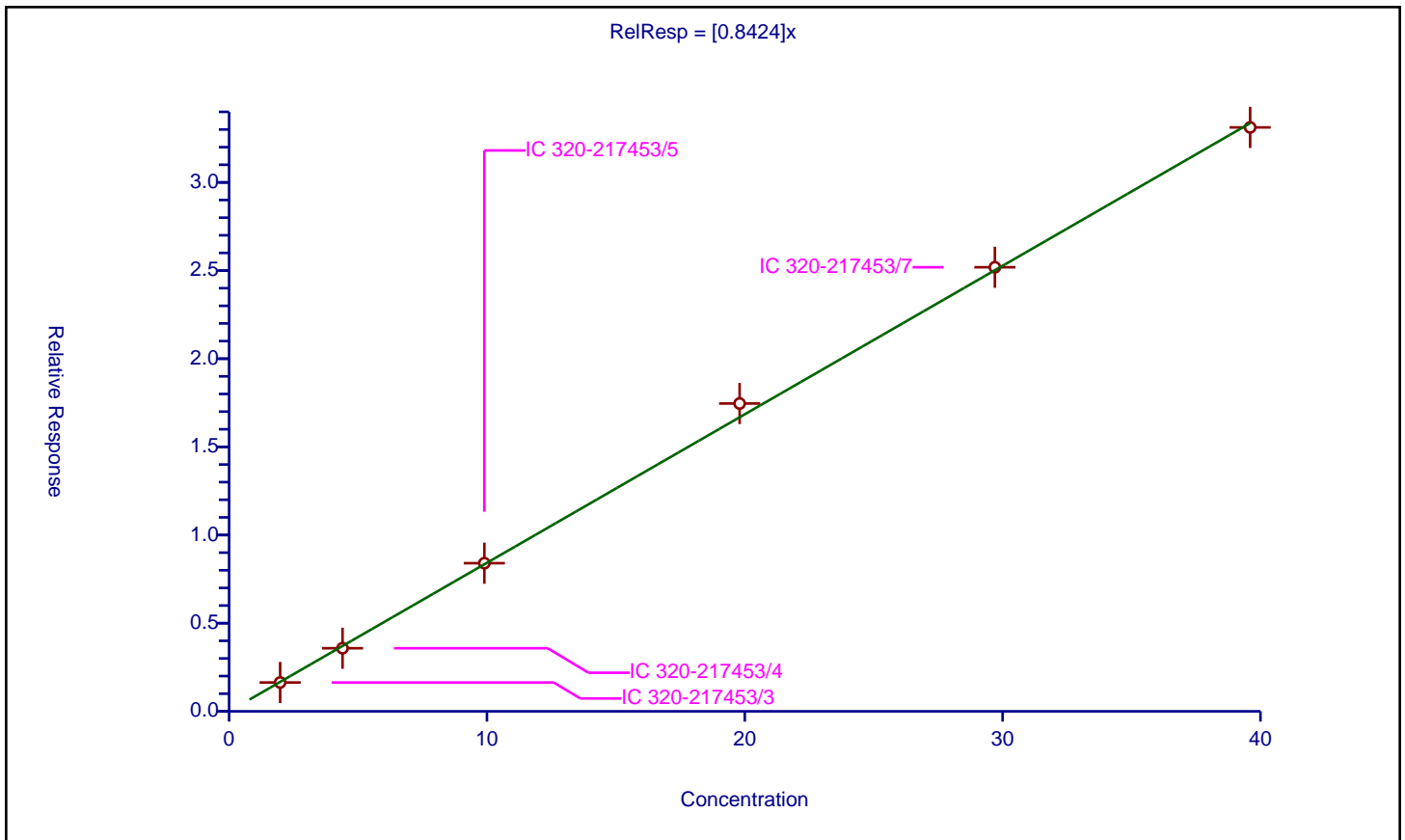
/ Perfluorononanoic acid

Curve Type: Average
 Weighting: Conc_Sq
 Origin: Force
 Dependency: Response
 Calib Mode: ISTD
 Response Base:
 RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	0.8424

Error Coefficients	
Standard Error:	1990000
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 320-217453/3	1.98	1.635697	10.0	1044020.0	0.826109	Y
2	IC 320-217453/4	4.4	3.578464	10.0	921915.0	0.813287	Y
3	IC 320-217453/5	9.9	8.402645	10.0	945031.0	0.848752	Y
4	IC 320-217453/6	19.8	17.459935	10.0	996809.0	0.881815	Y
5	IC 320-217453/7	29.7	25.186865	10.0	929546.0	0.848043	Y
6	IC 320-217453/8	39.6	33.119218	10.0	982926.0	0.836344	Y



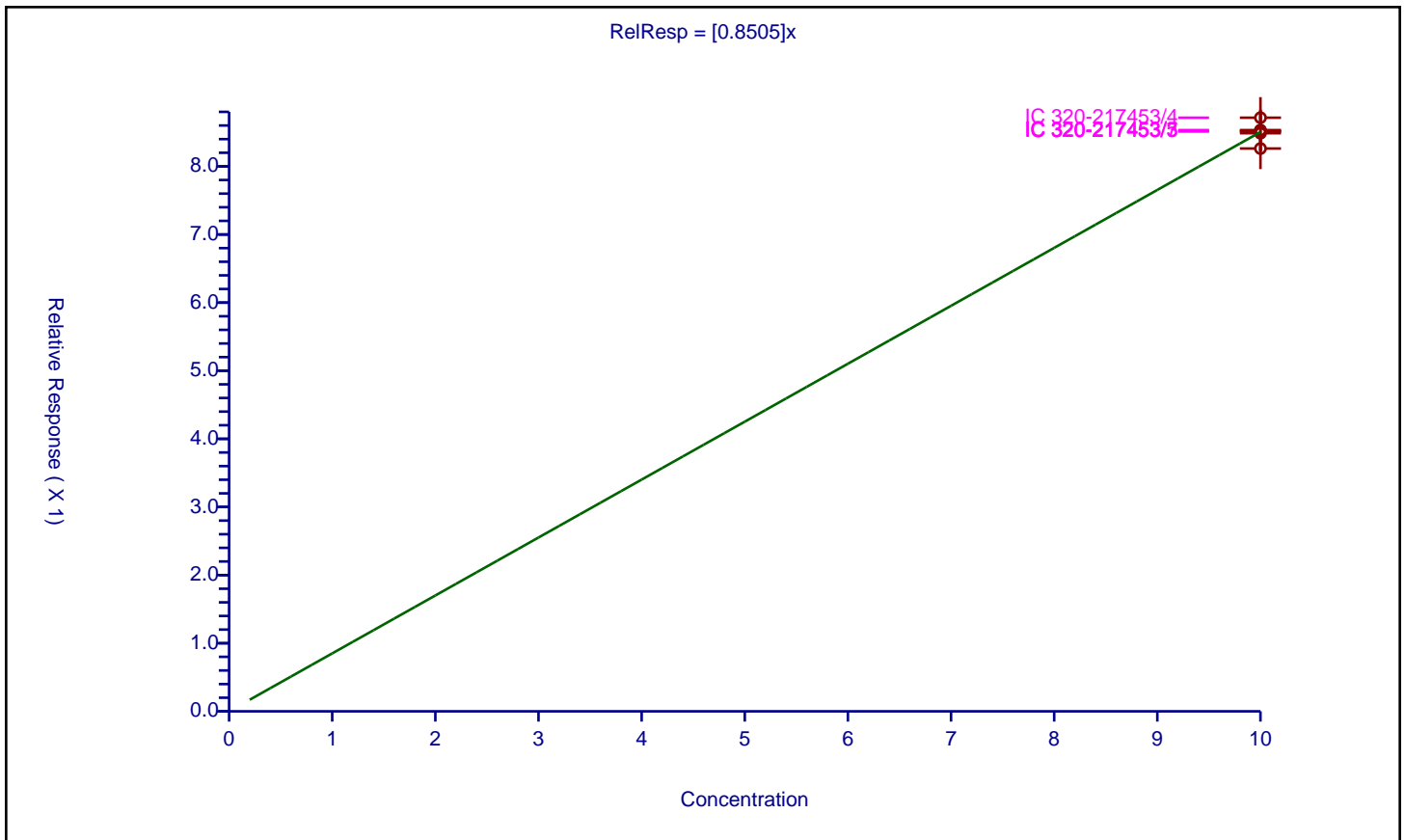
Calibration

Curve Type: Average
Weighting: Conc_Sq
Origin: Force
Dependency: Response
Calib Mode: ISTD
Response Base:
RF Rounding: 0

Curve Coefficients	
Intercept:	0
Slope:	0.8505

Error Coefficients	
Standard Error:	904000
Relative Standard Error:	1.7
Correlation Coefficient:	NA
Coefficient of Determination (Adjusted):	0

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-217453/3	10.0	8.512691	10.0	1044020.0	0.851269	Y
2	IC 320-217453/4	10.0	8.714491	10.0	921915.0	0.871449	Y
3	IC 320-217453/5	10.0	8.53263	10.0	945031.0	0.853263	Y
4	IC 320-217453/6	10.0	8.486982	10.0	996809.0	0.848698	Y
5	IC 320-217453/7	10.0	8.519223	10.0	929546.0	0.851922	Y
6	IC 320-217453/8	10.0	8.262189	10.0	982926.0	0.826219	Y



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Lab Sample ID: CCVL 320-217453/10 Calibration Date: 04/11/2018 12:18
 Instrument ID: A8_N Calib Start Date: 04/11/2018 11:45
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 04/11/2018 12:09
 Lab File ID: 2018.04.11_537ICALB_011.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.052	1.078		20.5	20.0	2.5	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	1.079		2.17	2.16	0.5	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.583		6.48	6.72	-3.6	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	1.067		4.42	4.40	0.4	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	1.026		8.45	8.79	-3.8	50.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.8056		4.21	4.40	-4.4	50.0
13C2 PFHxA	Ave	1.063	1.036		9.74	10.0	-2.6	30.0
13C2 PFDA	Ave	0.8505	0.8798		10.3	10.0	3.4	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_011.d
 Lims ID: CCVL
 Client ID:
 Sample Type: CCVL
 Inject. Date: 11-Apr-2018 12:18:29 ALS Bottle#: 2 Worklist Smp#: 10
 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\20180411-56557.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 11-Apr-2018 12:35:34 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK015

First Level Reviewer: westendorfc Date: 11-Apr-2018 12:32:05

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	1.382	-0.001	1.000	1796973	20.5		1419	
298.90 > 99.00	1.381	1.382	-0.001	1.000	1315166		1.37(0.00-0.00)	1507	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.517	1.515	0.002	1.000	999202	9.74		8081	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.669	1.669	0.0	1.000	886015	6.48		254	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.669	1.669	0.0	1.000	224797	2.17		28.4	
* 6 13C2-PFOA									
415.00 > 370.00	1.866	1.865	0.001		964533	10.0		6486	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.866	1.866	0.0	1.000	452711	4.42		66.1	
413.00 > 169.00	1.859	1.866	-0.007	0.996	238029		1.90(0.00-0.00)	253	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.102	2.094	0.008	1.000	750245	8.45		211	a
499.00 > 99.00	2.102	2.094	0.008	1.000	160618		4.67(0.00-0.00)	405	a
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.102	0.0		2387973	28.7		1256	
9 Perfluorononanoic acid									
463.00 > 419.00	2.109	2.109	0.0	1.000	341890	4.21		51.1	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.261	2.260	0.001	1.000	848574	10.3		7810	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L2_00022

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_011.d

Injection Date: 11-Apr-2018 12:18:29

Instrument ID: A8_N

Lims ID: CCVL

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 10

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

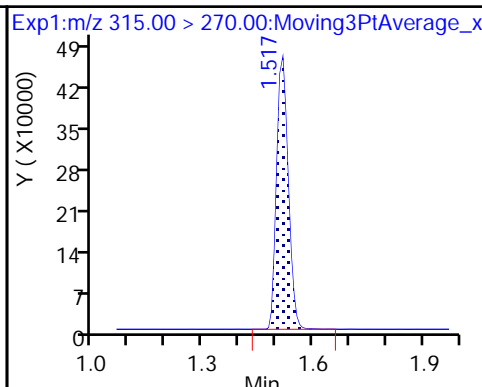
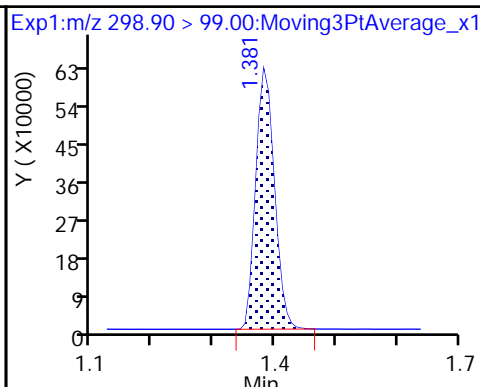
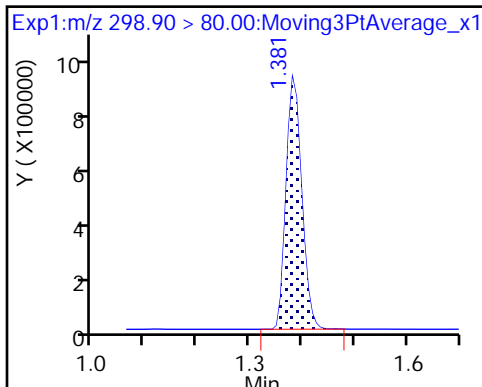
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

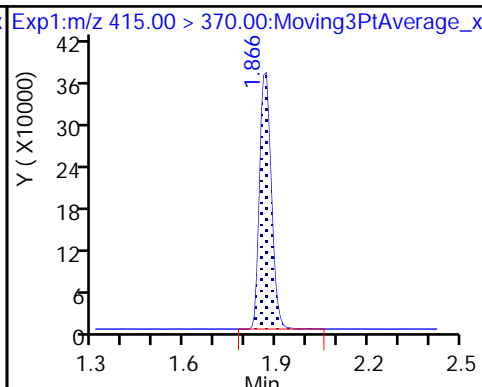
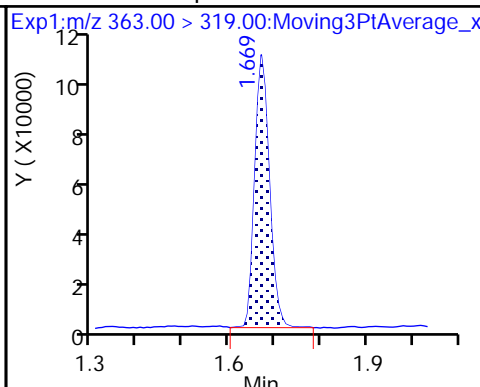
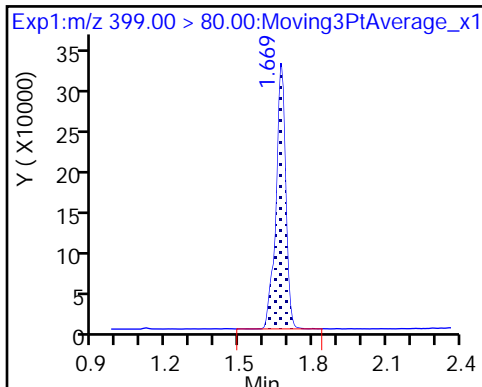
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

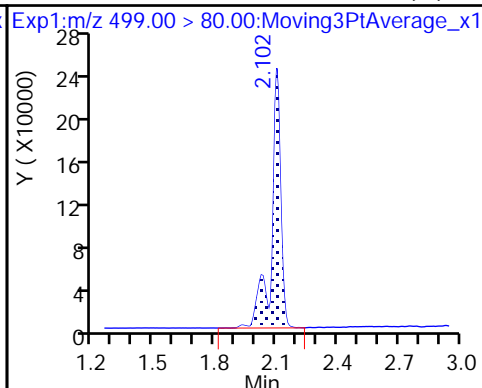
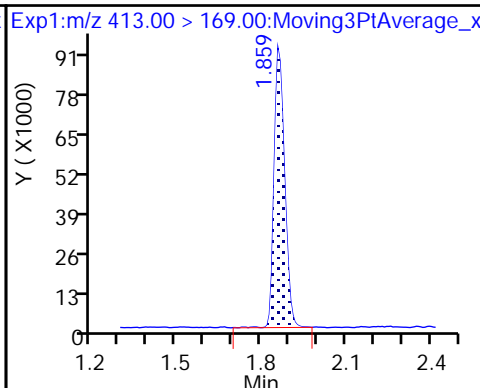
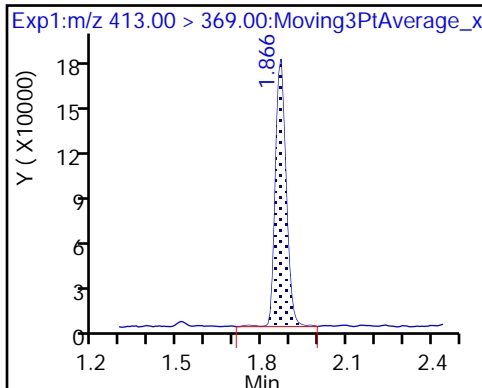
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

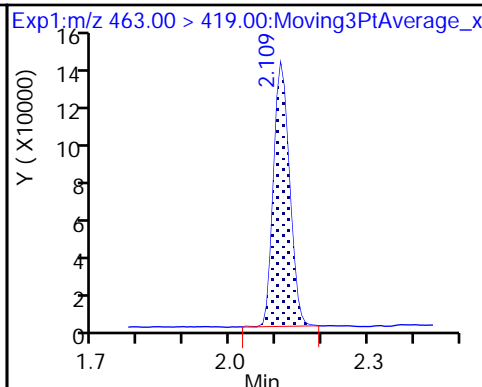
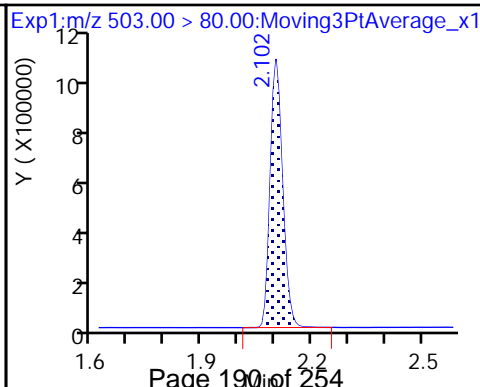
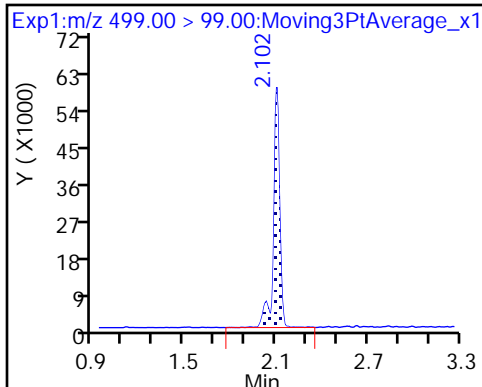
8 Perfluorooctane sulfonic acid (M)



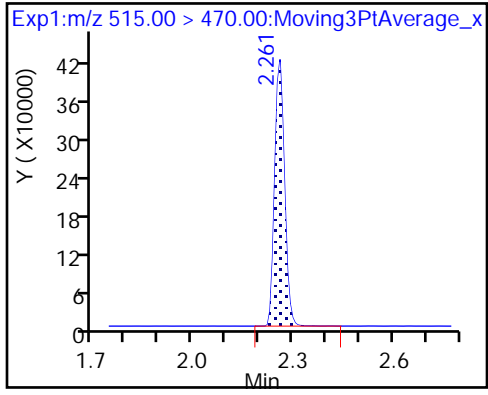
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

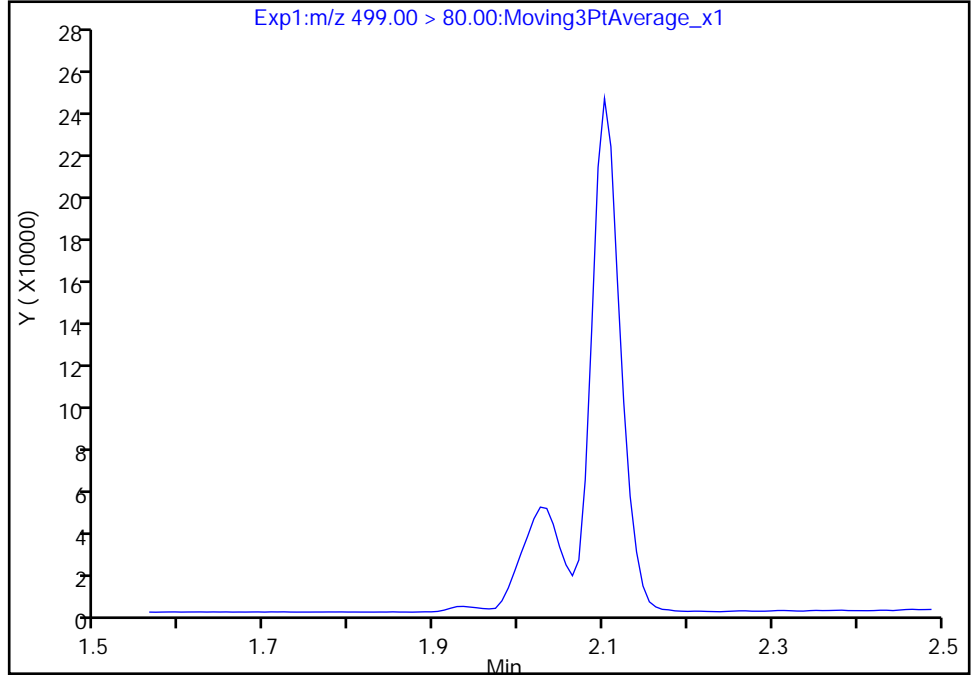
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_011.d
Injection Date: 11-Apr-2018 12:18:29 Instrument ID: A8_N
Lims ID: CCVL
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 10
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

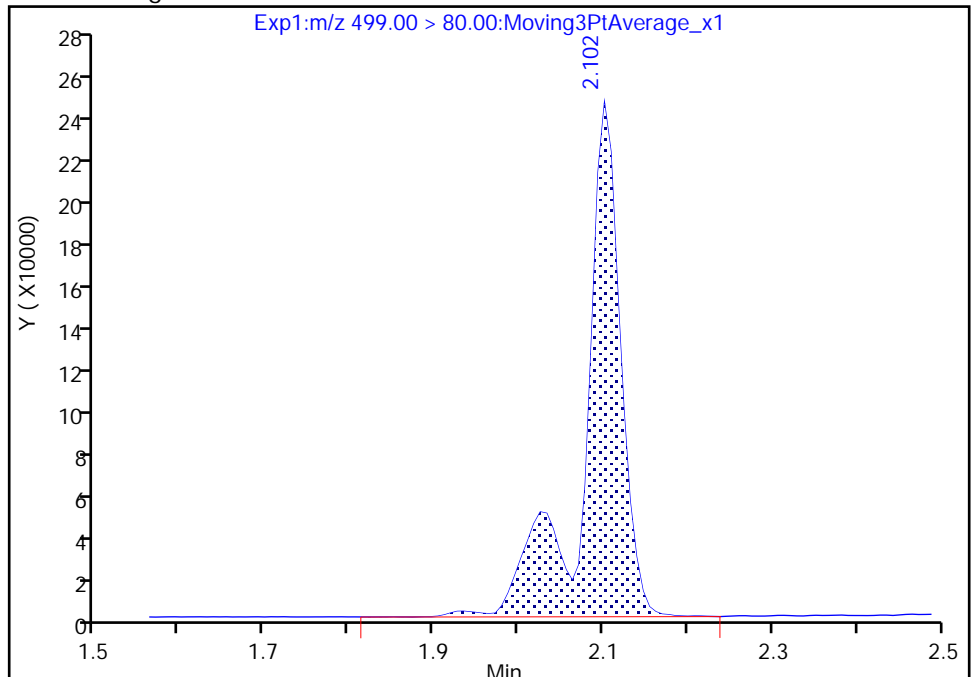
Not Detected
Expected RT: 2.09

Processing Integration Results



Manual Integration Results

RT: 2.10
Area: 750245
Amount: 8.452126
Amount Units: ng/ml



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Lab Sample ID: ICV 320-217453/12 Calibration Date: 04/11/2018 12:27
 Instrument ID: A8_N Calib Start Date: 04/11/2018 11:45
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 04/11/2018 12:09
 Lab File ID: 2018.04.11_537ICALB_013.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.052	0.9079		86.4	100	-13.7	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	0.9453		8.80	10.0	-12.0	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.546		19.0	20.2	-5.8	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	0.8947		17.0	20.2	-15.8	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	0.9451		17.9	20.2	-11.3	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.7643		18.3	20.2	-9.3	30.0
13C2 PFHxA	Ave	1.063	0.9887		9.30	10.0	-7.0	30.0
13C2 PFDA	Ave	0.8505	0.7817		9.19	10.0	-8.1	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_013.d
 Lims ID: ICV
 Client ID:
 Sample Type: ICV
 Inject. Date: 11-Apr-2018 12:27:50 ALS Bottle#: 7 Worklist Smp#: 12
 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\20180411-56557.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 11-Apr-2018 12:35:36 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
 Process Host: XAWRK015

First Level Reviewer: westendorfc Date: 11-Apr-2018 12:35:17

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	1.382	-0.001	1.000	8588615	86.4		6016	
298.90 > 99.00	1.381	1.382	-0.001	1.000	6638954		1.29(0.00-0.00)	7031	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.510	1.515	-0.005	1.000	1110636	9.30		10046	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.669	1.669	0.0	1.000	2946450	19.0		915	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.669	1.669	0.0	1.000	1061944	8.80		129	
* 6 13C2-PFOA									
415.00 > 370.00	1.859	1.865	-0.006		1123391	10.0		7104	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.859	1.866	-0.007	1.000	2026973	17.0		297	
413.00 > 169.00	1.859	1.866	-0.007	1.000	1039561		1.95(0.00-0.00)	1075	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.102	2.094	0.008	1.000	1801850	17.9		451	a
499.00 > 99.00	2.102	2.094	0.008	1.000	352970		5.10(0.00-0.00)	761	a
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.102	0.0		2710764	28.7		1406	
9 Perfluorononanoic acid									
463.00 > 419.00	2.109	2.109	0.0	1.000	1731220	18.3		262	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.253	2.260	-0.007	1.000	878101	9.19		8492	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-ICV_00030

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_013.d

Injection Date: 11-Apr-2018 12:27:50

Instrument ID: A8_N

Lims ID: ICV

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 7

Worklist Smp#: 12

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

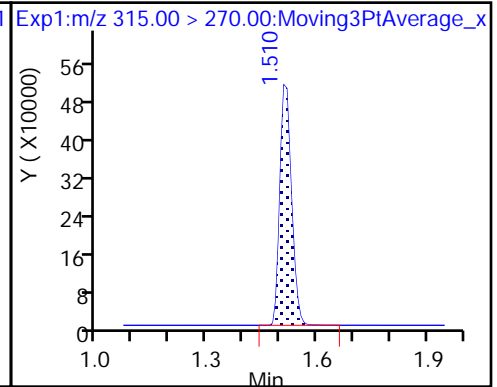
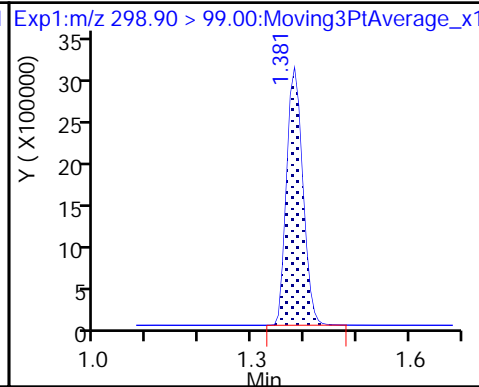
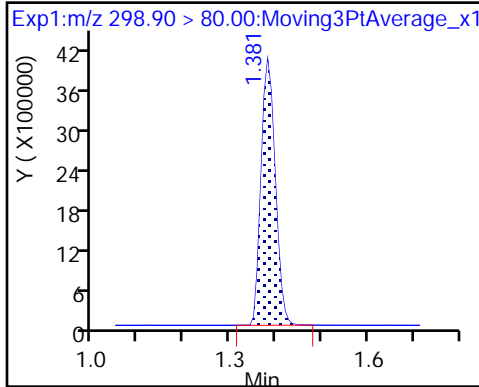
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

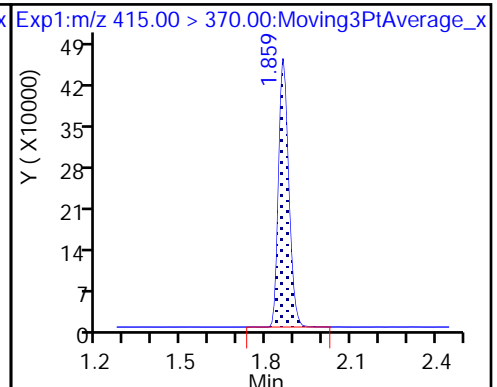
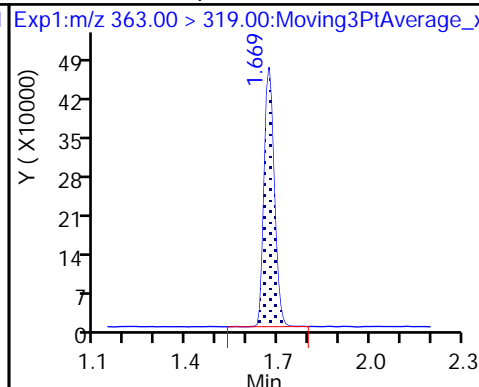
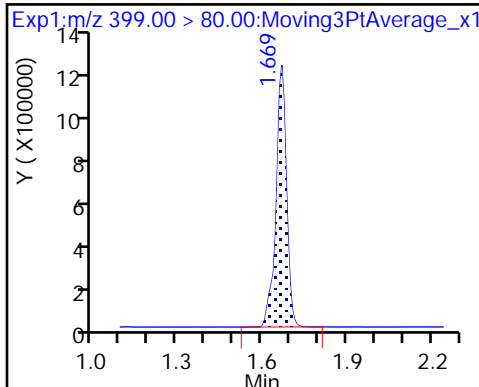
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

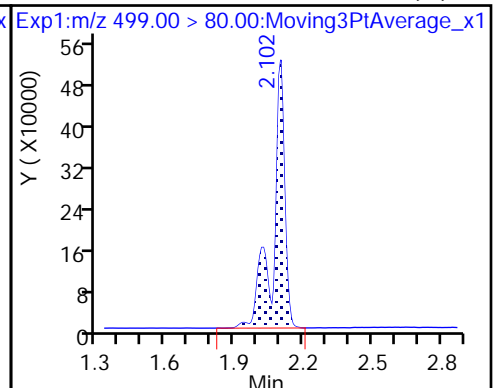
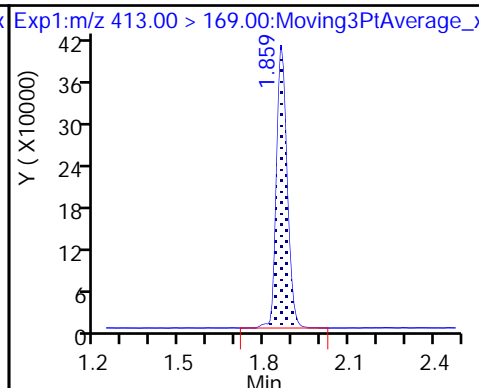
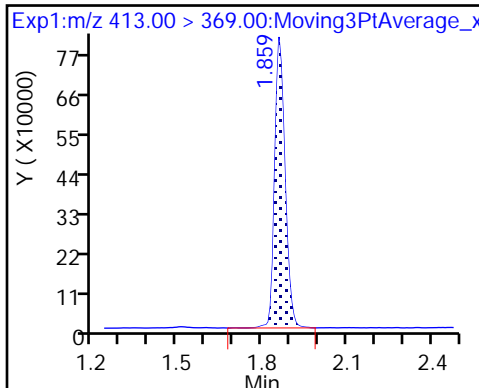
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

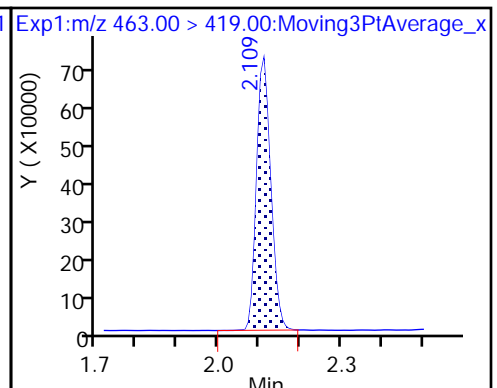
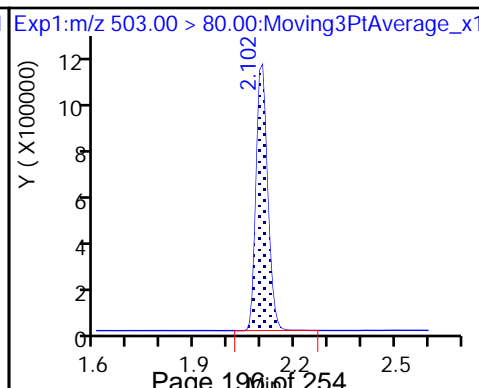
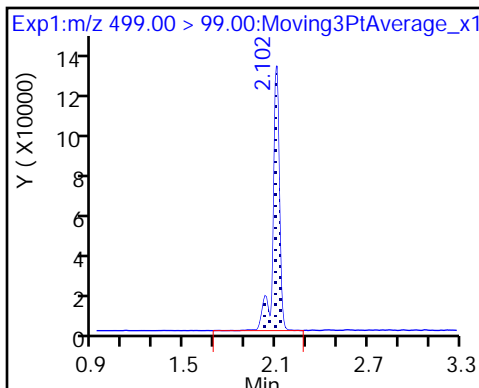
8 Perfluorooctane sulfonic acid (M)



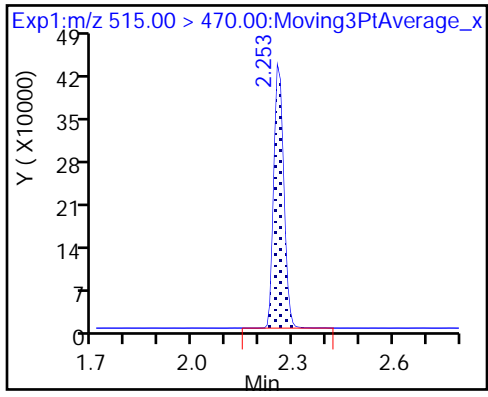
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

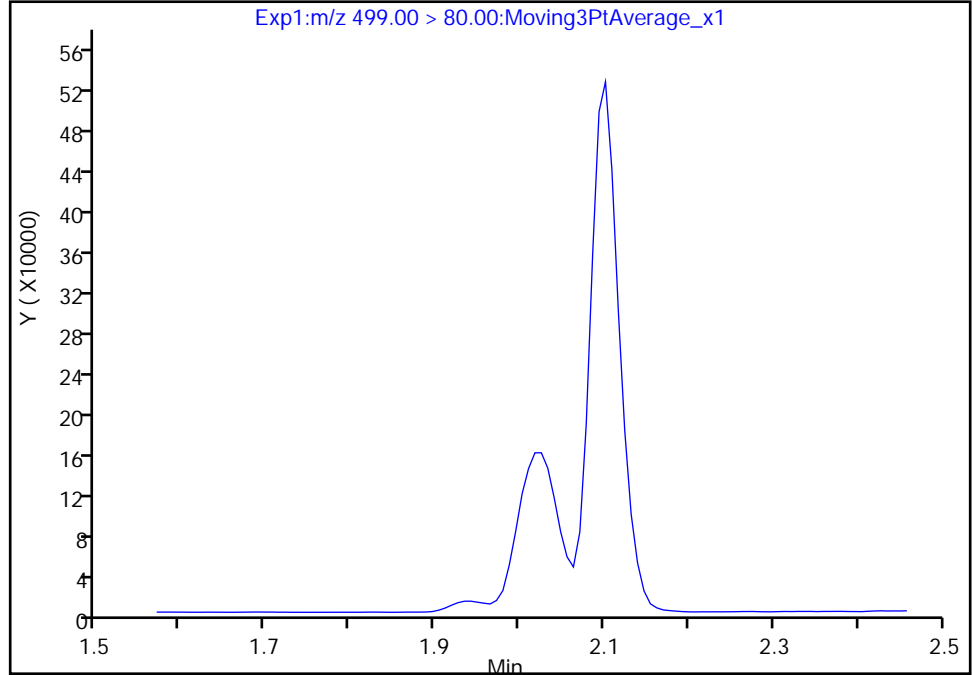
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_013.d
Injection Date: 11-Apr-2018 12:27:50 Instrument ID: A8_N
Lims ID: ICV
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 7 Worklist Smp#: 12
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

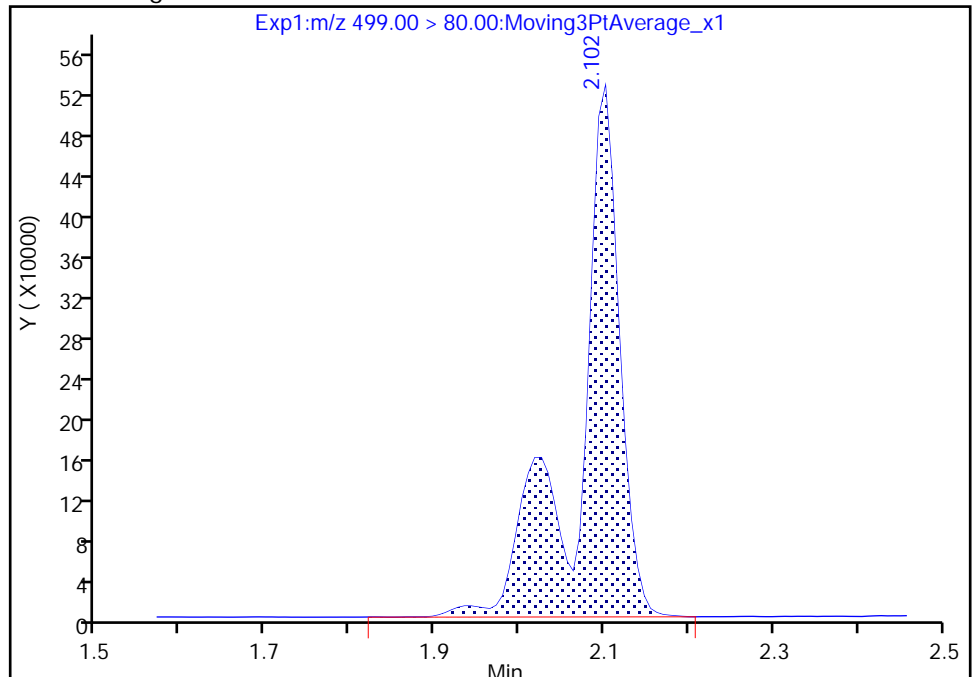
Not Detected
Expected RT: 2.09

Processing Integration Results



RT: 2.10
Area: 1801850
Amount: 17.882127
Amount Units: ng/ml

Manual Integration Results



Reviewer: westendorfc, 11-Apr-2018 12:35:10
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Lab Sample ID: CCVL 320-219239/1 Calibration Date: 04/21/2018 17:22
 Instrument ID: A8_N Calib Start Date: 04/11/2018 11:45
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 04/11/2018 12:09
 Lab File ID: 2018.04.21_537A_004.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.052	1.095		20.8	20.0	4.1	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	0.9845		1.98	2.16	-8.3	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.653		6.76	6.72	0.6	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	1.020		4.23	4.40	-4.0	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	1.030		8.49	8.79	-3.4	50.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.7806		4.08	4.40	-7.3	50.0
13C2 PFHxA	Ave	1.063	1.002		9.42	10.0	-5.8	30.0
13C2 PFDA	Ave	0.8505	0.7982		9.39	10.0	-6.1	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57049.b\2018.04.21_537A_004.d
 Lims ID: CCVL
 Client ID:
 Sample Type: CCVL
 Inject. Date: 21-Apr-2018 17:22:06 ALS Bottle#: 2 Worklist Smp#: 1
 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\20180423-57049.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:27:59 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
 Process Host: XAWRK022

First Level Reviewer: roycea Date: 23-Apr-2018 09:05:58

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.396	1.396	0.0	1.000	1754292	20.8		1266	
298.90 > 99.00	1.396	1.396	0.0	1.000	1355750		1.29(0.00-0.00)	1517	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.525	1.525	0.0	1.000	1011917	9.42		6441	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.684	1.677	0.007	1.000	889338	6.76		260	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.684	1.677	0.007	1.000	214816	1.98		23.3	
* 6 13C2-PFOA									
415.00 > 370.00	1.882	1.866	0.016		1010179	10.0		5366	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.882	1.866	0.016	1.000	453431	4.23		82.8	
413.00 > 169.00	1.882	1.866	0.016	1.000	237829		1.91(0.00-0.00)	201	
* 7 13C4 PFOS									
503.00 > 80.00	2.124	2.102	0.022		2295874	28.7		1276	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.124	2.109	0.015	1.000	724536	8.49		214	a
499.00 > 99.00	2.117	2.109	0.008	0.996	157102		4.61(0.00-0.00)	274	a
9 Perfluorononanoic acid									
463.00 > 419.00	2.132	2.117	0.015	1.000	346958	4.08		89.2	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.284	2.269	0.016	1.000	806320	9.39		6999	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L2_00022

Amount Added: 1.00

Units: mL

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57049.b\2018.04.21_537A_004.d

Injection Date: 21-Apr-2018 17:22:06

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

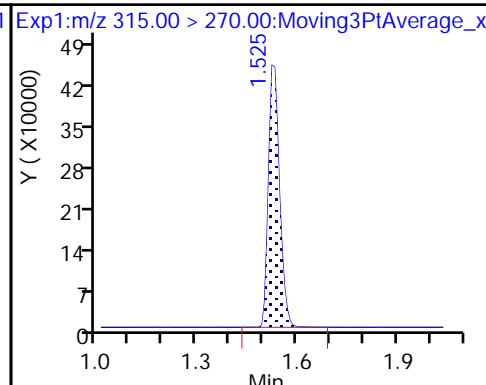
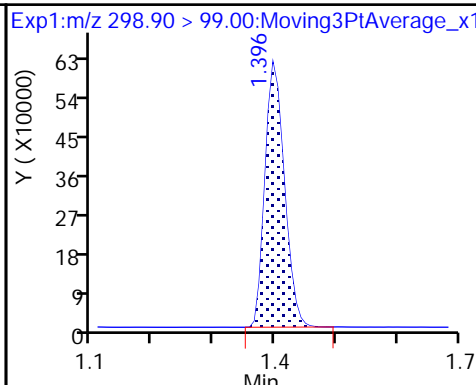
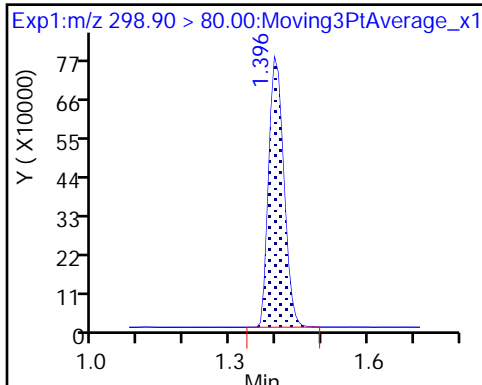
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

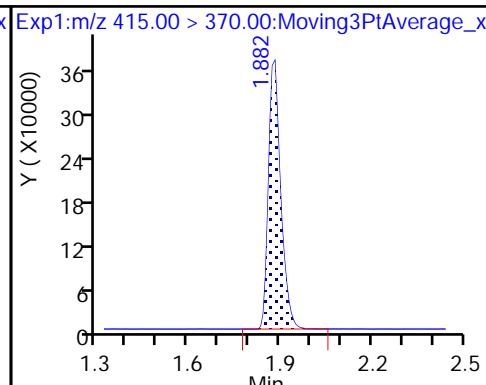
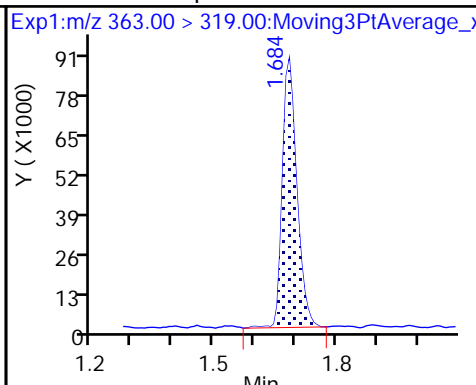
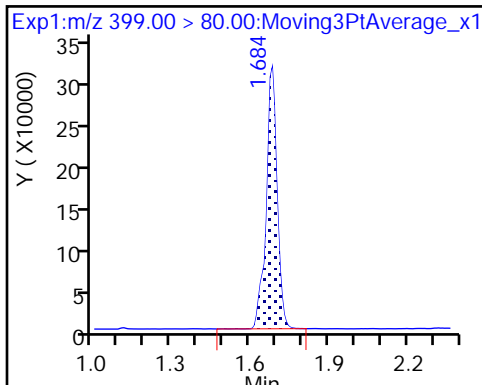
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

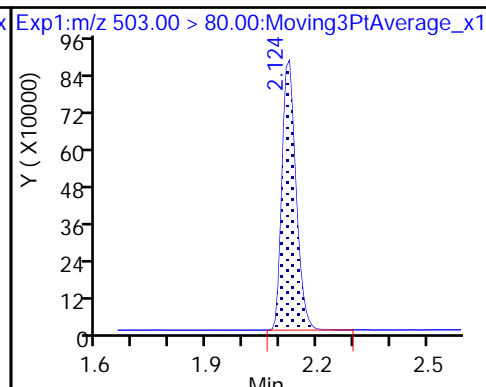
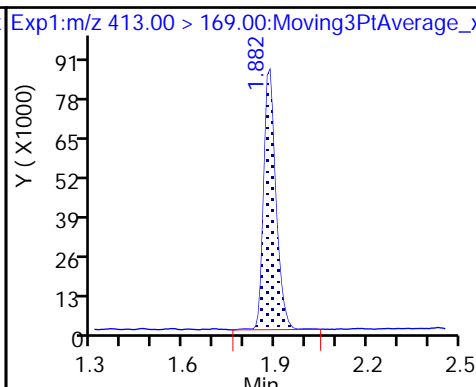
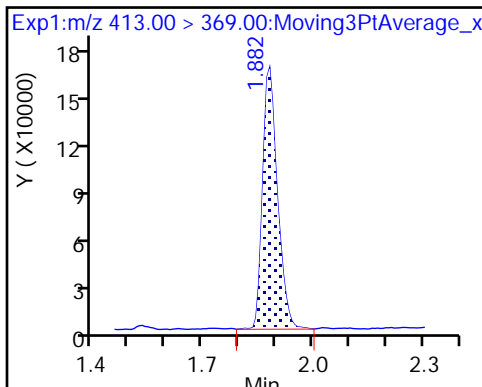
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

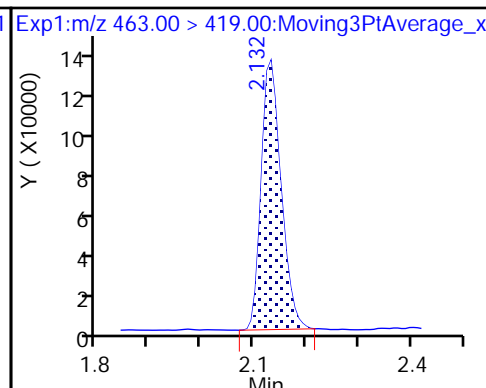
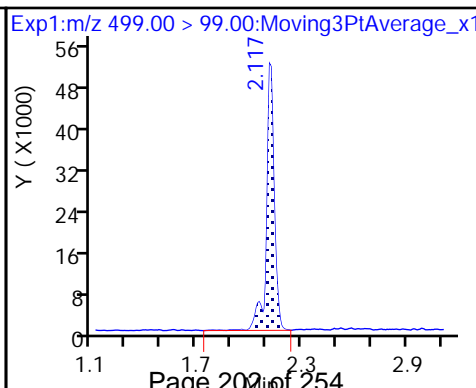
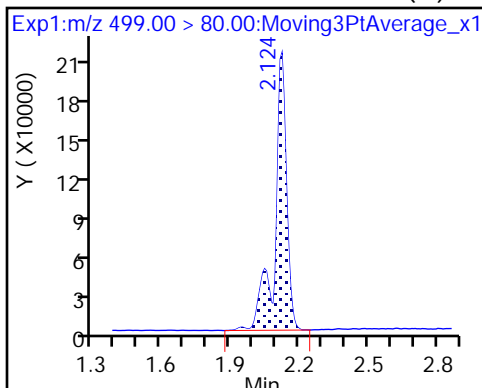
* 7 13C4 PFOS



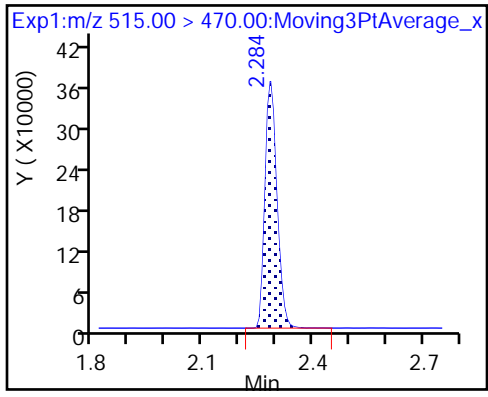
8 Perfluorooctane sulfonic acid (M)

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

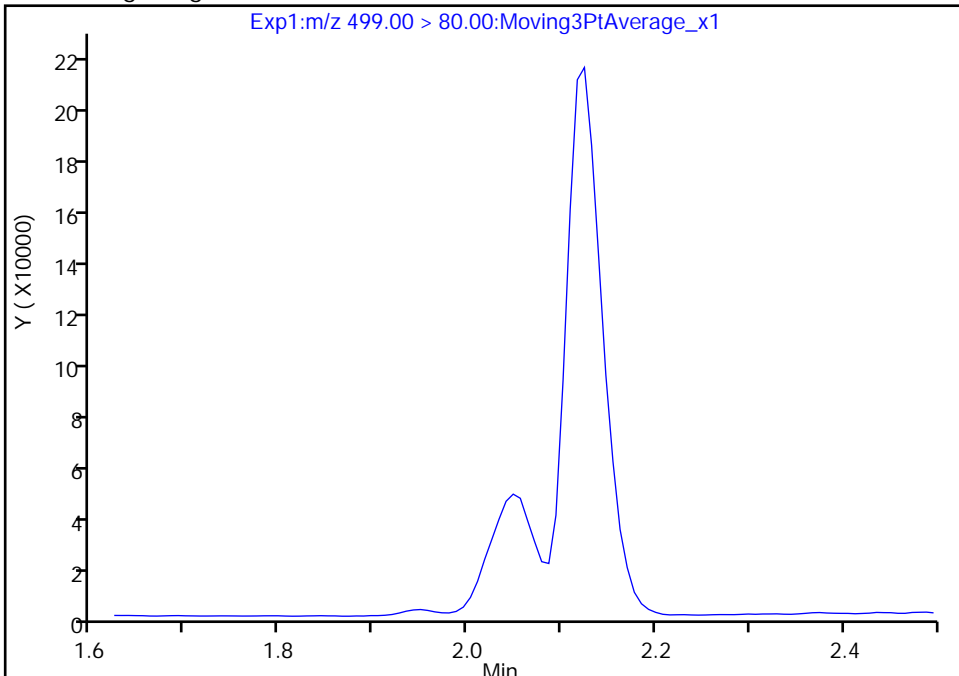
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57049.b\2018.04.21_537A_004.d
Injection Date: 21-Apr-2018 17:22:06 Instrument ID: A8_N
Lims ID: CCVL
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 1
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

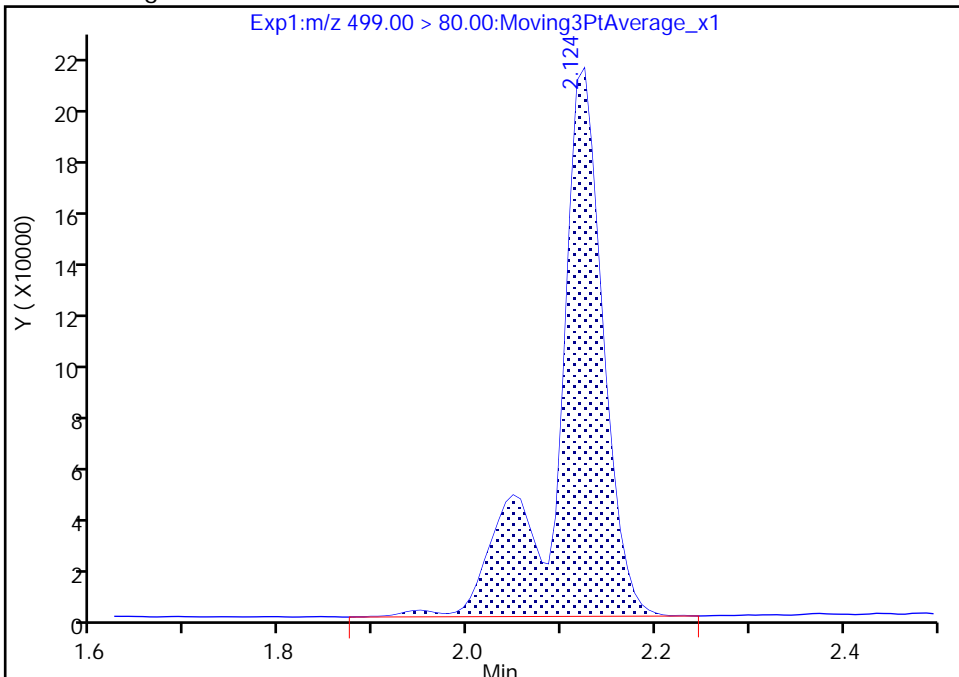
Not Detected
Expected RT: 2.11

Processing Integration Results



RT: 2.12
Area: 724536
Amount: 8.489931
Amount Units: ng/ml

Manual Integration Results



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Lab Sample ID: CCV 320-219245/1 Calibration Date: 04/21/2018 19:28
 Instrument ID: A8_N Calib Start Date: 04/11/2018 11:45
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 04/11/2018 12:09
 Lab File ID: 2018.04.21_537A_031.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.052	1.145		49.0	45.0	8.9	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	1.040		4.71	4.86	-3.1	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.694		15.6	15.1	3.1	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	1.017		9.48	9.90	-4.3	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	1.081		20.0	19.8	1.4	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.7978		9.38	9.90	-5.3	30.0
13C2 PFHxA	Ave	1.063	1.026		9.65	10.0	-3.5	30.0
13C2 PFDA	Ave	0.8505	0.7884		9.27	10.0	-7.3	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_031.d
 Lims ID: CCV L3
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 21-Apr-2018 19:28:10 ALS Bottle#: 3 Worklist Smp#: 1
 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\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK022

First Level Reviewer: roycea Date: 23-Apr-2018 09:10:23

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.396	1.396	0.0	1.000	4221685	49.0		2966	
298.90 > 99.00	1.396	1.396	0.0	1.000	3102844		1.36(0.00-0.00)	3292	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.525	1.525	0.0	1.000	1056872	9.65		8550	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.677	1.677	0.0	1.000	2096961	15.6		619	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.677	1.677	0.0	1.000	520918	4.71		54.4	
* 6 13C2-PFOA									
415.00 > 370.00	1.866	1.866	0.0		1030135	10.0		7092	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.866	1.866	0.0	1.000	1037182	9.48		197	
413.00 > 169.00	1.866	1.866	0.0	1.000	572906		1.81(0.00-0.00)	505	
* 7 13C4 PFOS									
503.00 > 80.00	2.109	2.109	0.0		2347952	28.7		1279	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.109	2.102	0.007	1.000	1749313	20.0		461	a
499.00 > 99.00	2.109	2.102	0.007	1.000	382693		4.57(0.00-0.00)	756	a
9 Perfluorononanoic acid									
463.00 > 419.00	2.117	2.117	0.0	1.000	813632	9.38		199	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.269	0.0	1.000	812152	9.27		7471	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L3_00025

Amount Added: 1.00

Units: mL

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_031.d

Injection Date: 21-Apr-2018 19:28:10

Instrument ID: A8_N

Lims ID: CCV L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 1

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

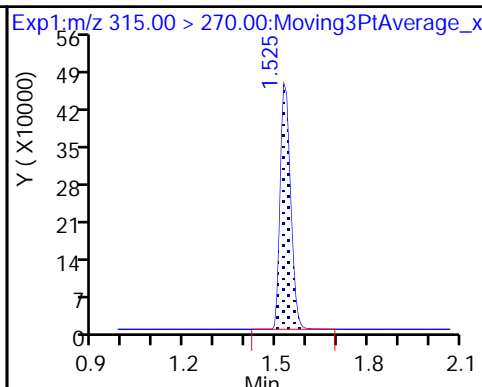
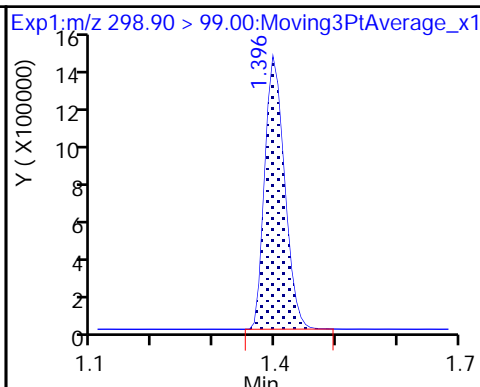
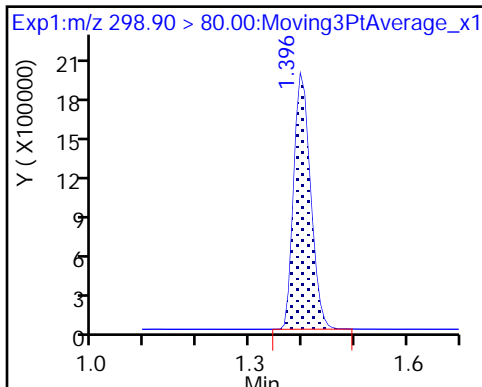
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

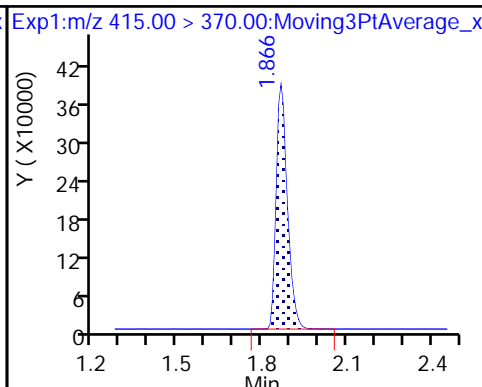
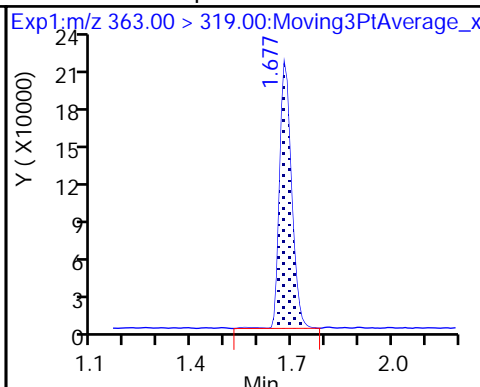
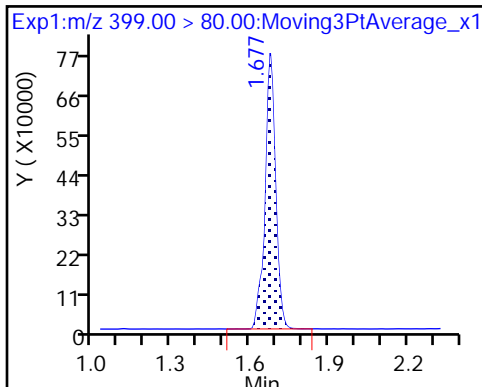
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

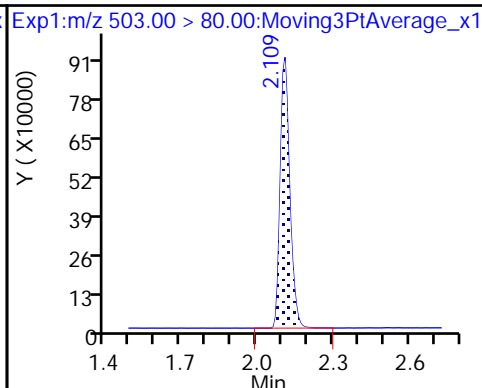
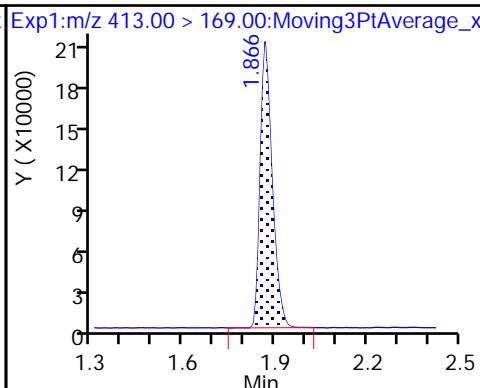
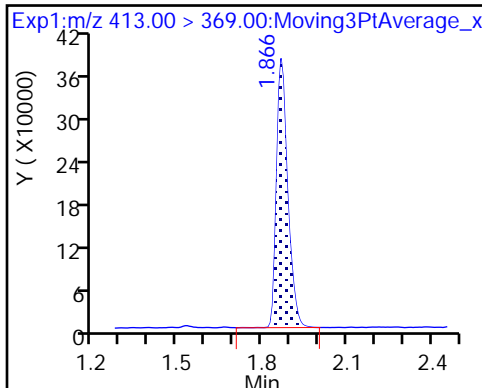
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

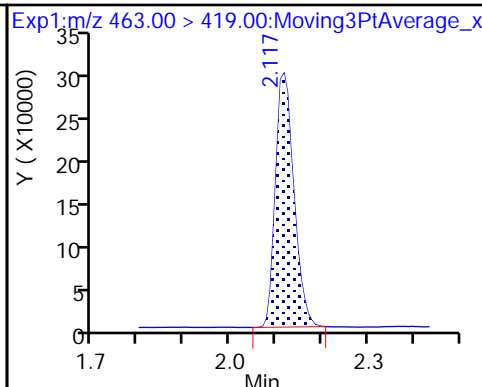
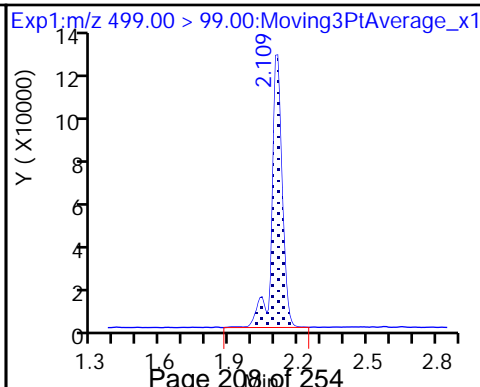
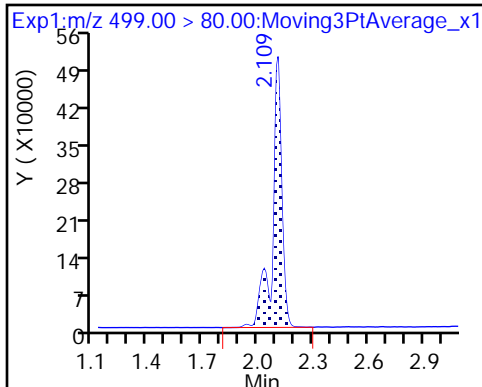
* 7 13C4 PFOS



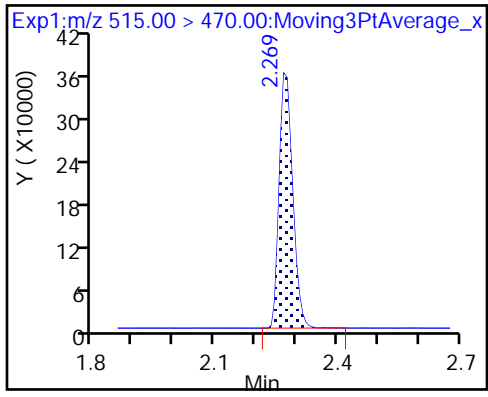
8 Perfluorooctane sulfonic acid (M)

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

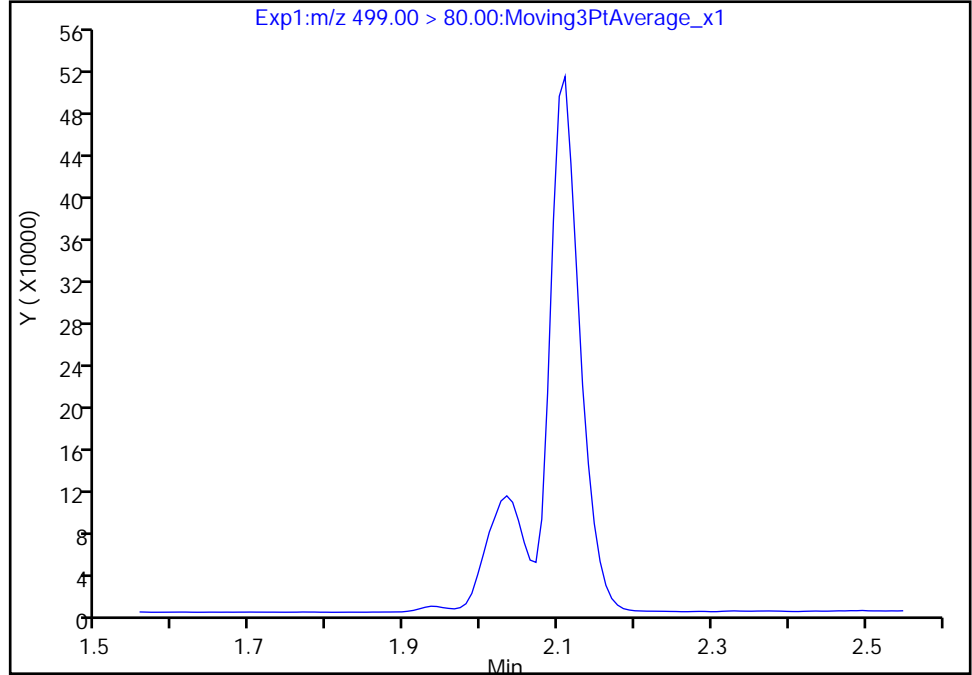
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_031.d
Injection Date: 21-Apr-2018 19:28:10 Instrument ID: A8_N
Lims ID: CCV L3
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 1
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

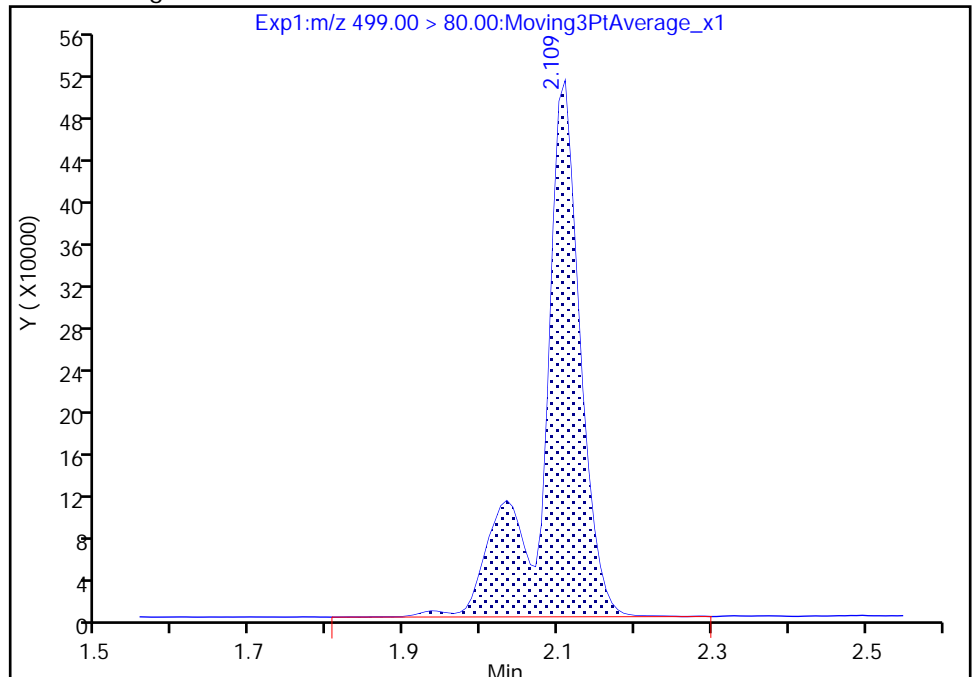
Not Detected
Expected RT: 2.10

Processing Integration Results



RT: 2.11
Area: 1749313
Amount: 20.043362
Amount Units: ng/ml

Manual Integration Results



Reviewer: roycea, 23-Apr-2018 09:10:13
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Lab Sample ID: CCV 320-219245/10 Calibration Date: 04/21/2018 20:10
 Instrument ID: A8_N Calib Start Date: 04/11/2018 11:45
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 04/11/2018 12:09
 Lab File ID: 2018.04.21_537A_040.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.052	1.075		138	135	2.2	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	1.081		14.7	14.6	0.6	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.743		48.2	45.4	6.1	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	1.128		31.5	29.7	6.1	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.8159		28.8	29.7	-3.1	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	1.089		60.6	59.3	2.1	30.0
13C2 PFHxA	Ave	1.063	1.093		10.3	10.0	2.8	30.0
13C2 PFDA	Ave	0.8505	0.8491		9.98	10.0	-0.2	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_040.d
 Lims ID: CCV L5
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 21-Apr-2018 20:10:16 ALS Bottle#: 5 Worklist Smp#: 10
 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\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:27 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK022

First Level Reviewer: barnettj Date: 23-Apr-2018 10:38:53

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	1.388	0.0	1.000	11630635	138.1		7250	
298.90 > 99.00	1.388	1.388	0.0	1.000	9044029		1.29(0.00-0.00)	8420	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.517	1.517	0.0	1.000	1062332	10.3		8374	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.669	1.669	0.0	1.000	6331922	48.2		1651	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.669	1.669	0.0	1.000	1531265	14.7		158	
* 6 13C2-PFOA									
415.00 > 370.00	1.859	1.859	0.0		971858	10.0		6465	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.859	1.859	0.0	1.000	3254468	31.5		576	
413.00 > 169.00	1.859	1.859	0.0	1.000	1648031		1.97(0.00-0.00)	1322	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.102	2.102	0.0	1.000	5168243	60.6		1343	a
499.00 > 99.00	2.102	2.102	0.0	1.000	1104060		4.68(0.00-0.00)	1967	a
* 7 13C4 PFOS									
503.00 > 80.00	2.094	2.094	0.0		2296172	28.7		1164	
9 Perfluorononanoic acid									
463.00 > 419.00	2.102	2.102	0.0	1.000	2355077	28.8		540	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.261	2.261	0.0	1.000	825202	9.98		7301	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L5_00026

Amount Added: 1.00

Units: mL

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_040.d

Injection Date: 21-Apr-2018 20:10:16

Instrument ID: A8_N

Lims ID: CCV L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 10

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

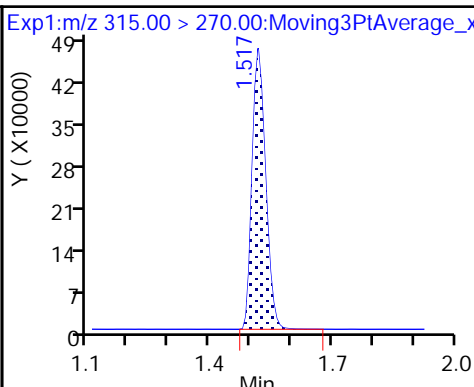
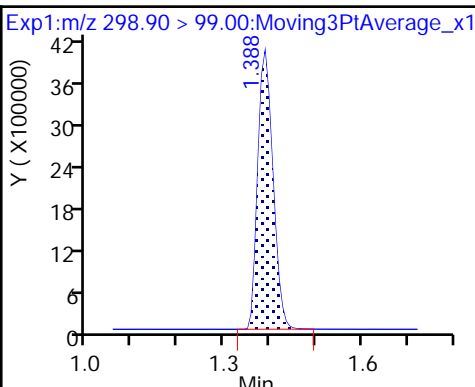
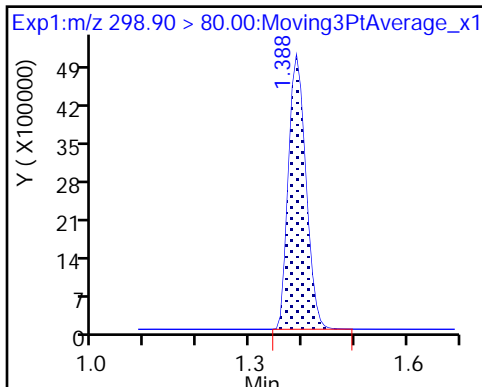
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

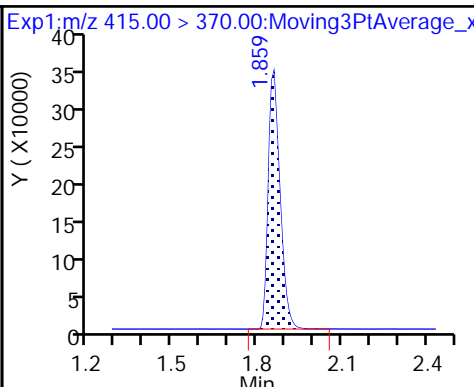
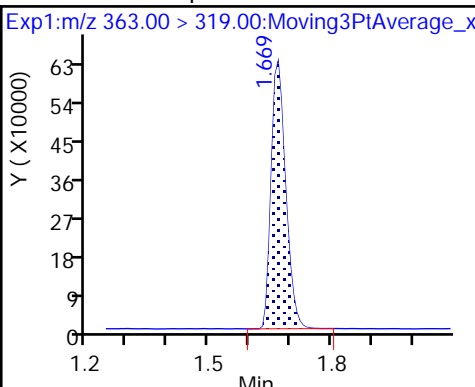
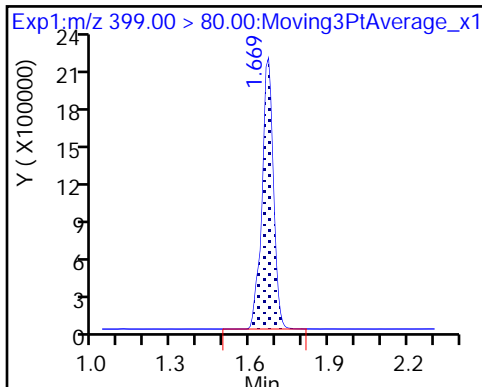
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

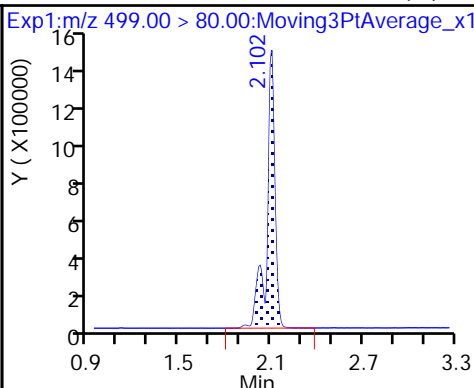
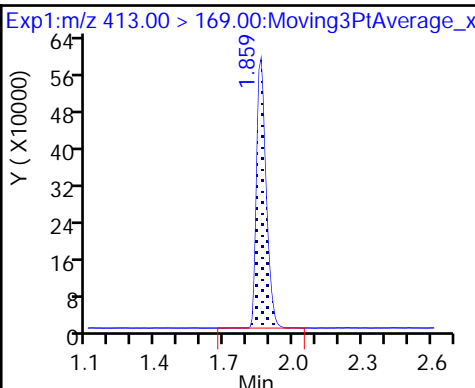
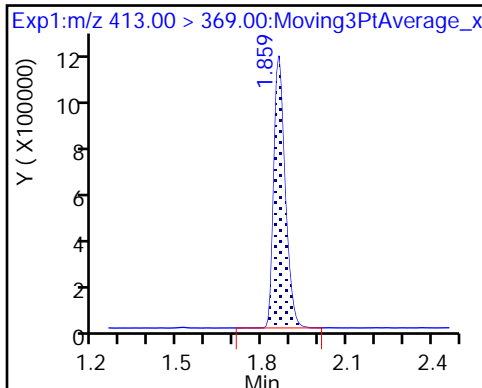
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

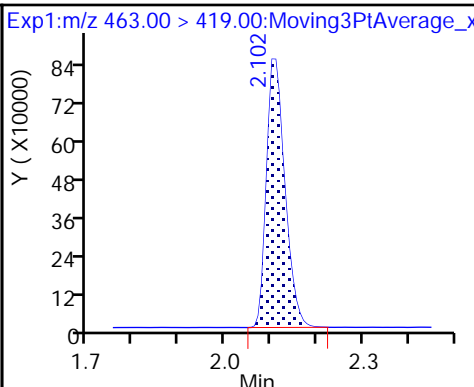
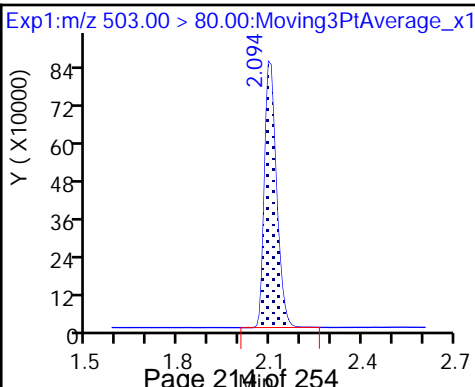
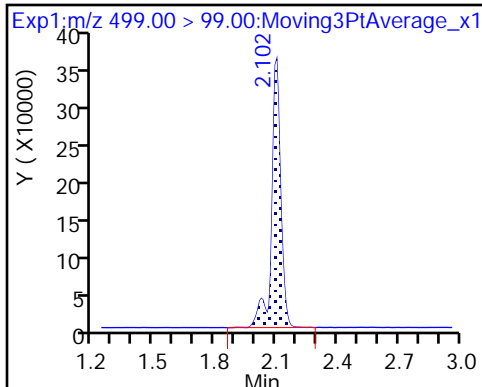
8 Perfluorooctane sulfonic acid (M)



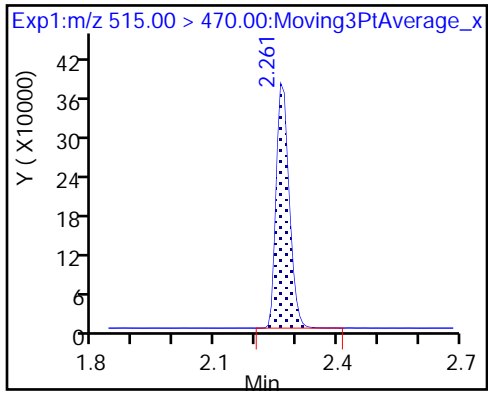
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

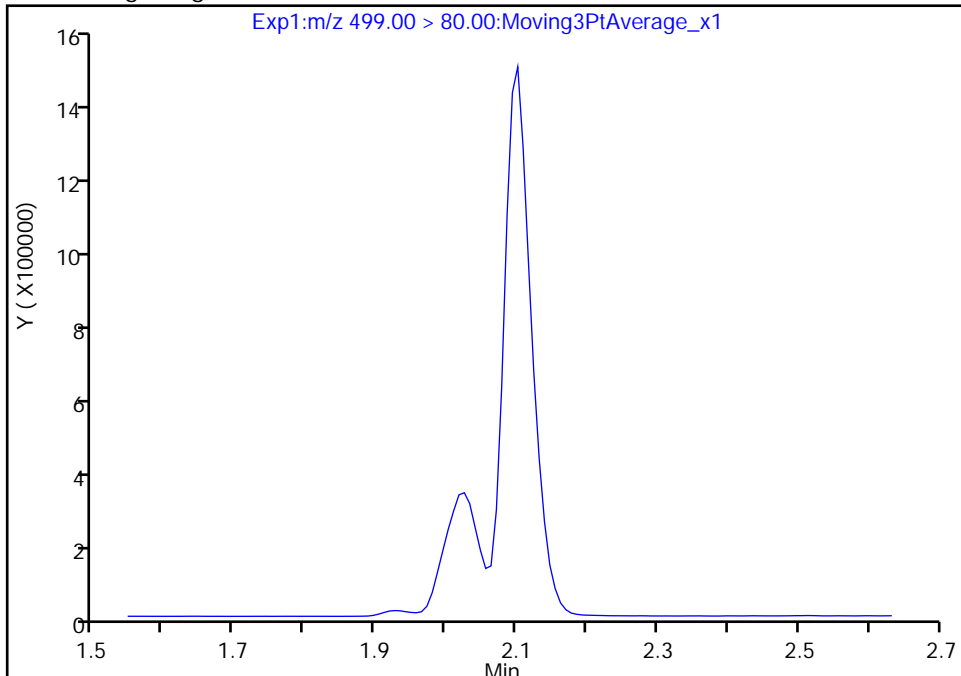
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_040.d
Injection Date: 21-Apr-2018 20:10:16 Instrument ID: A8_N
Lims ID: CCV L5
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 10
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

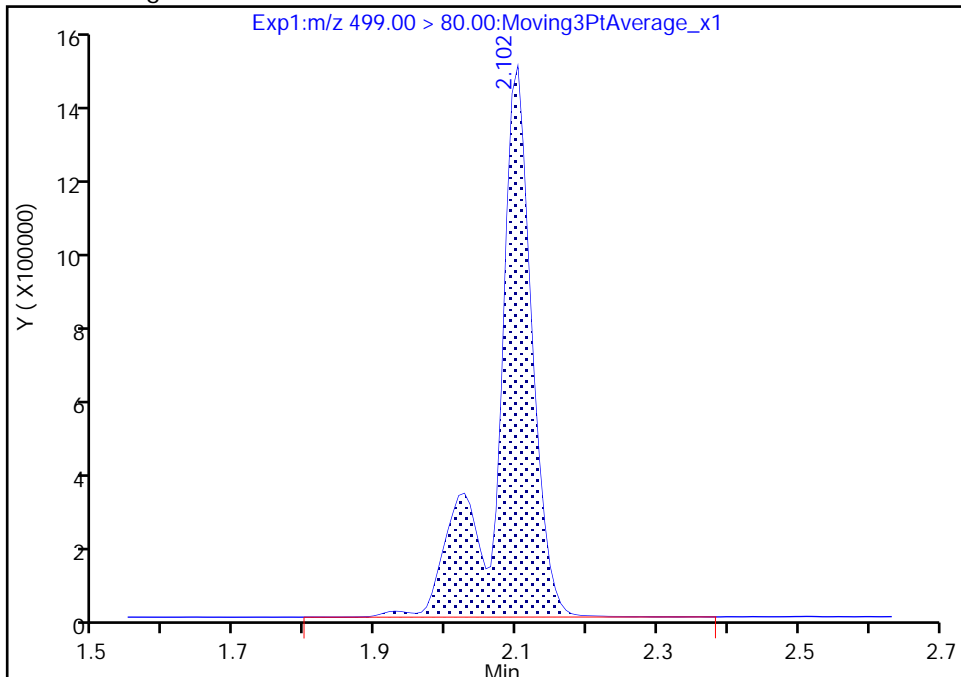
Not Detected
Expected RT: 2.10

Processing Integration Results



RT: 2.10
Area: 5168243
Amount: 60.552316
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 23-Apr-2018 10:38:47
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: MB 320-218546/1-A
 Matrix: Water Lab File ID: 2018.04.21_537A_033.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 250 (mL) Date Analyzed: 04/21/2018 19:37
 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.: 219245 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	102		70-130
STL00996	13C2 PFDA	87		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_033.d
 Lims ID: MB 320-218546/1-A
 Client ID:
 Sample Type: MB
 Inject. Date: 21-Apr-2018 19:37:31 ALS Bottle#: 29 Worklist Smp#: 3
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: mb 320-218546/1-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
 Process Host: XAWRK022

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
\$ 2 13C2 PFHxA	315.00 > 270.00	1.525	1.525	0.0	1.000	1056495	10.2	7972	
* 6 13C2-PFOA	415.00 > 370.00	1.866	1.866	0.0		976707	10.0	5687	
* 7 13C4 PFOS	503.00 > 80.00	2.102	2.109	-0.007		2334610	28.7	1367	
\$ 10 13C2 PFDA	515.00 > 470.00	2.269	2.269	0.0	1.000	725409	8.73	7668	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_033.d

Injection Date: 21-Apr-2018 19:37:31

Instrument ID: A8_N

Lims ID: MB 320-218546/1-A

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 29

Worklist Smp#: 3

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

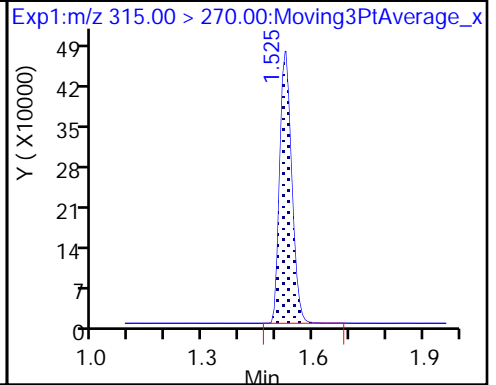
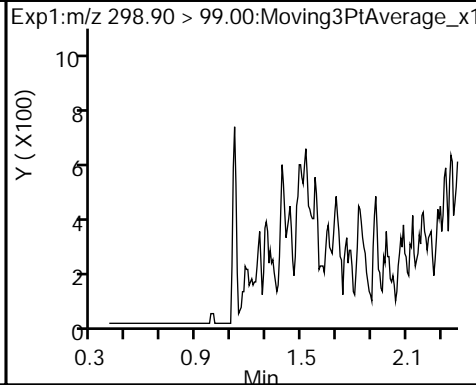
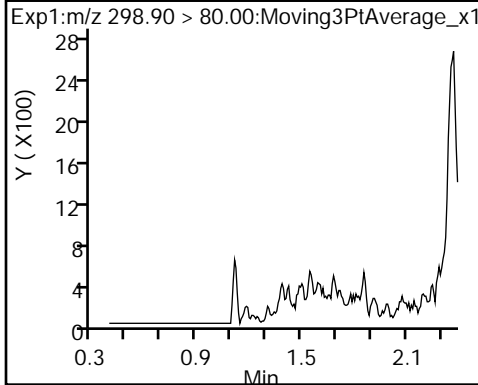
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid (ND)

1 Perfluorobutanesulfonic acid (ND)

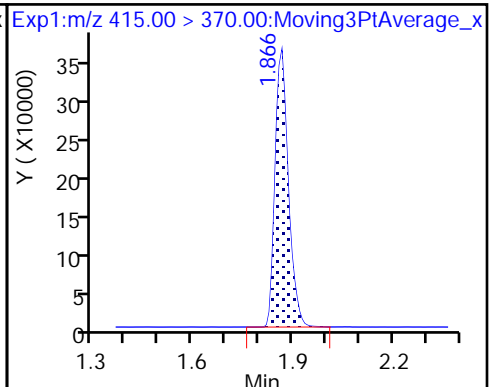
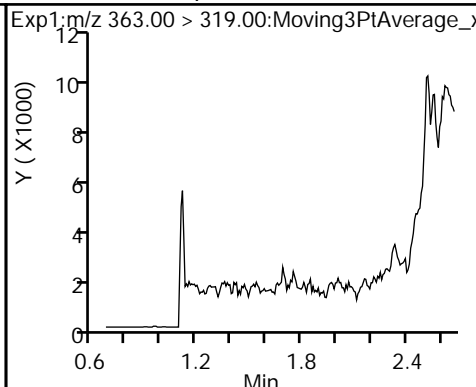
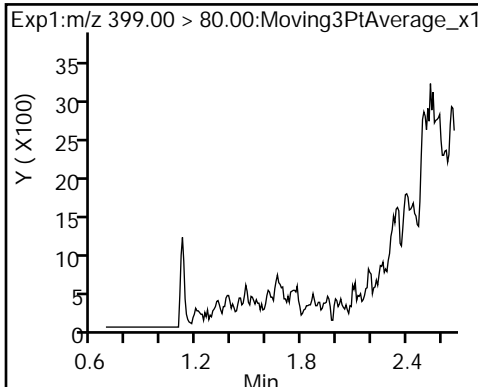
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid (ND)

4 Perfluoroheptanoic acid (ND)

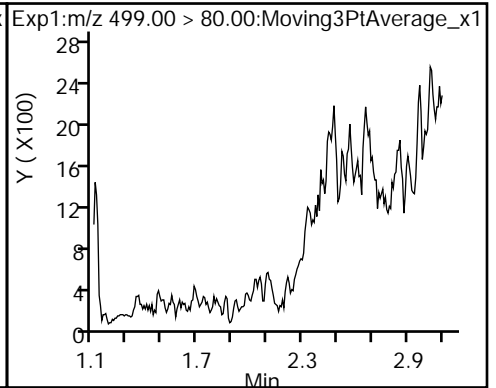
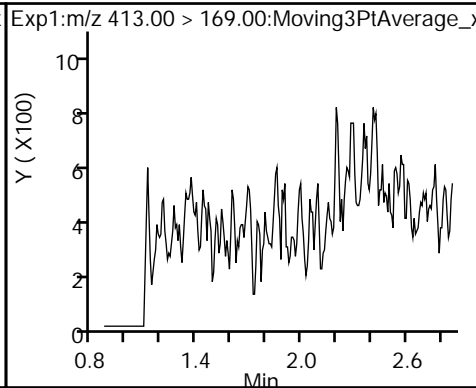
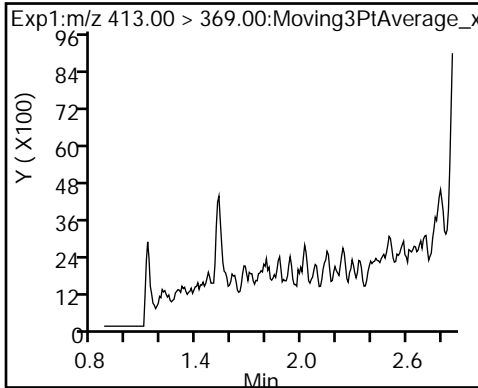
* 6 13C2-PFOA



5 Perfluorooctanoic acid (ND)

5 Perfluorooctanoic acid (ND)

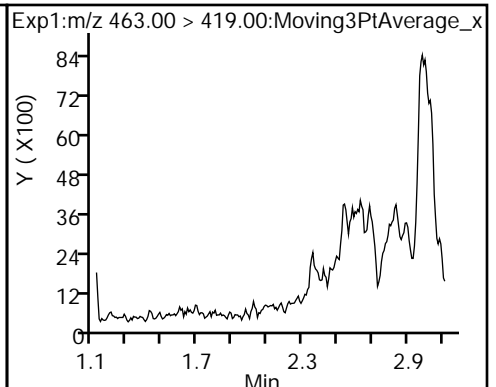
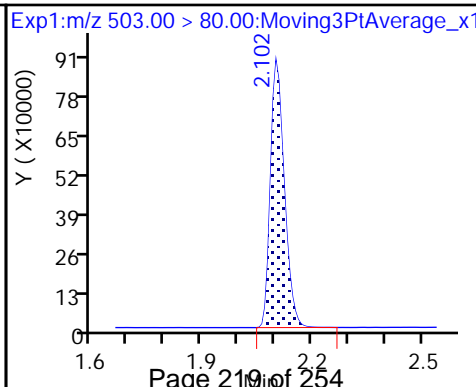
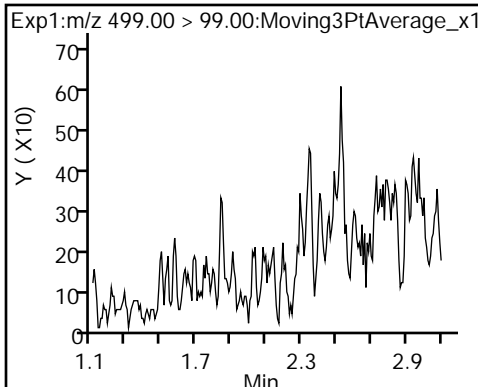
8 Perfluorooctane sulfonic acid (ND)



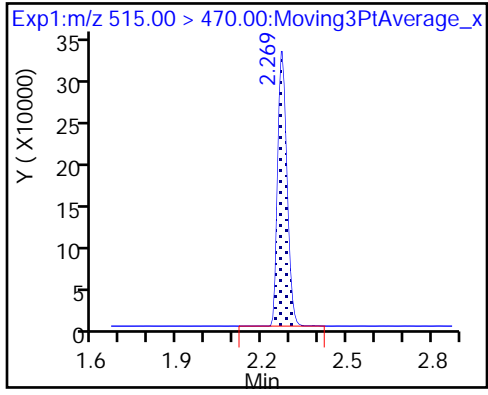
8 Perfluorooctane sulfonic acid (ND)

* 7 13C4 PFOS

9 Perfluorononanoic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_033.d
 Lims ID: MB 320-218546/1-A
 Client ID:
 Sample Type: MB
 Inject. Date: 21-Apr-2018 19:37:31 ALS Bottle#: 29 Worklist Smp#: 3
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: mb 320-218546/1-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK022

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	10.2	101.74
\$ 10 13C2 PFDA	10.0	8.73	87.33

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: LCS 320-218546/2-A
 Matrix: Water Lab File ID: 2018.04.21_537A_034.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 250 (mL) Date Analyzed: 04/21/2018 19:42
 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.: 219245 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	223	M	40	16	6.8
335-67-1	Perfluorooctanoic acid (PFOA)	105		20	8.0	2.8
375-95-1	Perfluorononanoic acid (PFNA)	101		24	20	8.0
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	186		30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	56.4		10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	499		90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	99		70-130
STL00996	13C2 PFDA	89		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_034.d
 Lims ID: LCS 320-218546/2-A
 Client ID:
 Sample Type: LCS
 Inject. Date: 21-Apr-2018 19:42:13 ALS Bottle#: 30 Worklist Smp#: 4
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: lcs 320-218546/2-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK022

First Level Reviewer: roycea Date: 23-Apr-2018 09:10:49

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	1.396	-0.008	1.000	10457430	124.7		6487	
298.90 > 99.00	1.388	1.396	-0.008	1.000	8001369		1.31(0.00-0.00)	6989	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.517	1.525	-0.008	1.000	1057533	9.92		7896	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.669	1.677	-0.008	1.000	6104881	46.6		1700	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.669	1.677	-0.008	1.000	1517715	14.1		174	
* 6 13C2-PFOA									
415.00 > 370.00	1.851	1.866	-0.015		1002942	10.0		5591	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.859	1.866	-0.007	1.000	2793552	26.2		455	
413.00 > 169.00	1.859	1.866	-0.007	1.000	1519687		1.84(0.00-0.00)	1250	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.094	2.102	-0.008	1.000	4744637	55.8		1154	a
499.00 > 99.00	2.094	2.102	-0.008	1.000	1042687		4.55(0.00-0.00)	1703	a
* 7 13C4 PFOS									
503.00 > 80.00	2.094	2.109	-0.015		2286947	28.7		1238	
9 Perfluorononanoic acid									
463.00 > 419.00	2.102	2.117	-0.015	1.000	2129163	25.2		437	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.261	2.269	-0.007	1.000	756208	8.87		8289	

QC Flag Legend

Review Flags

a - User Assigned ID

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_034.d

Injection Date: 21-Apr-2018 19:42:13

Instrument ID: A8_N

Lims ID: LCS 320-218546/2-A

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 30

Worklist Smp#: 4

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

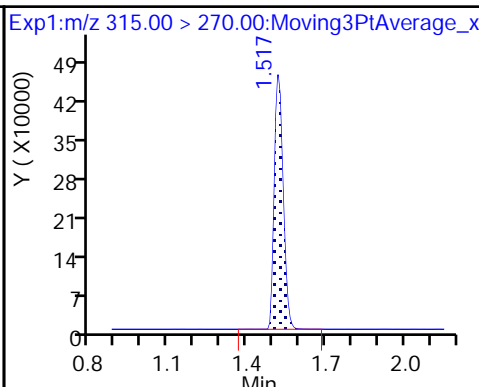
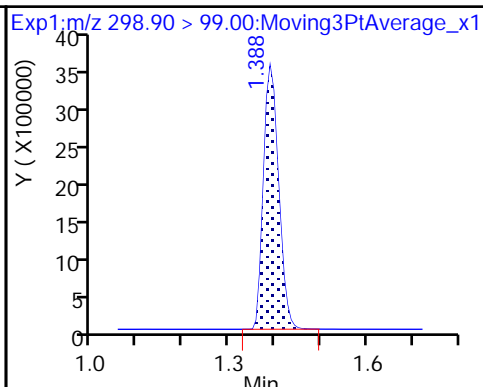
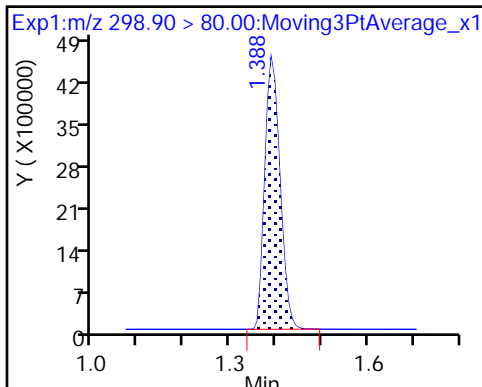
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

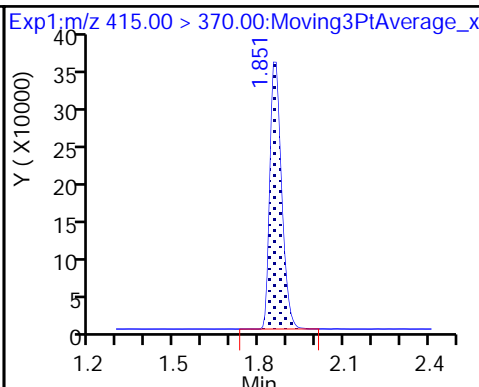
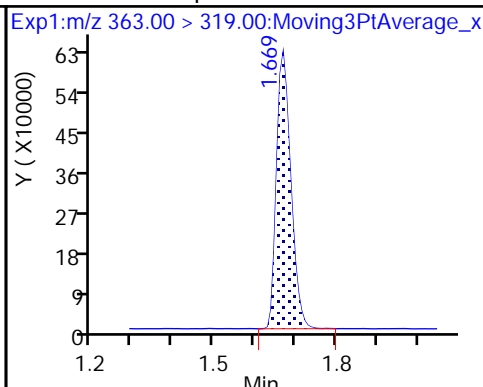
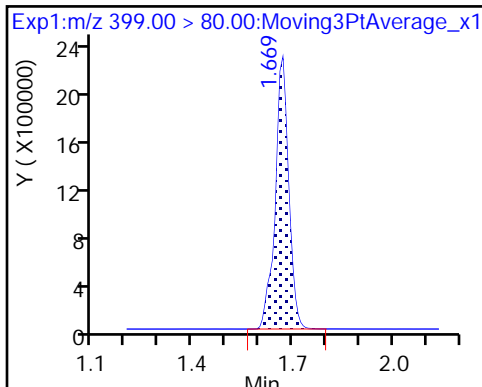
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

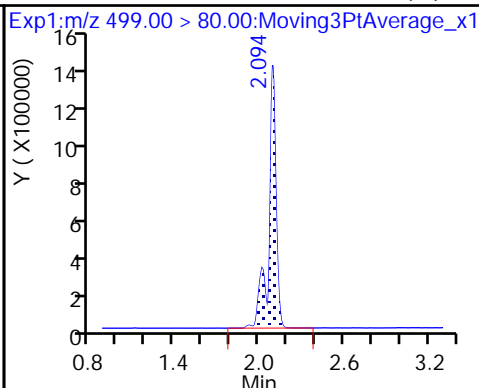
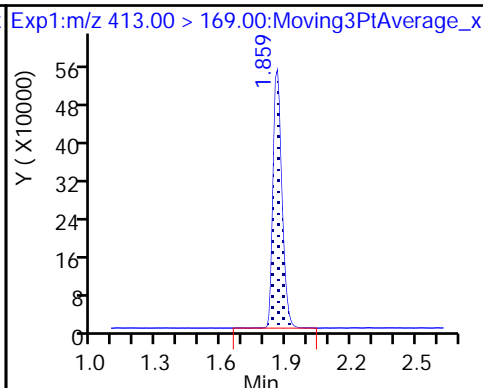
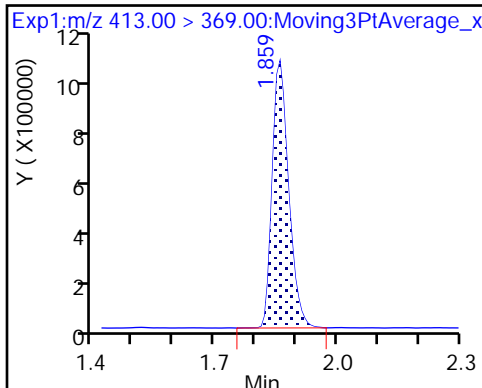
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

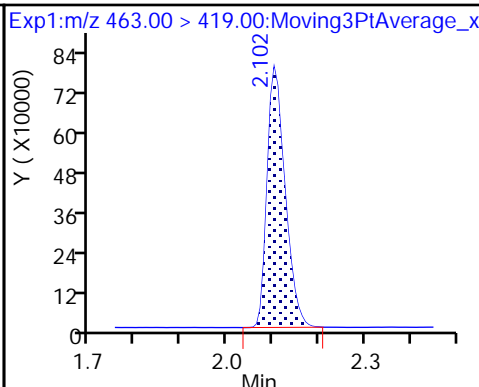
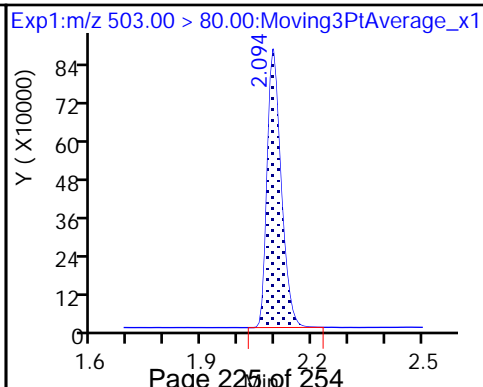
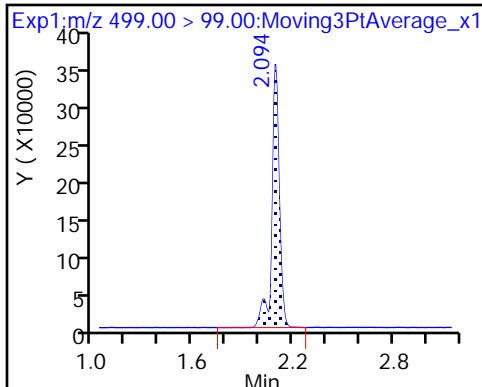
8 Perfluorooctane sulfonic acid (M)



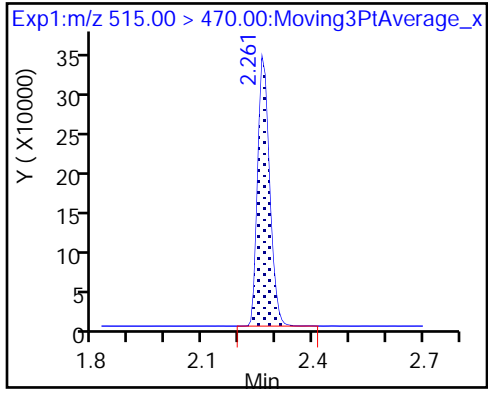
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_034.d
 Lims ID: LCS 320-218546/2-A
 Client ID:
 Sample Type: LCS
 Inject. Date: 21-Apr-2018 19:42:13 ALS Bottle#: 30 Worklist Smp#: 4
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: lcs 320-218546/2-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK022

First Level Reviewer: roycea Date: 23-Apr-2018 09:10:49

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.92	99.18
\$ 10 13C2 PFDA	10.0	8.87	88.66

TestAmerica Sacramento

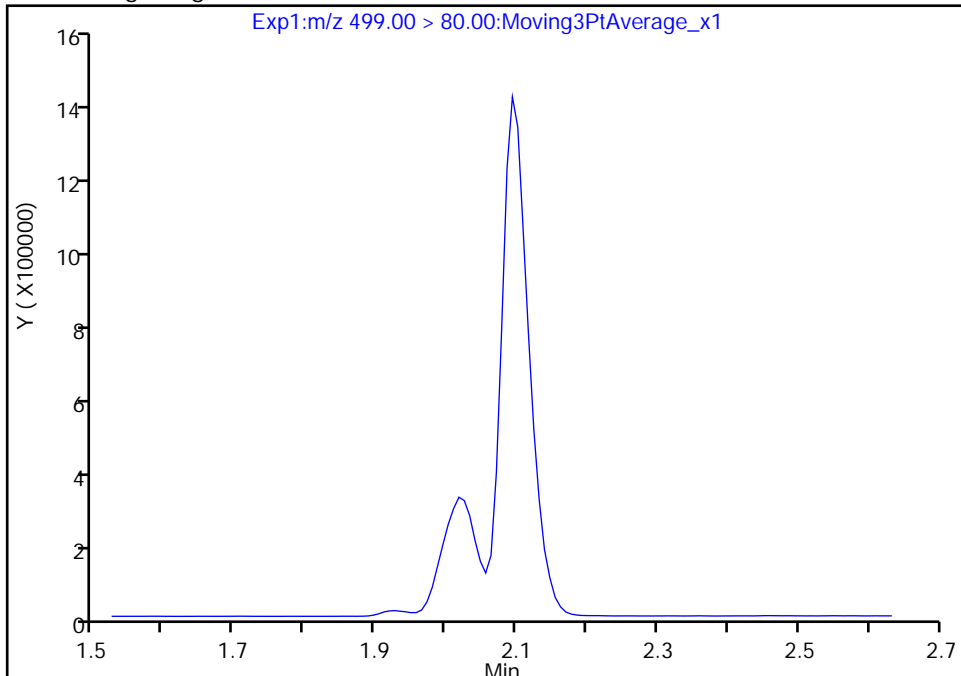
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_034.d
Injection Date: 21-Apr-2018 19:42:13 Instrument ID: A8_N
Lims ID: LCS 320-218546/2-A
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 30 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

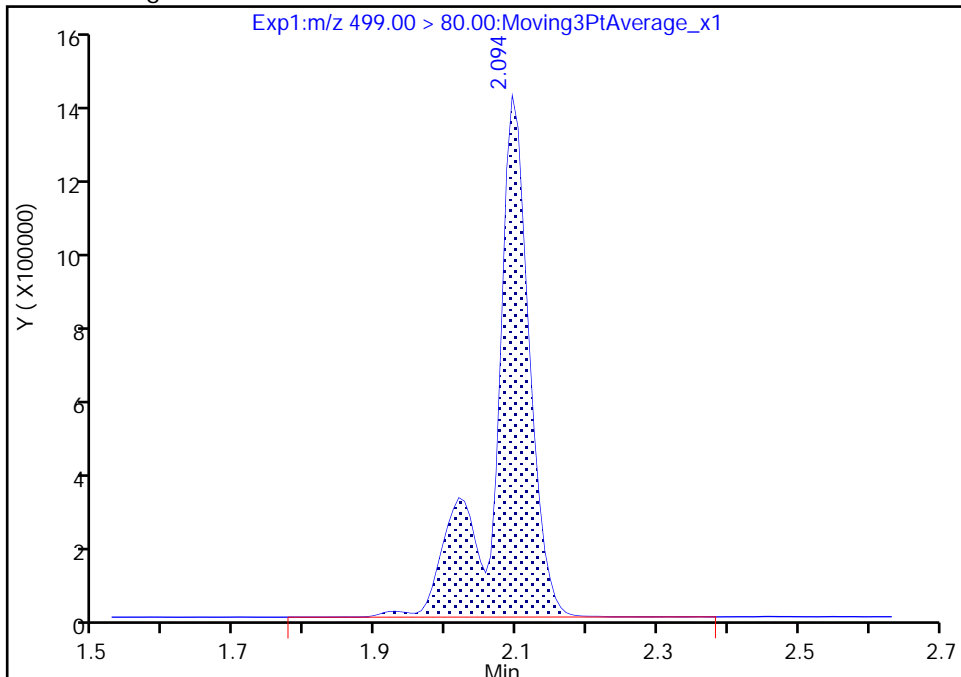
Not Detected
Expected RT: 2.10

Processing Integration Results



RT: 2.09
Area: 4744637
Amount: 55.813485
Amount Units: ng/ml

Manual Integration Results



Reviewer: roycea, 23-Apr-2018 09:10:36
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: LCSD 320-218546/3-A
 Matrix: Water Lab File ID: 2018.04.21_537A_035.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 250 (mL) Date Analyzed: 04/21/2018 19:46
 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.: 219245 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	218	M	40	16	6.8
335-67-1	Perfluorooctanoic acid (PFOA)	112		20	8.0	2.8
375-95-1	Perfluorononanoic acid (PFNA)	104		24	20	8.0
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	181		30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	53.7		10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	483		90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	98		70-130
STL00996	13C2 PFDA	88		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_035.d
 Lims ID: LCSD 320-218546/3-A
 Client ID:
 Sample Type: LCSD
 Inject. Date: 21-Apr-2018 19:46:53 ALS Bottle#: 31 Worklist Smp#: 5
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: lcsd 320-218546/3-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK022

First Level Reviewer: roycea Date: 23-Apr-2018 09:11:02

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.396	1.396	0.0	1.000	10375438	120.7		6128	
298.90 > 99.00	1.396	1.396	0.0	1.000	8268499		1.25(0.00-0.00)	6814	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.525	1.525	0.0	1.000	1040125	9.75		7345	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.677	1.677	0.0	1.000	6080848	45.3		1669	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.677	1.677	0.0	1.000	1445025	13.4		168	
* 6 13C2-PFOA									
415.00 > 370.00	1.866	1.866	0.0		1003363	10.0		5658	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.866	1.866	0.0	1.000	2983576	28.0		507	
413.00 > 169.00	1.866	1.866	0.0	1.000	1538716		1.94(0.00-0.00)	1261	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.102	2.102	0.0	1.000	4742884	54.4		1181	a
499.00 > 99.00	2.102	2.102	0.0	1.000	1014380		4.68(0.00-0.00)	1639	a
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.109	-0.007		2343654	28.7		1195	
9 Perfluorononanoic acid									
463.00 > 419.00	2.109	2.117	-0.008	1.000	2188655	25.9		438	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.269	0.0	1.000	752846	8.82		8395	

QC Flag Legend

Review Flags

a - User Assigned ID

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_035.d

Injection Date: 21-Apr-2018 19:46:53

Instrument ID: A8_N

Lims ID: LCSD 320-218546/3-A

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 31

Worklist Smp#: 5

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

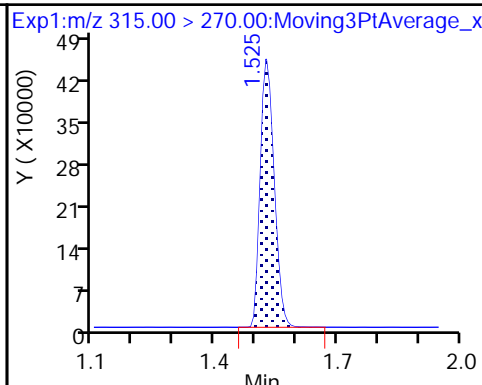
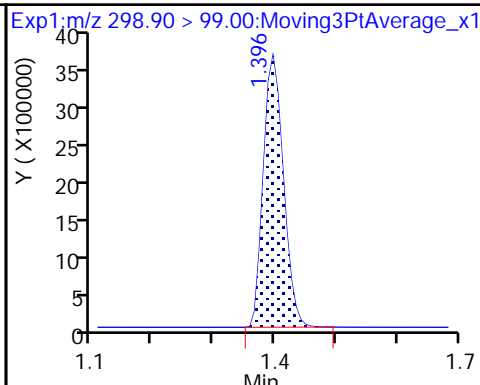
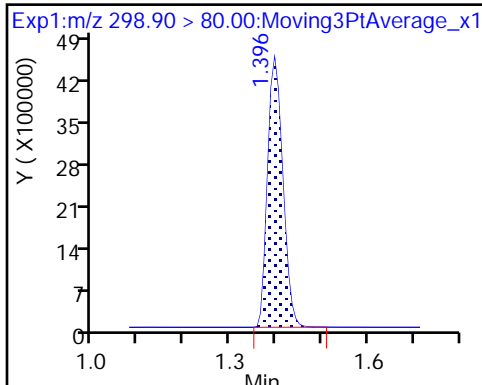
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

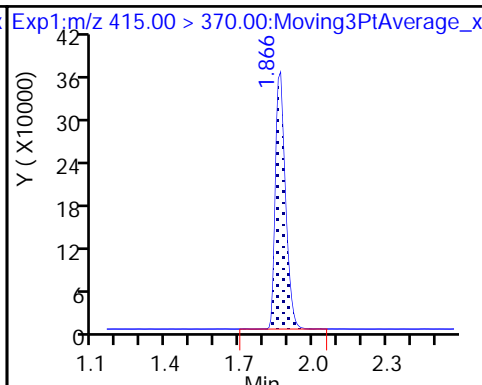
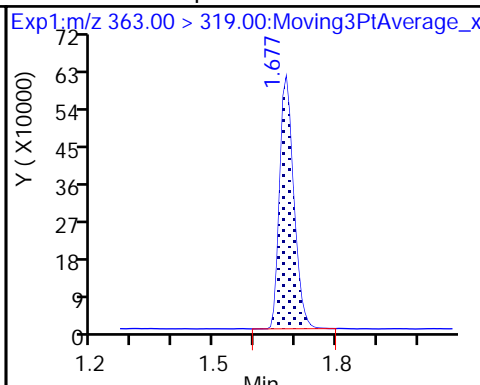
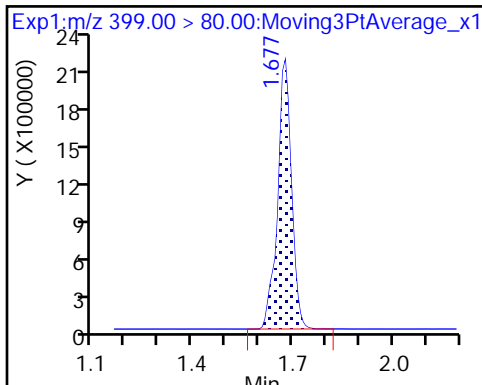
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

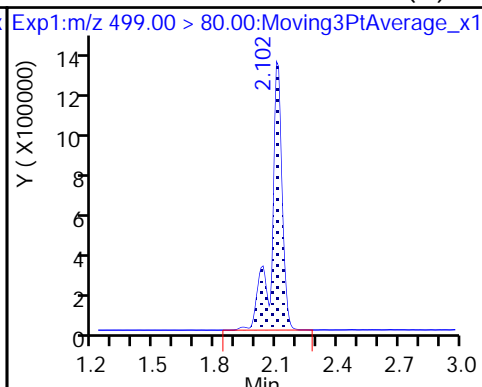
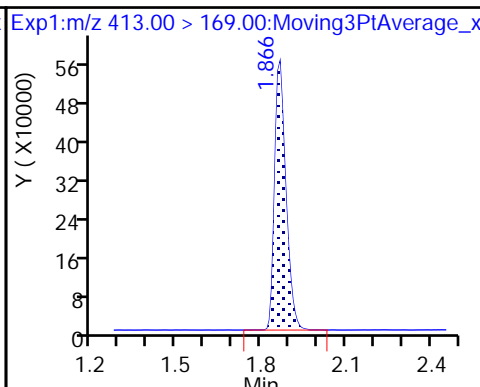
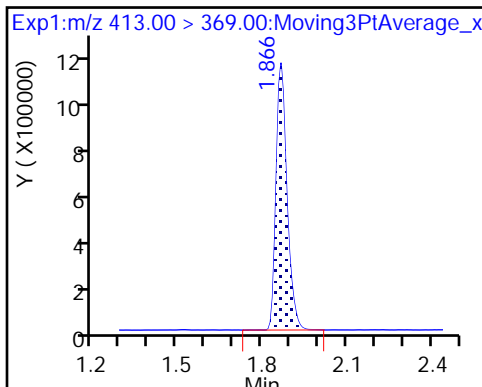
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

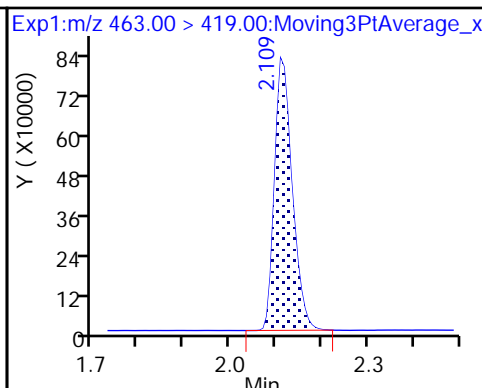
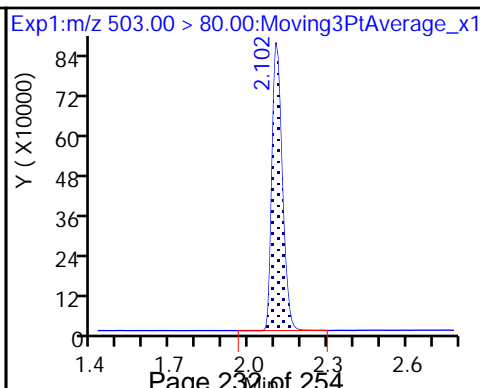
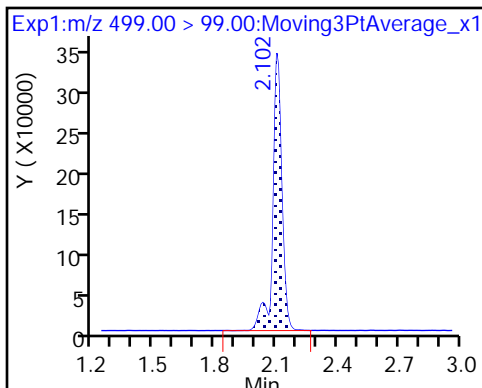
8 Perfluorooctane sulfonic acid (M)



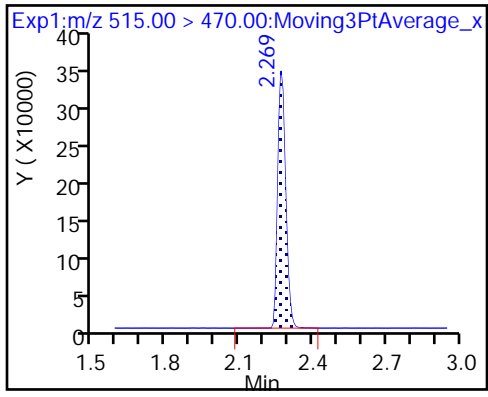
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_035.d
 Lims ID: LCSD 320-218546/3-A
 Client ID:
 Sample Type: LCSD
 Inject. Date: 21-Apr-2018 19:46:53 ALS Bottle#: 31 Worklist Smp#: 5
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: lcsd 320-218546/3-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 23-Apr-2018 10:44:21 Calib Date: 11-Apr-2018 12:09:09
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK022

First Level Reviewer: roycea Date: 23-Apr-2018 09:11:02

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.75	97.50
\$ 10 13C2 PFDA	10.0	8.82	88.22

TestAmerica Sacramento

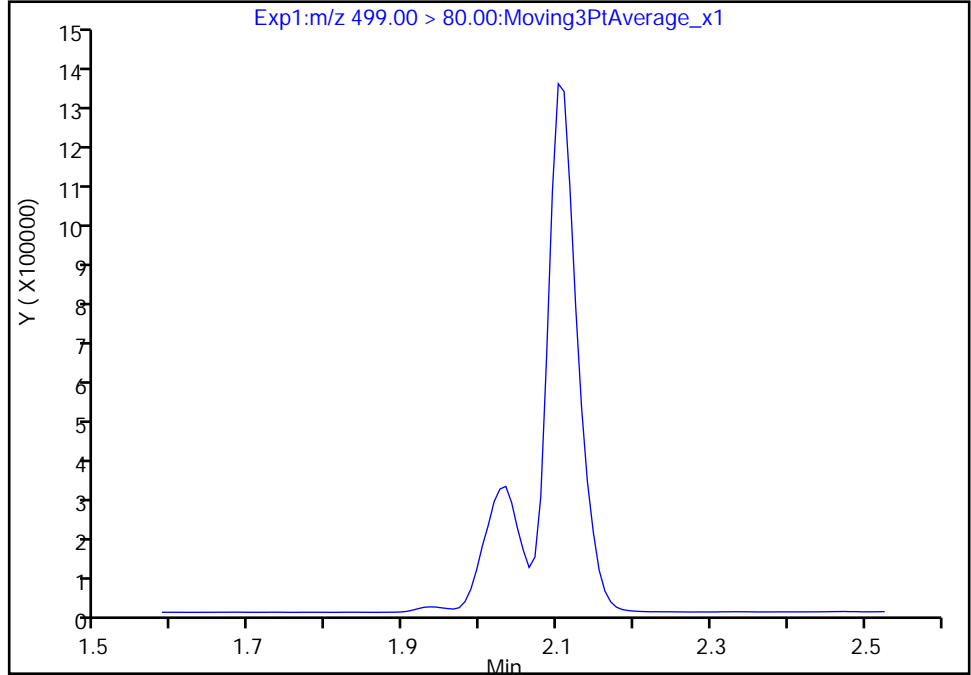
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_035.d
Injection Date: 21-Apr-2018 19:46:53 Instrument ID: A8_N
Lims ID: LCSD 320-218546/3-A
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 31 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

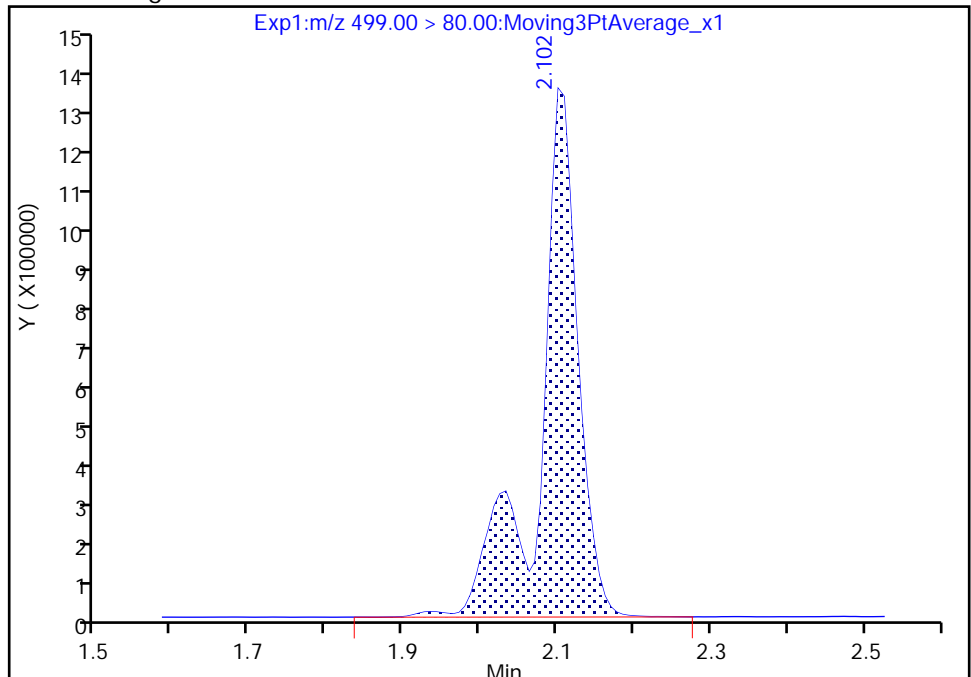
Not Detected
Expected RT: 2.10

Processing Integration Results



Manual Integration Results

RT: 2.10
Area: 4742884
Amount: 54.442901
Amount Units: ng/ml



Reviewer: roycea, 23-Apr-2018 09:10:52
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Instrument ID: A8_N Start Date: 04/11/2018 11:45

Analysis Batch Number: 217453 End Date: 04/11/2018 12:27

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-217453/3		04/11/2018 11:45	1	2018.04.11_537I CALB 004.d	GeminiC18 3x100 3(mm)
IC 320-217453/4		04/11/2018 11:50	1	2018.04.11_537I CALB 005.d	GeminiC18 3x100 3(mm)
IC 320-217453/5		04/11/2018 11:55	1	2018.04.11_537I CALB 006.d	GeminiC18 3x100 3(mm)
IC 320-217453/6 ICISAV		04/11/2018 11:59	1	2018.04.11_537I CALB 007.d	GeminiC18 3x100 3(mm)
IC 320-217453/7		04/11/2018 12:04	1	2018.04.11_537I CALB 008.d	GeminiC18 3x100 3(mm)
IC 320-217453/8		04/11/2018 12:09	1	2018.04.11_537I CALB 009.d	GeminiC18 3x100 3(mm)
ZZZZZ		04/11/2018 12:13	1		GeminiC18 3x100 3(mm)
CCVL 320-217453/10		04/11/2018 12:18	1	2018.04.11_537I CALB 011.d	GeminiC18 3x100 3(mm)
ICB 320-217453/11		04/11/2018 12:23	1		GeminiC18 3x100 3(mm)
ICV 320-217453/12		04/11/2018 12:27	1	2018.04.11_537I CALB 013.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Instrument ID: A8_N Start Date: 04/21/2018 17:22

Analysis Batch Number: 219239 End Date: 04/21/2018 17:22

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-219239/1		04/21/2018 17:22	1	2018.04.21_537A 004.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Instrument ID: A8_N Start Date: 04/21/2018 19:28

Analysis Batch Number: 219245 End Date: 04/21/2018 20:10

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-219245/1 CCVIS		04/21/2018 19:28	1	2018.04.21_537A 031.d	GeminiC18 3x100 3(mm)
MB 320-218546/1-A		04/21/2018 19:37	1	2018.04.21_537A 033.d	GeminiC18 3x100 3(mm)
LCS 320-218546/2-A		04/21/2018 19:42	1	2018.04.21_537A 034.d	GeminiC18 3x100 3(mm)
LCSD 320-218546/3-A		04/21/2018 19:46	1	2018.04.21_537A 035.d	GeminiC18 3x100 3(mm)
320-37999-1		04/21/2018 19:51	1	2018.04.21_537A 036.d	GeminiC18 3x100 3(mm)
320-37999-2		04/21/2018 19:56	1	2018.04.21_537A 037.d	GeminiC18 3x100 3(mm)
320-37999-3		04/21/2018 20:00	1	2018.04.21_537A 038.d	GeminiC18 3x100 3(mm)
320-37999-4		04/21/2018 20:05	1	2018.04.21_537A 039.d	GeminiC18 3x100 3(mm)
CCV 320-219245/10 CCVIS		04/21/2018 20:10	1	2018.04.21_537A 040.d	GeminiC18 3x100 3(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Batch Number: 218546 Batch Start Date: 04/18/18 09:04 Batch Analyst: Kouchari, Shamiran

Batch Method: 537 Batch End Date: 04/21/18 11:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-HSP 00029
MB 320-218546/1		537, 537				250 mL	1.00 mL	7 SU	
LCS 320-218546/2		537, 537				250 mL	1.00 mL	7 SU	100 uL
LCSD 320-218546/3		537, 537				250 mL	1.00 mL	7 SU	100 uL
320-37999-A-1	NAWC-040918-RW-359	537, 537	T	282.69 g	28.49 g	254.2 mL	1.00 mL	7 SU	
320-37999-A-2	NAWC-040918-FRB-359	537, 537	T	291.65 g	29.86 g	261.8 mL	1.00 mL	7 SU	
320-37999-A-3	WGNA-040918-RW-4848	537, 537	T	277.43 g	28.75 g	248.7 mL	1.00 mL	7 SU	
320-37999-A-4	WGNA-040918-FRB-4848	537, 537	T	277.82 g	27.89 g	249.9 mL	1.00 mL	7 SU	

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-IS 00067	LC537-SU 00066	AnalysisComment			
MB 320-218546/1		537, 537		100 uL	100 uL	Chlorine, ND			
LCS 320-218546/2		537, 537		100 uL	100 uL	Chlorine, ND			
LCSD 320-218546/3		537, 537		100 uL	100 uL	Chlorine, ND			
320-37999-A-1	NAWC-040918-RW-359	537, 537	T	100 uL	100 uL	Chlorine, ND			
320-37999-A-2	NAWC-040918-FRB-359	537, 537	T	100 uL	100 uL	Chlorine, ND			
320-37999-A-3	WGNA-040918-RW-4848	537, 537	T	100 uL	100 uL	Chlorine, ND			
320-37999-A-4	WGNA-040918-FRB-4848	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.: 320-37999-1

SDG No.: _____

Batch Number: 218546 Batch Start Date: 04/18/18 09:04 Batch Analyst: Kouchari, Shamiran

Batch Method: 537 Batch End Date: 04/21/18 11:00

Batch Notes	
Analyst ID - Aliquot Step	SKD
Batch Comment	Client labels match TA label, 04/18/18 SKD
Analyst ID - Concentration	SKD
Analyst ID - Final Volume Step	SKD
Internal Standard ID#	1208799
Manifold ID	1
Methanol ID	1207207
pH Indicator ID	3817
Pipette ID	043093F, I46360G
Analyst ID - IS Reagent Drop	SKD
Analyst ID - IS Reagent Drop Witness	VPM
Analyst ID - SU Reagent Drop	SKD
Analyst ID - SU Reagent Drop Witness	HJA
Analyst ID - TA Reagent Drop	SKD
Analyst ID - TA Reagent Drop Witness	HJA
SPE Cartridge Lot ID	6369499-12
Trizma ID	SLBR5241V
Reagent Water ID	04/18/18

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.

A8

Job No: 37999 Instrument ID & Date: 4-21-18 ICAL Batch: 217453
 Extraction Batch: 218546 Worklist #: 57050 TALS Batch: 219245

Review Items	-- Level 1 --			Level 2
	Yes	No	N/A	
Initial Calibration				
1. Is ICAL verified and locked in Chrom & TALS?	✓			✓
2. Is ICV properly linked in TALS?	✓			✓
Continuing Calibration				
1. Low-range CCV injected at start of analytical run? CCV injected after every 10 samples and at the end of the analytical run and alternated between Low-range, Mid-range and High-range?	✓			✓
2. If sequence was not after an ICAL was a low and mid range CCV injected at the start of the analytical run?	✓			✓
3. Native compounds and surrogates in control? Low-range within ±50% of true value Mid and High-range within ±30% of true value	✓			✓
4. Internal Standard areas in control? Areas ≥ 50% of average area of the ICAL and 70-140% of the most recent CCV.	✓			✓
Client Samples & QC Sample Results				
1. Were preparation and analysis done within holding times?	✓			✓
2. Are Chromatograms reviewed and spectra verified?	✓			✓
3. Are positive results within calibration range?	✓			✓
4. Dilutions due to target cpds? _____ Dilutions due to non-targets? _____			✓	
5. All target compounds in MB < 1/3 RL ? (Requires NCM if "no.")	✓			✓
6. Are target constituents in LCS/LCSD within method control limits?	✓			✓
7. Internal Standard areas in control for all samples and QC reported? ±50% from the average area of the ICAL and 70-140% of the most recent CCV	✓			✓
8. Do results (e.g., dilutions/trip blanks) make sense?	✓			✓
9. Are MS/MSD recoveries and RPDs within method control limits?			✓	
10. Are all QC samples properly linked in TALS?	✓			✓
11. All manual integrations appropriate and completely documented?	✓			✓
12. Are nonconformances documented as NCMs?			✓	
13. Are all Chrom graphics uploaded?	✓			✓

1st Level Reviewer / Date: JRB 4-23-18 2nd Level Reviewer / Date: Sul 4/24/18

NCM # and Comments: _____

A8

Instrument ID & Date: 4/11/18 Worklist#: 56557

ICAL Batch: 217453, 217454 Calibration ID number: 38530, 38531

Review Items	— Level 1 —			Level 2
	Yes	No	N/A	
Initial Calibration				
1. Mass calibration, as needed, verified by full scan of PFC stock standard. All PFC ions used for quantitation are within 0.3 m/z of true mass?	✓			✓
2. Responses increase with increasing concentration?	✓			✓
3. Fit used (circle): <u>Average</u> Linear (1/x ²) Linear Quadratic (6 points minimum)				
4. Meets fit criteria? Intercept ≤ ½ RL RSD ≤ 30% for Average R ² ≥ 0.990 for Linear R ² ≥ 0.990 for Quadratic NOTE: "Force through Zero" must be used and weighted if needed	✓			✓
5. If quadratic fit used the curve does not "bend over".			✓	
6. Feed calibration points into the calculated curve. Are points ≤MRL within ±50% of true value? Are points >MRL within ±30% of true value?	✓			✓
7. Any carryover from the high calibration point must be ≤ 1/3 RL	✓			✓
8. Asymmetry check meets criteria for the first two eluting peaks?(0.8 - 1.5).	✓			✓
9. Is the asymmetry check scanned and linked in TALS to the calibration point?	✓			✓
10. Is ICV (2 nd source) ± 30% of true value?	✓			✓
11. Is ICV (2 nd source) internal standards ±50% of average area of the ICAL?	✓			✓
12. ICAL locked in Chrom and uploaded to TALS?	✓			✓
13. ICAL locked in TALS and scanned?				✓

1st Level Reviewer / Date: JRB 4-11-18

2nd Level Reviewer / Date: CBW 4-11-18

NCM # and Comments: _____

TestAmerica Laboratories
Worklist QC Batch Report

Worklist Name: 21APR2018_537B Worklist Number: 57050
 Instrument Name: A8_N Chrom Method: 537_A8_N
 Data Directory: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b
 QC Batching: Enabled Limit Group Batching: Enabled

QC Batch: 1	LC 537 ICAL Raw Batch: 219245
# 1 CCV L3	# 1 CCV L3
# 2 RB	# 2 RB
# 3 MB 320-218546/1-A	# 3 MB 320-218546/1-A
# 4 LCS 320-218546/2-A	# 4 LCS 320-218546/2-A
# 5 LCSD 320-218546/3-A	# 5 LCSD 320-218546/3-A
# 6 320-37999-A-1-A	# 6 320-37999-A-1-A
# 7 320-37999-A-2-A	# 7 320-37999-A-2-A
# 8 320-37999-A-3-A	# 8 320-37999-A-3-A
# 9 320-37999-A-4-A	# 9 320-37999-A-4-A
#10 CCV L5	#10 CCV L5

CCV6 in AB 219239

QC Batch: 2	LC 537 ICAL Raw Batch: 219247
#10 CCV L5	#10 CCV L5
#11 RB	#11 RB
#12 MB 320-218549/1-A	#12 MB 320-218549/1-A
#13 LLCS 320-218549/2-A	#13 LLCS 320-218549/2-A
#14 LLCSD 320-218549/3-A	#14 LLCSD 320-218549/3-A
#15 190-16025-A-1-A	#15 190-16025-A-1-A
#16 190-16025-A-2-A	#16 190-16025-A-2-A
#17 190-16014-A-1-A	#17 190-16014-A-1-A
#18 CCV L3	#18 CCV L3
#19 RB	#19 RB

TestAmerica Laboratories
Worklist Run Log Report

Worklist Name: 21APR2018_537B

Worklist Num: 57050

Instrument: A8_N

Method: 537_A8_N

Batch Directory: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b

Analysis Type: SemiVOA

Creator: Royce, Amani A

Inj Volume: 2.00

Inj Vol Units: ul

Lab ID	Worklist ID	Sample Type	Inj Date/Time	File Name	Vial	Dil Factor	Client ID	Fract
CCV L3	320-0057050-001	CCV/S	21-Apr-2018 19:28:10	2018.04.21_537A_031.d	3	1.0		sv
RB	320-0057050-002	RB	21-Apr-2018 19:32:50	2018.04.21_537A_032.d	8	1.0		sv
MB 320-218546/1-A	320-0057050-003	MB	21-Apr-2018 19:37:31	2018.04.21_537A_033.d	29	1.0		sv
LCS 320-218546/2-A	320-0057050-004	LCS	21-Apr-2018 19:42:13	2018.04.21_537A_034.d	30	1.0		sv
LLCSD 320-218546/3-A	320-0057050-005	LLCSD	21-Apr-2018 19:46:53	2018.04.21_537A_035.d	31	1.0		sv
320-37999-A-1-A	320-0057050-006	Client	21-Apr-2018 19:51:34	2018.04.21_537A_036.d	32	1.0	NAWC-040918-RW-359	sv
320-37999-A-2-A	320-0057050-007	Client	21-Apr-2018 19:56:13	2018.04.21_537A_037.d	33	1.0	NAWC-040918-FRB-359	sv
320-37999-A-3-A	320-0057050-008	Client	21-Apr-2018 20:00:54	2018.04.21_537A_038.d	34	1.0	WGNA-040918-RW-4848	sv
320-37999-A-4-A	320-0057050-009	Client	21-Apr-2018 20:05:34	2018.04.21_537A_039.d	35	1.0	WGNA-040918-FRB-4848	sv
CCV L5	320-0057050-010	CCVIS	21-Apr-2018 20:10:16	2018.04.21_537A_040.d	5	1.0		sv
RB	320-0057050-011	RB	21-Apr-2018 20:14:55	2018.04.21_537A_041.d	8	1.0		sv
MB 320-218549/1-A	320-0057050-012	MB	21-Apr-2018 20:19:37	2018.04.21_537A_042.d	36	1.0		sv
LLCS 320-218549/2-A	320-0057050-013	LLCS	21-Apr-2018 20:24:17	2018.04.21_537A_043.d	37	1.0		sv
LLCSD 320-218549/3-A	320-0057050-014	LLCSD	21-Apr-2018 20:28:58	2018.04.21_537A_044.d	38	1.0		sv
190-16025-A-1-A	320-0057050-015	Client	21-Apr-2018 20:33:39	2018.04.21_537A_045.d	39	1.0	Field Blank	sv
190-16025-A-2-A	320-0057050-016	Client	21-Apr-2018 20:38:19	2018.04.21_537A_046.d	40	1.0	Lake Huron Pump Station Raw	sv
190-16014-A-1-A	320-0057050-017	Client	21-Apr-2018 20:43:01	2018.04.21_537A_047.d	41	1.0	Formulation Room, Sink Faucet	sv
CCV L3	320-0057050-018	CCVIS	21-Apr-2018 20:47:41	2018.04.21_537A_048.d	3	1.0		sv
RB	320-0057050-019	RB	21-Apr-2018 20:52:23	2018.04.21_537A_049.d	8	1.0		sv

TestAmerica Laboratories
Worklist Run Log Report

Worklist Name: 21APR2018_537A

Worklist Num: 57049

Instrument: A8_N

Method: 537_A8_N

Batch Directory: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57049.b

Analysis Type: SemiVOA

Creator: Royce, Amani A

Inj Volume: 2.00

Inj Vol Units: ul

Lab ID	Worklist ID	Sample Type	Inj Date/Time	File Name	Vial	Dil Factor	Client ID	Fract
CCVL	320-0057049-001	CCVL	21-Apr-2018 17:22:06	2018.04.21_537A_004.d	2	1.0		sv
CCV L5	320-0057049-002	CCVIS	21-Apr-2018 17:26:46	2018.04.21_537A_005.d	5	1.0		sv
RB	320-0057049-003	RB	21-Apr-2018 17:31:26	2018.04.21_537A_006.d	8	1.0		sv
MB 320-218552/1-A	320-0057049-004	MB	21-Apr-2018 17:36:08	2018.04.21_537A_007.d	11	1.0		sv
LCS 320-218552/2-A	320-0057049-005	LCS	21-Apr-2018 17:40:48	2018.04.21_537A_008.d	12	1.0		sv
LCSD 320-218552/3-A	320-0057049-006	LCSD	21-Apr-2018 17:45:28	2018.04.21_537A_009.d	13	1.0		sv
320-38221-A-1-A	320-0057049-007	Client	21-Apr-2018 17:50:08	2018.04.21_537A_010.d	14	1.0	GC041618-LHWA-BED1E-L	sv
320-38221-A-2-A	320-0057049-008	Client	21-Apr-2018 17:54:48	2018.04.21_537A_011.d	15	1.0	GC041618-LHWA-BED2E-L	sv
320-38221-A-3-A	320-0057049-009	Client	21-Apr-2018 17:59:28	2018.04.21_537A_012.d	16	1.0	GC041618-LHWA-BED2E-L	sv
320-38221-A-4-A	320-0057049-010	Client	21-Apr-2018 18:04:08	2018.04.21_537A_013.d	17	1.0	GC041618-LHWA-BED1W-I	sv
320-38221-A-4-B MS	320-0057049-011	MS	21-Apr-2018 18:08:49	2018.04.21_537A_014.d	18	1.0	GC041618-LHWA-BED1W-I	sv
320-38221-A-4-C MSD	320-0057049-012	MSD	21-Apr-2018 18:13:30	2018.04.21_537A_015.d	19	1.0	GC041618-LHWA-BED1W-I	sv
320-38221-A-5-A	320-0057049-013	Client	21-Apr-2018 18:18:11	2018.04.21_537A_016.d	20	1.0	GC041618-LHWA-BED2W-I	sv
CCV L3	320-0057049-014	CCVIS	21-Apr-2018 18:22:51	2018.04.21_537A_017.d	3	1.0		sv
RB	320-0057049-015	RB	21-Apr-2018 18:27:31	2018.04.21_537A_018.d	8	1.0		sv
320-38221-A-6-A	320-0057049-016	Client	21-Apr-2018 18:32:10	2018.04.21_537A_019.d	21	1.0	GC041618-LHWA-PT	sv
320-38221-A-7-A	320-0057049-017	Client	21-Apr-2018 18:36:50	2018.04.21_537A_020.d	22	1.0	FRB-LH-041618	sv
CCV L5	320-0057049-018	CCVIS	21-Apr-2018 18:41:30	2018.04.21_537A_021.d	5	1.0		sv
RB	320-0057049-019	RB	21-Apr-2018 18:46:09	2018.04.21_537A_022.d	8	1.0		sv
320-34885-A-1-I	320-0057049-020	Client	21-Apr-2018 18:50:50	2018.04.21_537A_023.d	23	1.0	MDL Day 1	sv
MB 320-218811/2-A	320-0057049-021	MB	21-Apr-2018 18:55:30	2018.04.21_537A_024.d	24	1.0		sv
MB 320-218811/3-A	320-0057049-022	MB	21-Apr-2018 19:00:11	2018.04.21_537A_025.d	25	1.0		sv
MDLS 320-218811/4-A	320-0057049-023	MDLS	21-Apr-2018 19:04:51	2018.04.21_537A_026.d	26	1.0		sv
MDLS 320-218811/5-A	320-0057049-024	MDLS	21-Apr-2018 19:09:30	2018.04.21_537A_027.d	27	1.0		sv
MDLS 320-218811/6-A	320-0057049-025	MDLS	21-Apr-2018 19:14:10	2018.04.21_537A_028.d	28	1.0		sv

Lab ID	Worklist ID	Sample Type	Inj Date/Time	File Name	Vial	Dil Factor	Client ID	Fract
CCV L3	320-0057049-026	CCVIS	21-Apr-2018 19:18:50	2018.04.21_537A_029.d	3	1.0		sv
RB	320-0057049-027	RB	21-Apr-2018 19:23:31	2018.04.21_537A_030.d	8	1.0		sv

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-218546

Method Code: 320-537_Prep-320

Analyst: Kouchari, Shamiran

Batch Open: 4/18/2018 9:04:00AM

Batch End: 4/21/2018 11:00:00AM

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4/21/18

Extraction of Perfluorinated Alkyl Acids

Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmt		PHs Rcvd Adj1 Adj2	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
			FinAmt	1.00 mL						
1 MB-320-218546/1 N/A	N/A		250 mL	1.00 mL	7	N/A	N/A	N/A	Chlorine, ND	MB-320-218546/1-A
2 LCS-320-218546/2 N/A	N/A		250 mL	1.00 mL	7	N/A	N/A	N/A	Chlorine, ND	LCS-320-218546/2-A
3 LCS-320-218546/3 N/A	N/A		250 mL	1.00 mL	7	N/A	N/A	N/A	Chlorine, ND	LCS-320-218546/3-A
4 320-37999-A-1 (537_DOD5)	N/A (320-37999-1)	282.69 g 28.49 g	254.2 mL	1.00 mL	7	4/14/18	16_Days	4	Chlorine, ND	320-37999-A-1-A
5 320-37999-A-2 (537_DOD5)	N/A (320-37999-1)	291.65 g 29.86 g	261.8 mL	1.00 mL	7	4/14/18	16_Days	4	Chlorine, ND	320-37999-A-2-A
6 320-37999-A-3 (537_DOD5)	N/A (320-37999-1)	277.43 g 28.75 g	248.7 mL	1.00 mL	7	4/14/18	16_Days	4	Chlorine, ND	320-37999-A-3-A
7 320-37999-A-4 (537_DOD5)	N/A (320-37999-1)	277.82 g 27.89 g	249.9 mL	1.00 mL	7	4/14/18	16_Days	4	Chlorine, ND	320-37999-A-4-A

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-218546

Analyst: Kouchari, Shamiran

Batch Open: 4/18/2018 9:04:00AM

Method Code: 320-537_Prep-320

Batch End: 4/21/2018 11:00:00AM

Batch Notes

Manifold ID 1

pH Indicator ID 3817

Trizma ID SLBR5241V

SPE Cartridge Lot ID 6369499-12

Methanol ID 1207207

Reagent Water ID 04/18/18

Internal Standard ID# 1208799

Pipette ID O43093F, 146360G

Analyst ID - TA Reagent Drop SKD

Analyst ID - TA Reagent Drop Witness HJA

Analyst ID - SU Reagent Drop SKD

Analyst ID - SU Reagent Drop Witness HJA

Analyst ID - IS Reagent Drop SKD

Analyst ID - IS Reagent Drop Witness VPM

Analyst ID - Concentration SKD

Analyst ID - Aliquot Step SKD

Analyst ID - Final Volume Step SKD

Batch Comment Client labels match TA label, 04/18/18 SKD

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-218546

Analyst: Kouchari, Shamiran

Batch Open: 4/18/2018 9:04:00AM

Method Code: 320-537_Prep-320

Batch End: 4/21/2018 11:00:00AM

Comments

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-218546

Analyst: Kouchari, Shamiran

Batch Open: 4/18/2018 9:04:00AM

Method Code: 320-537_Prep-320

Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-218546/1	LC537-SU_00066	100 uL	1.00 mL	SKD 4/18/18	HSA 4-18-18
LCS 320-218546/2	LC537-HSP_00029	100 uL	1.00 mL		
LCS 320-218546/2	LC537-SU_00066	100 uL	1.00 mL		
LCSD 320-218546/3	LC537-HSP_00029	100 uL	1.00 mL		
LCSD 320-218546/3	LC537-SU_00066	100 uL	1.00 mL		
320-37999-A-1	LC537-SU_00066	100 uL	1.00 mL		
320-37999-A-2	LC537-SU_00066	100 uL	1.00 mL		
320-37999-A-3	LC537-SU_00066	100 uL	1.00 mL		
320-37999-A-4	LC537-SU_00066	100 uL	1.00 mL		

Other Reagents:

Reagent	Amount/Units	Lot#:

Preparation Batch Number(s) 218546 Test 537

Earliest Holding Time 4/23/18

Batch Information	1 st Level Reviewer	2 nd Level Reviewer
Date and time accurate and entered into TALS correctly	/	✓
All necessary batch information complete and entered into TALS correctly	/	✓
BD, FV, and AL initials are transcribed into the batch comment	/	✓
Sample List Tab	1 st Level Reviewer	2 nd Level Reviewer
Samples identified to the correct method	/	✓
Holding time violation NCM filed	N/A	NA
MS/MSD or MS/DU NCM filed	/	✓
NCM for any anomalies filed	N/A	NA
All NCMs include method code, matrix, and prep batch	/	✓
Method/sample/login/QAS checked and correct	/	✓
Batch contains no more than 20 live samples	/	✓
Worksheet Tab	1 st Level Reviewer	2 nd Level Reviewer
All samples properly preserved	/	✓
Weights in anticipated range and not targeted	/	✓
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and CI Check)	/	✓
The pH is transcribed properly in TALS	/	✓
All additional information is transcribed into TALS and is correct and raw data is attached	/	✓
Comments/Observations are transcribed correctly in TALS	/	✓
Reagents Tab	1 st Level Reviewer	2 nd Level Reviewer
All necessary reagents not expired and checked into TALS	/	✓
All spike amounts correct and added to necessary samples and QC	/	✓
Internal Standard is added to the reagents	/	✓
All units are correctly transcribed into TALS	/	✓

1st Level Reviewer: SKD

Date: 4/21/18

2nd Level Reviewer: VPM

Date: 4/21/18

Comments: _____

Shipping and Receiving Documents



320-37999 Chain of Custody

TestAmerica Sacramento

880 Riverside Parkway
West Sacramento, CA 95605-1500
phone 916.373.5600 fax 303.467.7248

Chain of Custody Record



THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.

Client Contact
 TetraTech
 234 Mall Boulevard Suite 280
 King of Prussia, PA 19406
 610-382-1174
 610-491-9688
 Project Name: WE04
 Site: WE04
 P O # 1132358 (through EarthToxics)

Regulatory Program: DW NPDES RCRA Other:
Project Manager: Andy Frebowitz
Tel/Fax: 610.382.1170
Analysis Turnaround Time
 CALENDAR DAYS WORKING DAYS
 TAT if different from Below 21
 2 weeks
 1 week
 2 days
 1 day

Site Contact: Mary Kay Bond
Lab Contact: Dave Alltucker
Carrier: FedEx
Date: 4/9/2018
COC No.: 1 of 1 COCs
Sampler: Mary Kay Bond
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

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
NAWC-040918-RW-359	4/9/2018	9:10	G	DW	2	N	N	Y
NAWC-040918-FRB-359	4/9/2018	9:05	G	DW	2	N	N	Y
WGNA-040918-RW-4848	4/9/2018	16:10	G	DW	2	N	N	Y
WGNA-040918-FRB-4848	4/9/2018	16:05	G	DW	2	N	N	Y

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other: Trizma
Possible Hazard Identification:
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the
 Non-Hazard Flammable Skin Irritant Poison B Unknown

Fed Ex Tracking: 7719 4551 2488

Return to Client Disposal by Lab Archive for _____ Months

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Received by:	Date/Time:	Company:	Received by:	Date/Time:	Company:	Received in Laboratory by:	Date/Time:	Company:
<i>[Signature]</i>	4/9/2018 18:00	Tetra Tech	<i>[Signature]</i>	4/9/2018 18:00	Tetra Tech			

Custody Seals Intact: Yes No
Custody Seal No.:
Cooper Temp. (°C): Obs'd: _____ Corrd: _____
Therm ID No.:

Form No. CA-C-WI-002, Rev. 4.11, dated 1/24/2017

5.90c

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 320-37999-1

Login Number: 37999

List Source: TestAmerica Sacramento

List Number: 1

Creator: Her, David A

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	
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

"NAWC-040918-RW-359","537","RES","320-37999-1","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","91","ng/L","M","6.7","DL","","TRG","","","39","LOQ","YES","-99","","254.2","1.00","16",""
"NAWC-040918-RW-359","537","RES","320-37999-1","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","22","ng/L","","2.8","DL","","TRG","","","20","LOQ","YES","-99","","254.2","1.00","7.9",""
"NAWC-040918-RW-359","537","RES","320-37999-1","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","56","ng/L","","5.4","DL","","TRG","","","30","LOQ","YES","-99","","254.2","1.00","12",""
"NAWC-040918-RW-359","537","RES","320-37999-1","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","35","ng/L","U","16","DL","","TRG","","","89","LOQ","YES","-99","","254.2","1.00","35",""
"NAWC-040918-RW-359","537","RES","320-37999-1","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","23","ng/L","","1.9","DL","","TRG","","","9.8","LOQ","YES","-99","","254.2","1.00","3.9",""
"NAWC-040918-RW-359","537","RES","320-37999-1","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","20","ng/L","U","7.9","DL","","TRG","","","24","LOQ","YES","-99","","254.2","1.00","20",""
"NAWC-040918-RW-359","537","RES","320-37999-1","TALSAC","STL00993","13C2
PFHxA","34","ng/L","","-99","DL","","SURR","86","","-99","LOQ","YES","39.3","","254.2","1.00","0",""
"NAWC-040918-RW-359","537","RES","320-37999-1","TALSAC","STL00996","13C2
PFDA","32","ng/L","","-99","DL","","SURR","81","","-99","LOQ","YES","39.3","","254.2","1.00","0",""
"NAWC-040918-FRB-359","537","RES","320-37999-2","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","15","ng/L","U","6.5","DL","","TRG","","","38","LOQ","YES","-99","","261.8","1.00","15",""
"NAWC-040918-FRB-359","537","RES","320-37999-2","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","7.6","ng/L","U","2.7","DL","","TRG","","","19","LOQ","YES","-99","","261.8","1.00","7.6",""
"NAWC-040918-FRB-359","537","RES","320-37999-2","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","11","ng/L","U","5.3","DL","","TRG","","","29","LOQ","YES","-99","","261.8","1.00","11",""
"NAWC-040918-FRB-359","537","RES","320-37999-2","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","34","ng/L","U","15","DL","","TRG","","","86","LOQ","YES","-99","","261.8","1.00","34",""
"NAWC-040918-FRB-359","537","RES","320-37999-2","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","3.8","ng/L","U","1.8","DL","","TRG","","","9.5","LOQ","YES","-99","","261.8","1.00","3.8",""
"NAWC-040918-FRB-359","537","RES","320-37999-2","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","19","ng/L","U","7.6","DL","","TRG","","","23","LOQ","YES","-99","","261.8","1.00","19",""
"NAWC-040918-FRB-359","537","RES","320-37999-2","TALSAC","STL00993","13C2
PFHxA","36","ng/L","","-99","DL","","SURR","95","","-99","LOQ","YES","38.2","","261.8","1.00","0",""
"NAWC-040918-FRB-359","537","RES","320-37999-2","TALSAC","STL00996","13C2
PFDA","34","ng/L","","-99","DL","","SURR","88","","-99","LOQ","YES","38.2","","261.8","1.00","0",""
"WGNA-040918-RW-4848","537","RES","320-37999-3","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","16","ng/L","U M","6.8","DL","","TRG","","","40","LOQ","YES","-99","","248.7","1.00","16",""
"WGNA-040918-RW-4848","537","RES","320-37999-3","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","8.0","ng/L","U","2.8","DL","","TRG","","","20","LOQ","YES","-99","","248.7","1.00","8.0",""
"WGNA-040918-RW-4848","537","RES","320-37999-3","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","12","ng/L","U M","5.5","DL","","TRG","","","30","LOQ","YES","-99","","248.7","1.00","12",""
"WGNA-040918-RW-4848","537","RES","320-37999-3","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","36","ng/L","U M","16","DL","","TRG","","","90","LOQ","YES","-99","","248.7","1.00","36",""
"WGNA-040918-RW-4848","537","RES","320-37999-3","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","4.0","ng/L","U M","1.9","DL","","TRG","","","10","LOQ","YES","-99","","248.7","1.00","4.0",""
"WGNA-040918-RW-4848","537","RES","320-37999-3","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","20","ng/L","U","8.0","DL","","TRG","","","24","LOQ","YES","-99","","248.7","1.00","20",""
"WGNA-040918-RW-4848","537","RES","320-37999-3","TALSAC","STL00993","13C2
PFHxA","39","ng/L","","-99","DL","","SURR","96","","-99","LOQ","YES","40.2","","248.7","1.00","0",""
"WGNA-040918-RW-4848","537","RES","320-37999-3","TALSAC","STL00996","13C2
PFDA","37","ng/L","","-99","DL","","SURR","91","","-99","LOQ","YES","40.2","","248.7","1.00","0",""
"WGNA-040918-FRB-4848","537","RES","320-37999-4","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","16","ng/L","U","6.8","DL","","TRG","","","40","LOQ","YES","-99","","249.9","1.00","16",""
"WGNA-040918-FRB-4848","537","RES","320-37999-4","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","8.0","ng/L","U","2.8","DL","","TRG","","","20","LOQ","YES","-99","","249.9","1.00","8.0",""
"WGNA-040918-FRB-4848","537","RES","320-37999-4","TALSAC","355-46-4","Perfluorohexanesulfonic acid

(PFHxS)", "12", "ng/L", "U", "5.5", "DL", "", "TRG", "", "", "30", "LOQ", "YES", "-99", "", "249.9", "1.00", "12", ""
"WGNA-040918-FRB-4848", "537", "RES", "320-37999-4", "TALSAC", "375-73-5", "Perfluorobutanesulfonic acid
(PFBS)", "36", "ng/L", "U", "16", "DL", "", "TRG", "", "", "90", "LOQ", "YES", "-99", "", "249.9", "1.00", "36", ""
"WGNA-040918-FRB-4848", "537", "RES", "320-37999-4", "TALSAC", "375-85-9", "Perfluoroheptanoic acid
(PFHpA)", "4.0", "ng/L", "U", "1.9", "DL", "", "TRG", "", "", "10", "LOQ", "YES", "-99", "", "249.9", "1.00", "4.0", ""
"WGNA-040918-FRB-4848", "537", "RES", "320-37999-4", "TALSAC", "375-95-1", "Perfluorononanoic acid
(PFNA)", "20", "ng/L", "U", "8.0", "DL", "", "TRG", "", "", "24", "LOQ", "YES", "-99", "", "249.9", "1.00", "20", ""
"WGNA-040918-FRB-4848", "537", "RES", "320-37999-4", "TALSAC", "STL00993", "13C2
PFHxA", "38", "ng/L", "", "-99", "DL", "", "SURR", "95", "", "-99", "LOQ", "YES", "40.0", "", "249.9", "1.00", "0", ""
"WGNA-040918-FRB-4848", "537", "RES", "320-37999-4", "TALSAC", "STL00996", "13C2
PFDA", "34", "ng/L", "", "-99", "DL", "", "SURR", "85", "", "-99", "LOQ", "YES", "40.0", "", "249.9", "1.00", "0", ""
"LCS 320-218546/2-A", "537", "RES", "LCS 320-218546/2-A", "TALSAC", "1763-23-1", "Perfluorooctanesulfonic acid
(PFOS)", "223", "ng/L", "M", "6.8", "DL", "", "SPK", "102", "", "40", "LOQ", "YES", "220", "", "250", "1.00", "16", ""
"LCS 320-218546/2-A", "537", "RES", "LCS 320-218546/2-A", "TALSAC", "335-67-1", "Perfluorooctanoic acid
(PFOA)", "105", "ng/L", "", "2.8", "DL", "", "SPK", "95", "", "20", "LOQ", "YES", "110", "", "250", "1.00", "8.0", ""
"LCS 320-218546/2-A", "537", "RES", "LCS 320-218546/2-A", "TALSAC", "355-46-4", "Perfluorohexanesulfonic acid
(PFHxS)", "186", "ng/L", "", "5.5", "DL", "", "SPK", "111", "", "30", "LOQ", "YES", "168", "", "250", "1.00", "12", ""
"LCS 320-218546/2-A", "537", "RES", "LCS 320-218546/2-A", "TALSAC", "375-73-5", "Perfluorobutanesulfonic acid
(PFBS)", "499", "ng/L", "", "16", "DL", "", "SPK", "100", "", "90", "LOQ", "YES", "500", "", "250", "1.00", "36", ""
"LCS 320-218546/2-A", "537", "RES", "LCS 320-218546/2-A", "TALSAC", "375-85-9", "Perfluoroheptanoic acid
(PFHpA)", "56.4", "ng/L", "", "1.9", "DL", "", "SPK", "104", "", "10", "LOQ", "YES", "54.0", "", "250", "1.00", "4.0", ""
"LCS 320-218546/2-A", "537", "RES", "LCS 320-218546/2-A", "TALSAC", "375-95-1", "Perfluorononanoic acid
(PFNA)", "101", "ng/L", "", "8.0", "DL", "", "SPK", "92", "", "24", "LOQ", "YES", "110", "", "250", "1.00", "20", ""
"LCS 320-218546/2-A", "537", "RES", "LCS 320-218546/2-A", "TALSAC", "STL00993", "13C2
PFHxA", "39.7", "ng/L", "", "-99", "DL", "", "SURR", "99", "", "-99", "LOQ", "YES", "40.0", "", "250", "1.00", "0", ""
"LCS 320-218546/2-A", "537", "RES", "LCS 320-218546/2-A", "TALSAC", "STL00996", "13C2
PFDA", "35.5", "ng/L", "", "-99", "DL", "", "SURR", "89", "", "-99", "LOQ", "YES", "40.0", "", "250", "1.00", "0", ""
"LCSD 320-218546/3-A", "537", "RES", "LCSD 320-218546/3-A", "TALSAC", "1763-23-1", "Perfluorooctanesulfonic
acid (PFOS)", "218", "ng/L", "M", "6.8", "DL", "", "SPK", "99", "2", "40", "LOQ", "YES", "220", "LCS 320-218546/2-
A", "250", "1.00", "16", ""
"LCSD 320-218546/3-A", "537", "RES", "LCSD 320-218546/3-A", "TALSAC", "335-67-1", "Perfluorooctanoic acid
(PFOA)", "112", "ng/L", "", "2.8", "DL", "", "SPK", "102", "7", "20", "LOQ", "YES", "110", "LCS 320-218546/2-
A", "250", "1.00", "8.0", ""
"LCSD 320-218546/3-A", "537", "RES", "LCSD 320-218546/3-A", "TALSAC", "355-46-4", "Perfluorohexanesulfonic
acid (PFHxS)", "181", "ng/L", "", "5.5", "DL", "", "SPK", "108", "3", "30", "LOQ", "YES", "168", "LCS 320-218546/2-
A", "250", "1.00", "12", ""
"LCSD 320-218546/3-A", "537", "RES", "LCSD 320-218546/3-A", "TALSAC", "375-73-5", "Perfluorobutanesulfonic acid
(PFBS)", "483", "ng/L", "", "16", "DL", "", "SPK", "96", "3", "90", "LOQ", "YES", "500", "LCS 320-218546/2-
A", "250", "1.00", "36", ""
"LCSD 320-218546/3-A", "537", "RES", "LCSD 320-218546/3-A", "TALSAC", "375-85-9", "Perfluoroheptanoic acid
(PFHpA)", "53.7", "ng/L", "", "1.9", "DL", "", "SPK", "99", "5", "10", "LOQ", "YES", "54.0", "LCS 320-218546/2-
A", "250", "1.00", "4.0", ""
"LCSD 320-218546/3-A", "537", "RES", "LCSD 320-218546/3-A", "TALSAC", "375-95-1", "Perfluorononanoic acid
(PFNA)", "104", "ng/L", "", "8.0", "DL", "", "SPK", "94", "3", "24", "LOQ", "YES", "110", "LCS 320-218546/2-
A", "250", "1.00", "20", ""
"LCSD 320-218546/3-A", "537", "RES", "LCSD 320-218546/3-A", "TALSAC", "STL00993", "13C2
PFHxA", "39.0", "ng/L", "", "-99", "DL", "", "SURR", "98", "", "-99", "LOQ", "YES", "40.0", "LCS 320-218546/2-
A", "250", "1.00", "0", ""
"LCSD 320-218546/3-A", "537", "RES", "LCSD 320-218546/3-A", "TALSAC", "STL00996", "13C2
PFDA", "35.3", "ng/L", "", "-99", "DL", "", "SURR", "88", "", "-99", "LOQ", "YES", "40.0", "LCS 320-218546/2-
A", "250", "1.00", "0", ""
"MB 320-218546/1-A", "537", "RES", "MB 320-218546/1-A", "TALSAC", "1763-23-1", "Perfluorooctanesulfonic acid
(PFOS)", "16", "ng/L", "U", "6.8", "DL", "", "TRG", "", "", "40", "LOQ", "YES", "-99", "", "250", "1.00", "16", ""
"MB 320-218546/1-A", "537", "RES", "MB 320-218546/1-A", "TALSAC", "335-67-1", "Perfluorooctanoic acid

(PFOA),"8.0","ng/L","U","2.8","DL","","","TRG","","","20","LOQ","YES","-99","","250","1.00","8.0",""
"MB 320-218546/1-A","537","RES","MB 320-218546/1-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid
(PFHxS)","12","ng/L","U","5.5","DL","","","TRG","","","30","LOQ","YES","-99","","250","1.00","12",""
"MB 320-218546/1-A","537","RES","MB 320-218546/1-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid
(PFBS)","36","ng/L","U","16","DL","","","TRG","","","90","LOQ","YES","-99","","250","1.00","36",""
"MB 320-218546/1-A","537","RES","MB 320-218546/1-A","TALSAC","375-85-9","Perfluoroheptanoic acid
(PFHpA)","4.0","ng/L","U","1.9","DL","","","TRG","","","10","LOQ","YES","-99","","250","1.00","4.0",""
"MB 320-218546/1-A","537","RES","MB 320-218546/1-A","TALSAC","375-95-1","Perfluorononanoic acid
(PFNA)","20","ng/L","U","8.0","DL","","","TRG","","","24","LOQ","YES","-99","","250","1.00","20",""
"MB 320-218546/1-A","537","RES","MB 320-218546/1-A","TALSAC","STL00993","13C2
PFHxA","40.7","ng/L","","-99","DL","","","SURR","102","","-99","LOQ","YES","40.0","","250","1.00","0",""
"MB 320-218546/1-A","537","RES","MB 320-218546/1-A","TALSAC","STL00996","13C2
PFDA","34.9","ng/L","","-99","DL","","","SURR","87","","-99","LOQ","YES","40.0","","250","1.00","0",""
"Unknown","Unknown","NAWC-040918-RW-359","04/09/2018 09:10","AQ","320-37999-
1","NM","","5.90","537","METHOD","RES","04/18/2018 09:04","04/21/2018
19:51","TALSAC","COA","WET","NA","1","NA","NA","","100","320-218546","320-218546","NA","320-
219245","320-37999-1","04/10/2018 08:55","04/11/2018 12:35",""
"Unknown","Unknown","NAWC-040918-FRB-359","04/09/2018 09:05","AQ","320-37999-
2","FB","","5.90","537","METHOD","RES","04/18/2018 09:04","04/21/2018
19:56","TALSAC","COA","WET","NA","1","NA","NA","","100","320-218546","320-218546","NA","320-
219245","320-37999-1","04/10/2018 08:55","04/11/2018 12:35",""
"Unknown","Unknown","WGNA-040918-RW-4848","04/09/2018 16:10","AQ","320-37999-
3","NM","","5.90","537","METHOD","RES","04/18/2018 09:04","04/21/2018
20:00","TALSAC","COA","WET","NA","1","NA","NA","","100","320-218546","320-218546","NA","320-
219245","320-37999-1","04/10/2018 08:55","04/11/2018 12:35",""
"Unknown","Unknown","WGNA-040918-FRB-4848","04/09/2018 16:05","AQ","320-37999-
4","FB","","5.90","537","METHOD","RES","04/18/2018 09:04","04/21/2018
20:05","TALSAC","COA","WET","NA","1","NA","NA","","100","320-218546","320-218546","NA","320-
219245","320-37999-1","04/10/2018 08:55","04/11/2018 12:35",""
"Unknown","Unknown","LCS 320-218546/2-A","","AQ","LCS 320-218546/2-
A","LCS","","-99","537","METHOD","RES","04/18/2018 09:04","04/21/2018
19:42","TALSAC","COA","WET","NA","1","NA","NA","","100","320-218546","320-218546","NA","320-
219245","320-37999-1","04/18/2018 09:04","04/11/2018 12:35",""
"Unknown","Unknown","LCSD 320-218546/3-A","","AQ","LCSD 320-218546/3-
A","LCSD","","-99","537","METHOD","RES","04/18/2018 09:04","04/21/2018
19:46","TALSAC","COA","WET","NA","1","NA","NA","","100","320-218546","320-218546","NA","320-
219245","320-37999-1","04/18/2018 09:04","04/11/2018 12:35",""
"Unknown","Unknown","MB 320-218546/1-A","","AQ","MB 320-218546/1-
A","MB","","-99","537","METHOD","RES","04/18/2018 09:04","04/21/2018
19:37","TALSAC","COA","WET","NA","1","NA","NA","","100","320-218546","320-218546","NA","320-
219245","320-37999-1","04/18/2018 09:04","04/11/2018 12:35",""



TO: A. FREBOWITZ **DATE:** APRIL 25, 2018
FROM: TERRI L. SOLOMON **COPIES:** DV FILE
SUBJECT: ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS)
NAS JRB WILLOW GROVE
SAMPLE DELIVERY GROUP (SDG) 320-37999-1

SAMPLES: 2/Field Reagent Blank (FRB)
NAWC-040918-FRB-359 WGNA-040918-FRB-4848

2/Drinking Water
NAWC-040918-RW-359 WGNA-040918-RW-4848

Overview

The sample set for NAS JRB Willow Grove, SDG 320-37999-1, consisted of two (2) drinking water samples and two (2) 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 April 9, 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 / laboratory control sample duplicate results, injected internal standard areas and recoveries, chromatographic resolution, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

Major

None.

Minor

None.

Notes

Samples with detections and their associated FRBs are summarized below. No detected results were present in the FRBs.

<u>Sample</u>	<u>Associated FRB</u>
NAWC-040918-RW-359	NAWC-040918-FRB-359
WGNA-040918-RW-4848	WGNA-040918-FRB-4848

Non-detected results were reported to the Limit of Detection (LOD).

The buffering agent Trizma was added to all drinking water samples.

TO: A. FREBOWITZ
SDG: 320-37999-1

PAGE 2

Executive Summary

Laboratory Performance: None.

Other Factors Affecting Data Quality: None.

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.



Tetra Tech, Inc.
Terri L. Solomon
Chemist/Data Validator



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.

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted method detection limit for sample and method.
J	The analyte was positively identified and 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).
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
R	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.
UR	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.

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

PROJ_NO: 08005-WE04 SDG: 320-37999-1 FRACTION: PFAS MEDIA: WATER	NSAMPLE	NAWC-040918-FRB-359			NAWC-040918-RW-359			WGNA-040918-FRB-4848			WGNA-040918-RW-4848		
	LAB_ID	320-37999-2			320-37999-1			320-37999-4			320-37999-3		
	SAMP_DATE	4/9/2018			4/9/2018			4/9/2018			4/9/2018		
	QC_TYPE	FB			NM			FB			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	7.6	U		22			8	U		8	U		
PERFLUOROBUTANESULFONIC ACID	34	U		35	U		36	U		36	U		
PERFLUOROHEPTANOIC ACID	3.8	U		23			4	U		4	U		
PERFLUOROHXANESULFONIC ACID	11	U		56			12	U		12	U		
PERFLUORONONANOIC ACID	19	U		20	U		20	U		20	U		
PERFLUOROOCTANE SULFONIC ACID	15	U		91			16	U		16	U		

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: NAWC-040918-RW-359 Lab Sample ID: 320-37999-1
 Matrix: Water Lab File ID: 2018.04.21_537A_036.d
 Analysis Method: 537 Date Collected: 04/09/2018 09:10
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 254.2 (mL) Date Analyzed: 04/21/2018 19:51
 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.: 219245 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	91	M	39	16	6.7
335-67-1	Perfluorooctanoic acid (PFOA)	22		20	7.9	2.8
375-95-1	Perfluorononanoic acid (PFNA)	20	U	24	20	7.9
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	56		30	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	23		9.8	3.9	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	89	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	86		70-130
STL00996	13C2 PFDA	81		70-130

Wesley L. Selmer
04/25/2018

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: NAWC-040918-FRB-359 Lab Sample ID: 320-37999-2
 Matrix: Water Lab File ID: 2018.04.21_537A_037.d
 Analysis Method: 537 Date Collected: 04/09/2018 09:05
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 261.8 (mL) Date Analyzed: 04/21/2018 19:56
 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.: 219245 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	38	15	6.5
335-67-1	Perfluorooctanoic acid (PFOA)	7.6	U	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	29	11	5.3
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.8	U	9.5	3.8	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	34	U	86	34	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	95		70-130
STL00996	13C2 PFDA	88		70-130

Wesley J. Selman
04/25/2018

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: WGNA-040918-RW-4848 Lab Sample ID: 320-37999-3
 Matrix: Water Lab File ID: 2018.04.21_537A_038.d
 Analysis Method: 537 Date Collected: 04/09/2018 16:10
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 248.7(mL) Date Analyzed: 04/21/2018 20:00
 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.: 219245 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	16	U M	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 M	30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.0	U M	10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36	U M	90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	96		70-130
STL00996	13C2 PFDA	91		70-130

Mari L. Salmeron
04/25/2018

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: WGNA-040918-FRB-4848 Lab Sample ID: 320-37999-4
 Matrix: Water Lab File ID: 2018.04.21_537A_039.d
 Analysis Method: 537 Date Collected: 04/09/2018 16:05
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 249.9(mL) Date Analyzed: 04/21/2018 20:05
 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.: 219245 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	95		70-130
STL00996	13C2 PFDA	85		70-130

Mari L. Salaman
04/25/2018

Appendix B

Results as Reported by the Laboratory

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: NAWC-040918-RW-359 Lab Sample ID: 320-37999-1
 Matrix: Water Lab File ID: 2018.04.21_537A_036.d
 Analysis Method: 537 Date Collected: 04/09/2018 09:10
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 254.2 (mL) Date Analyzed: 04/21/2018 19:51
 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.: 219245 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	91	M	39	16	6.7
335-67-1	Perfluorooctanoic acid (PFOA)	22		20	7.9	2.8
375-95-1	Perfluorononanoic acid (PFNA)	20	U	24	20	7.9
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	56		30	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	23		9.8	3.9	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	89	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	86		70-130
STL00996	13C2 PFDA	81		70-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: NAWC-040918-FRB-359 Lab Sample ID: 320-37999-2
 Matrix: Water Lab File ID: 2018.04.21_537A_037.d
 Analysis Method: 537 Date Collected: 04/09/2018 09:05
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 261.8(mL) Date Analyzed: 04/21/2018 19:56
 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.: 219245 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	38	15	6.5
335-67-1	Perfluorooctanoic acid (PFOA)	7.6	U	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	29	11	5.3
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.8	U	9.5	3.8	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	34	U	86	34	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	95		70-130
STL00996	13C2 PFDA	88		70-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: WGNA-040918-RW-4848 Lab Sample ID: 320-37999-3
 Matrix: Water Lab File ID: 2018.04.21_537A_038.d
 Analysis Method: 537 Date Collected: 04/09/2018 16:10
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 248.7(mL) Date Analyzed: 04/21/2018 20:00
 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.: 219245 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	16	U M	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 M	30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.0	U M	10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36	U M	90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	96		70-130
STL00996	13C2 PFDA	91		70-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: WGNA-040918-FRB-4848 Lab Sample ID: 320-37999-4
 Matrix: Water Lab File ID: 2018.04.21_537A_039.d
 Analysis Method: 537 Date Collected: 04/09/2018 16:05
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 249.9(mL) Date Analyzed: 04/21/2018 20:05
 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.: 219245 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	95		70-130
STL00996	13C2 PFDA	85		70-130

Appendix C

Support Documentation



320-37999 Chain of Custody

TestAmerica Sacramento

880 Riverside Parkway
West Sacramento, CA 95605-1500
phone 916.373.5600 fax 303.467.7248

Chain of Custody Record

Regulatory Program: DW NPDES RCRA Other:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact		Project Manager: Andy Frebowitz			Site Contact: Mary Kay Bond			Date: 4/9/2018			COC No:		
TetraTech		Tel/Fax: 610.382.1170			Lab Contact: Dave Alltucker			Carrier: FedEx			1 of 1 COCs		
234 Mall Boulevard Suite 260		Analysis Turnaround Time			Filtered Sample (Y / N) Perform MS / MSD (Y / N) EPA 537 UCMR3						Sampler: Mary Kay Bond For Lab Use Only: Walk-in Client: <input type="checkbox"/> Lab Sampling: <input type="checkbox"/> Job / SDG No.: <input type="text"/> Sample Specific Notes:		
King of Prussia, PA 19406		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below 21											
610-382-1174		<input type="checkbox"/> 2 weeks											
610-491-9688		<input type="checkbox"/> 1 week											
Project Name: WE04		<input type="checkbox"/> 2 days											
Site: WE04		<input type="checkbox"/> 1 day											
P O # 1132358 (through EarthToxics)													
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				
NAWC-040918-RW-359		4/9/2018	9:10	G	DW	2	N	N	Y				
NAWC-040918-FRB-359		4/9/2018	9:05	G	DW	2	N	N	Y	Field Reagent Blank			
WGNA-040918-RW-4848		4/9/2018	16:10	G	DW	2	N	N	Y				
WGNA-040918-FRB-4848		4/9/2018	16:05	G	DW	2	N	N	Y	Field Reagent Blank			
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other: Trizma							6						
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the							Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)						
<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown							<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months						
Fed Ex Tracking: 7719 4551 2488													
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:			Cooler Temp. (°C): Obs'd: _____			Corr'd: _____			Therm ID No.: _____		
Relinquished by: <i>[Signature]</i>		Company: Tetra Tech		Date/Time: 4/9/2018 18:00		Received by: <i>[Signature]</i>			Company: T#320		Date/Time: 4/10/18 855		
Relinquished by:		Company:		Date/Time:		Received by:			Company:		Date/Time:		
Relinquished by:		Company:		Date/Time:		Received in Laboratory by:			Company:		Date/Time:		

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Form No. CA-C-WI-002, Rev. 4.11, dated 1/24/2017

5.9°C

Job Narrative
320-37999-1

Receipt

The samples were received on 4/10/2018 8:55 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.9° 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.

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

Organic Prep

Method(s) 537: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-218546.

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

Definitions/Glossary

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

TestAmerica Job ID: 320-37999-1

Qualifiers

LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
M	Manual integrated compound.

Glossary

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: 320-37999-1

Method	Method Description	Protocol	Laboratory
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: 320-37999-1

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

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-37999-1	NAWC-040918-RW-359	Water	04/09/18 09:10	04/10/18 08:55
320-37999-2	NAWC-040918-FRB-359	Water	04/09/18 09:05	04/10/18 08:55
320-37999-3	WGNA-040918-RW-4848	Water	04/09/18 16:10	04/10/18 08:55
320-37999-4	WGNA-040918-FRB-4848	Water	04/09/18 16:05	04/10/18 08:55

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
NAWC-040918-RW-359	320-37999-1	86	81
NAWC-040918-FRB-359	320-37999-2	95	88
WGNA-040918-RW-4848	320-37999-3	96	91
WGNA-040918-FRB-4848	320-37999-4	95	85
	MB 320-218546/1-A	102	87
	LCS 320-218546/2-A	99	89
	LCSD 320-218546/3-A	98	88

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.: 320-37999-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 2018.04.21_537A_034.d
 Lab ID: LCS 320-218546/2-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	220	223	102	70-130	M
Perfluorooctanoic acid (PFOA)	110	105	95	70-130	
Perfluorononanoic acid (PFNA)	110	101	92	70-130	
Perfluorohexanesulfonic acid (PFHxS)	168	186	111	70-130	
Perfluoroheptanoic acid (PFHpA)	54.0	56.4	104	70-130	
Perfluorobutanesulfonic acid (PFBS)	500	499	100	70-130	

Column to be used to flag recovery and RPD values

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Matrix: Water Level: Low Lab File ID: 2018.04.21_537A_035.d

Lab ID: LCSD 320-218546/3-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LCSD CONCENTRATION (ng/L)	LCSD % REC	% RPD	QC LIMITS		#
					RPD	REC	
Perfluorooctanesulfonic acid (PFOS)	220	218	99	2	30	70-130	M
Perfluorooctanoic acid (PFOA)	110	112	102	7	30	70-130	
Perfluorononanoic acid (PFNA)	110	104	94	3	30	70-130	
Perfluorohexanesulfonic acid (PFHxS)	168	181	108	3	30	70-130	
Perfluoroheptanoic acid (PFHpA)	54.0	53.7	99	5	30	70-130	
Perfluorobutanesulfonic acid (PFBS)	500	483	96	3	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.: 320-37999-1
 SDG No.: _____
 Lab File ID: 2018.04.21_537A_033.d Lab Sample ID: MB 320-218546/1-A
 Matrix: Water Date Extracted: 04/18/2018 09:04
 Instrument ID: A8_N Date Analyzed: 04/21/2018 19:37
 Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-218546/2-A	2018.04.21_537A_034.d	04/21/2018 19:42
	LCSD 320-218546/3-A	2018.04.21_537A_035.d	04/21/2018 19:46
NAWC-040918-RW-359	320-37999-1	2018.04.21_537A_036.d	04/21/2018 19:51
NAWC-040918-FRB-359	320-37999-2	2018.04.21_537A_037.d	04/21/2018 19:56
WGNA-040918-RW-4848	320-37999-3	2018.04.21_537A_038.d	04/21/2018 20:00
WGNA-040918-FRB-4848	320-37999-4	2018.04.21_537A_039.d	04/21/2018 20:05

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: MB 320-218546/1-A
 Matrix: Water Lab File ID: 2018.04.21_537A_033.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 04/18/2018 09:04
 Sample wt/vol: 250 (mL) Date Analyzed: 04/21/2018 19:37
 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.: 219245 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	102		70-130
STL00996	13C2 PFDA	87		70-130

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Instrument ID: A8_N Calibration Start Date: 04/11/2018 11:45
 GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 04/11/2018 12:09
 Calibration ID: 38530

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT	970041	1.86	2344935	2.10		
UPPER LIMIT	1455062	2.36	3517403	2.60		
LOWER LIMIT	485021	1.36	1172468	1.60		
LAB SAMPLE ID	CLIENT SAMPLE ID					
CCVL 320-217453/10		964533	1.87	2387973	2.10	
ICV 320-217453/12		1123391	1.86	2710764	2.10	
CCVL 320-219239/1		1010179	1.88	2295874	2.12	
CCV 320-219245/1 CCVIS		1030135	1.87	2347952	2.11	
MB 320-218546/1-A		976707	1.87	2334610	2.10	
LCS 320-218546/2-A		1002942	1.85	2286947	2.09	
LCSD 320-218546/3-A		1003363	1.87	2343654	2.10	
320-37999-1	NAWC-040918-RW-359	1073078	1.87	2431032	2.10	
320-37999-2	NAWC-040918-FRB-359	990154	1.86	2337066	2.09	
320-37999-3	WGNA-040918-RW-4848	1013538	1.86	2286536	2.10	
320-37999-4	WGNA-040918-FRB-4848	959793	1.86	2264068	2.10	
CCV 320-219245/10 CCVIS		971858	1.86	2296172	2.09	

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.: 320-37999-1
 SDG No.: _____
 Sample No.: CCV 320-219245/1 Date Analyzed: 04/21/2018 19:28
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2018.04.21_537A_031 Heated Purge: (Y/N) N
 Calibration ID: 38530

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	1030135	1.87	2347952	2.11		
UPPER LIMIT	1442189	2.37	3287133	2.61		
LOWER LIMIT	721095	1.37	1643566	1.61		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-218546/1-A		976707	1.87	2334610	2.10	
LCS 320-218546/2-A		1002942	1.85	2286947	2.09	
LCSD 320-218546/3-A		1003363	1.87	2343654	2.10	
320-37999-1	NAWC-040918-RW-359	1073078	1.87	2431032	2.10	
320-37999-2	NAWC-040918-FRB-359	990154	1.86	2337066	2.09	
320-37999-3	WGNA-040918-RW-4848	1013538	1.86	2286536	2.10	
320-37999-4	WGNA-040918-FRB-4848	959793	1.86	2264068	2.10	

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.: 320-37999-1
 SDG No.: _____
 Sample No.: CCV 320-219245/10 Date Analyzed: 04/21/2018 20:10
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2018.04.21_537A_040 Heated Purge: (Y/N) N
 Calibration ID: 38530

	13PFOA		PFOS		AREA #	RT #
	AREA #	RT #	AREA #	RT #		
12/24 HOUR STD	971858	1.86	2296172	2.09		
UPPER LIMIT	1360601	2.36	3214641	2.59		
LOWER LIMIT	680301	1.36	1607320	1.59		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-218546/1-A		976707	1.87	2334610	2.10	
LCS 320-218546/2-A		1002942	1.85	2286947	2.09	
LCSD 320-218546/3-A		1003363	1.87	2343654	2.10	
320-37999-1	NAWC-040918-RW-359	1073078	1.87	2431032	2.10	
320-37999-2	NAWC-040918-FRB-359	990154	1.86	2337066	2.09	
320-37999-3	WGNA-040918-RW-4848	1013538	1.86	2286536	2.10	
320-37999-4	WGNA-040918-FRB-4848	959793	1.86	2264068	2.10	

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.: 320-37999-1 Analy Batch No.: 217453

SDG No.: _____

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 04/11/2018 11:45 Calibration End Date: 04/11/2018 12:09 Calibration ID: 38530

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-217453/3	2018.04.11_537ICALB_004.d
Level 2	IC 320-217453/4	2018.04.11_537ICALB_005.d
Level 3	IC 320-217453/5	2018.04.11_537ICALB_006.d
Level 4	IC 320-217453/6	2018.04.11_537ICALB_007.d
Level 5	IC 320-217453/7	2018.04.11_537ICALB_008.d
Level 6	IC 320-217453/8	2018.04.11_537ICALB_009.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)	1.1422 0.9535	1.0952	1.0744	1.0454	1.0008	Ave		1.0519			6.4		30.0				
Perfluoroheptanoic acid (PFHpA)	1.0850 1.0447	1.0991	1.0649	1.0783	1.0702	Ave		1.0737			1.7		30.0				
Perfluorohexanesulfonic acid (PFHxS)	1.6457 1.6837	1.5988	1.6030	1.6384	1.6838	Ave		1.6422			2.3		30.0				
Perfluorooctanoic acid (PFOA)	1.0599 1.0325	1.0296	1.0703	1.0516	1.1300	Ave		1.0623			3.5		30.0				
Perfluorooctanesulfonic acid (PFOS)	1.0432 1.0989	1.0519	1.0326	1.0935	1.0764	Ave		1.0661			2.6		30.0				
Perfluorononanoic acid (PFNA)	0.8261 0.8363	0.8133	0.8488	0.8818	0.8480	Ave		0.8424			2.8		30.0				
13C2 PFHxA	1.0447 1.0648	1.0532	1.0875	1.0687	1.0602	Ave		1.0632			1.4		30.0				
13C2 PFDA	0.8513 0.8262	0.8714	0.8533	0.8487	0.8519	Ave		0.8505			1.7		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.: 320-37999-1 Analy Batch No.: 217453

SDG No.: _____

Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

Calibration Start Date: 04/11/2018 11:45 Calibration End Date: 04/11/2018 12:09 Calibration ID: 38530

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-217453/3	2018.04.11_537ICALB_004.d
Level 2	IC 320-217453/4	2018.04.11_537ICALB_005.d
Level 3	IC 320-217453/5	2018.04.11_537ICALB_006.d
Level 4	IC 320-217453/6	2018.04.11_537ICALB_007.d
Level 5	IC 320-217453/7	2018.04.11_537ICALB_008.d
Level 6	IC 320-217453/8	2018.04.11_537ICALB_009.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	870696 13871852	1696932	4015148	8010147	10764182	9.00 180	20.0	45.0	90.1	135
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	108741 1996261	218860	489075	1044752	1450463	0.960 19.4	2.16	4.86	9.72	14.6
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	418640 8226588	831963	2012030	4216387	6082352	3.00 60.5	6.72	15.1	30.2	45.4
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	219100 4019004	417632	1001316	2075568	3119787	1.98 39.6	4.40	9.90	19.8	29.7
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	349354 7016962	715378	1693810	3678059	5081660	3.95 79.1	8.79	19.8	39.5	59.3
Perfluorononanoic acid (PFNA)	13PF OA	Ave	170770 3255374	329904	794076	1740422	2341235	1.98 39.6	4.40	9.90	19.8	29.7
13C2 PFHxA	13PF OA	Ave	1090690 1046576	970942	1027706	1065262	985534	10.0 10.0	10.0	10.0	10.0	10.0
13C2 PFDA	13PF OA	Ave	888742 812112	803402	806360	845990	791901	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.: 320-37999-1 Analy Batch No.: 217453

SDG No.: _____

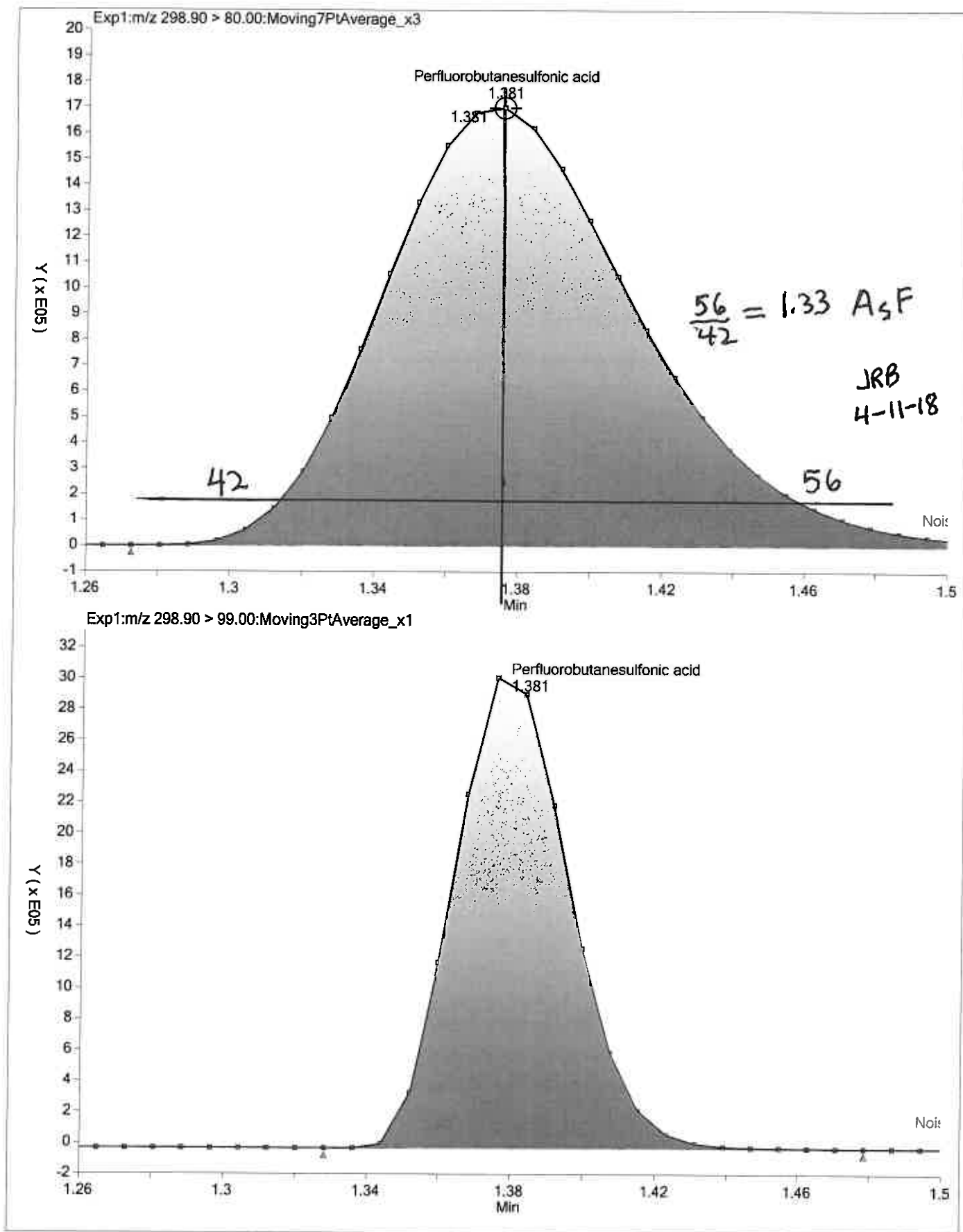
Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

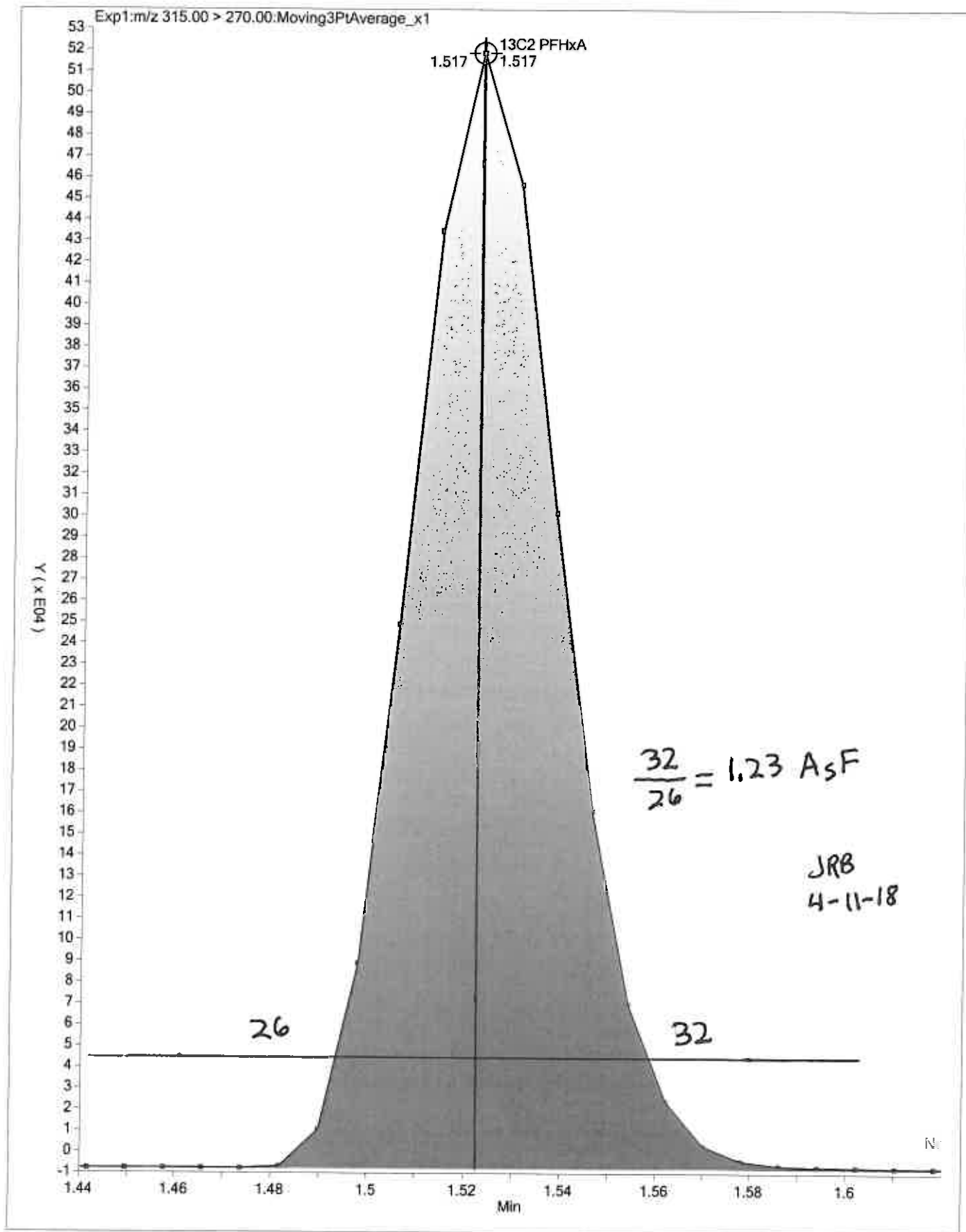
Calibration Start Date: 04/11/2018 11:45 Calibration End Date: 04/11/2018 12:09 Calibration ID: 38530

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-217453/3	2018.04.11_537ICALB_004.d
Level 2	IC 320-217453/4	2018.04.11_537ICALB_005.d
Level 3	IC 320-217453/5	2018.04.11_537ICALB_006.d
Level 4	IC 320-217453/6	2018.04.11_537ICALB_007.d
Level 5	IC 320-217453/7	2018.04.11_537ICALB_008.d
Level 6	IC 320-217453/8	2018.04.11_537ICALB_009.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)	8.6	4.1	2.1	-0.6	-4.9	-9.4	50	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	1.0	2.4	-0.8	0.4	-0.3	-2.7	50	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	0.2	-2.6	-2.4	-0.2	2.5	2.5	50	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	-0.2	-3.1	0.7	-1.0	6.4	-2.8	50	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	-2.1	-1.3	-3.1	2.6	1.0	3.1	50	30	30	30	30	30
Perfluorononanoic acid (PFNA)	-1.9	-3.5	0.8	4.7	0.7	-0.7	50	30	30	30	30	30
13C2 PFHxA	-1.7	-0.9	2.3	0.5	-0.3	0.1	30	30	30	30	30	30
13C2 PFDA	0.1	2.5	0.3	-0.2	0.2	-2.9	30	30	30	30	30	30





FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Lab Sample ID: CCVL 320-217453/10 Calibration Date: 04/11/2018 12:18
 Instrument ID: A8_N Calib Start Date: 04/11/2018 11:45
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 04/11/2018 12:09
 Lab File ID: 2018.04.11_537ICALB_011.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.052	1.078		20.5	20.0	2.5	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	1.079		2.17	2.16	0.5	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.583		6.48	6.72	-3.6	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	1.067		4.42	4.40	0.4	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	1.026		8.45	8.79	-3.8	50.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.8056		4.21	4.40	-4.4	50.0
13C2 PFHxA	Ave	1.063	1.036		9.74	10.0	-2.6	30.0
13C2 PFDA	Ave	0.8505	0.8798		10.3	10.0	3.4	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Lab Sample ID: ICV 320-217453/12 Calibration Date: 04/11/2018 12:27
 Instrument ID: A8_N Calib Start Date: 04/11/2018 11:45
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 04/11/2018 12:09
 Lab File ID: 2018.04.11_537ICALB_013.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.052	0.9079		86.4	100	-13.7	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	0.9453		8.80	10.0	-12.0	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.546		19.0	20.2	-5.8	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	0.8947		17.0	20.2	-15.8	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	0.9451		17.9	20.2	-11.3	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.7643		18.3	20.2	-9.3	30.0
13C2 PFHxA	Ave	1.063	0.9887		9.30	10.0	-7.0	30.0
13C2 PFDA	Ave	0.8505	0.7817		9.19	10.0	-8.1	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Lab Sample ID: CCVL 320-219239/1 Calibration Date: 04/21/2018 17:22
 Instrument ID: A8_N Calib Start Date: 04/11/2018 11:45
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 04/11/2018 12:09
 Lab File ID: 2018.04.21_537A_004.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.052	1.095		20.8	20.0	4.1	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	0.9845		1.98	2.16	-8.3	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.653		6.76	6.72	0.6	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	1.020		4.23	4.40	-4.0	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	1.030		8.49	8.79	-3.4	50.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.7806		4.08	4.40	-7.3	50.0
13C2 PFHxA	Ave	1.063	1.002		9.42	10.0	-5.8	30.0
13C2 PFDA	Ave	0.8505	0.7982		9.39	10.0	-6.1	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Lab Sample ID: CCV 320-219245/1 Calibration Date: 04/21/2018 19:28
 Instrument ID: A8_N Calib Start Date: 04/11/2018 11:45
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 04/11/2018 12:09
 Lab File ID: 2018.04.21_537A_031.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.052	1.145		49.0	45.0	8.9	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	1.040		4.71	4.86	-3.1	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.694		15.6	15.1	3.1	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	1.017		9.48	9.90	-4.3	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	1.081		20.0	19.8	1.4	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.7978		9.38	9.90	-5.3	30.0
13C2 PFHxA	Ave	1.063	1.026		9.65	10.0	-3.5	30.0
13C2 PFDA	Ave	0.8505	0.7884		9.27	10.0	-7.3	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1
 SDG No.: _____
 Lab Sample ID: CCV 320-219245/10 Calibration Date: 04/21/2018 20:10
 Instrument ID: A8_N Calib Start Date: 04/11/2018 11:45
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 04/11/2018 12:09
 Lab File ID: 2018.04.21_537A_040.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.052	1.075		138	135	2.2	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	1.081		14.7	14.6	0.6	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.743		48.2	45.4	6.1	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	1.128		31.5	29.7	6.1	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.8159		28.8	29.7	-3.1	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	1.089		60.6	59.3	2.1	30.0
13C2 PFHxA	Ave	1.063	1.093		10.3	10.0	2.8	30.0
13C2 PFDA	Ave	0.8505	0.8491		9.98	10.0	-0.2	30.0

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Instrument ID: A8_N Start Date: 04/11/2018 11:45

Analysis Batch Number: 217453 End Date: 04/11/2018 12:27

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-217453/3		04/11/2018 11:45	1	2018.04.11_537I CALB 004.d	GeminiC18 3x100 3(mm)
IC 320-217453/4		04/11/2018 11:50	1	2018.04.11_537I CALB 005.d	GeminiC18 3x100 3(mm)
IC 320-217453/5		04/11/2018 11:55	1	2018.04.11_537I CALB 006.d	GeminiC18 3x100 3(mm)
IC 320-217453/6 ICISAV		04/11/2018 11:59	1	2018.04.11_537I CALB 007.d	GeminiC18 3x100 3(mm)
IC 320-217453/7		04/11/2018 12:04	1	2018.04.11_537I CALB 008.d	GeminiC18 3x100 3(mm)
IC 320-217453/8		04/11/2018 12:09	1	2018.04.11_537I CALB 009.d	GeminiC18 3x100 3(mm)
ZZZZZ		04/11/2018 12:13	1		GeminiC18 3x100 3(mm)
CCVL 320-217453/10		04/11/2018 12:18	1	2018.04.11_537I CALB 011.d	GeminiC18 3x100 3(mm)
ICB 320-217453/11		04/11/2018 12:23	1		GeminiC18 3x100 3(mm)
ICV 320-217453/12		04/11/2018 12:27	1	2018.04.11_537I CALB 013.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Instrument ID: A8_N Start Date: 04/21/2018 17:22

Analysis Batch Number: 219239 End Date: 04/21/2018 17:22

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-219239/1		04/21/2018 17:22	1	2018.04.21_537A 004.d	GeminiC18 3x100 3(mm)

TestAmerica Laboratories
Worklist QC Batch Report

Worklist Name: 21APR2018_537B Worklist Number: 57050
 Instrument Name: A8_N Chrom Method: 537_A8_N
 Data Directory: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b
 QC Batching: Enabled Limit Group Batching: Enabled

QC Batch: 1	LC 537 ICAL Raw Batch: 219245
# 1 CCV L3	# 1 CCV L3
# 2 RB	# 2 RB
# 3 MB 320-218546/1-A	# 3 MB 320-218546/1-A
# 4 LCS 320-218546/2-A	# 4 LCS 320-218546/2-A
# 5 LCSD 320-218546/3-A	# 5 LCSD 320-218546/3-A
# 6 320-37999-A-1-A	# 6 320-37999-A-1-A
# 7 320-37999-A-2-A	# 7 320-37999-A-2-A
# 8 320-37999-A-3-A	# 8 320-37999-A-3-A
# 9 320-37999-A-4-A	# 9 320-37999-A-4-A
#10 CCV L5	#10 CCV L5

CCV6 in AB 219239

QC Batch: 2	LC 537 ICAL Raw Batch: 219247
#10 CCV L5	#10 CCV L5
#11 RB	#11 RB
#12 MB 320-218549/1-A	#12 MB 320-218549/1-A
#13 LLCS 320-218549/2-A	#13 LLCS 320-218549/2-A
#14 LLCSD 320-218549/3-A	#14 LLCSD 320-218549/3-A
#15 190-16025-A-1-A	#15 190-16025-A-1-A
#16 190-16025-A-2-A	#16 190-16025-A-2-A
#17 190-16014-A-1-A	#17 190-16014-A-1-A
#18 CCV L3	#18 CCV L3
#19 RB	#19 RB

TestAmerica Laboratories
Worklist Run Log Report

Worklist Name: 21APR2018_537B

Worklist Num: 57050

Instrument: A8_N

Method: 537_A8_N

Batch Directory: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b

Analysis Type: SemiVOA

Creator: Royce, Amani A

Inj Volume: 2.00

Inj Vol Units: ul

Lab ID	Worklist ID	Sample Type	Inj Date/Time	File Name	Vial	Dil Factor	Client ID	Fract
CCV L3	320-0057050-001	CCV/S	21-Apr-2018 19:28:10	2018.04.21_537A_031.d	3	1.0		sv
RB	320-0057050-002	RB	21-Apr-2018 19:32:50	2018.04.21_537A_032.d	8	1.0		sv
MB 320-218546/1-A	320-0057050-003	MB	21-Apr-2018 19:37:31	2018.04.21_537A_033.d	29	1.0		sv
LCS 320-218546/2-A	320-0057050-004	LCS	21-Apr-2018 19:42:13	2018.04.21_537A_034.d	30	1.0		sv
LLCSD 320-218546/3-A	320-0057050-005	LLCSD	21-Apr-2018 19:46:53	2018.04.21_537A_035.d	31	1.0		sv
320-37999-A-1-A	320-0057050-006	Client	21-Apr-2018 19:51:34	2018.04.21_537A_036.d	32	1.0	NAWC-040918-RW-359	sv
320-37999-A-2-A	320-0057050-007	Client	21-Apr-2018 19:56:13	2018.04.21_537A_037.d	33	1.0	NAWC-040918-FRB-359	sv
320-37999-A-3-A	320-0057050-008	Client	21-Apr-2018 20:00:54	2018.04.21_537A_038.d	34	1.0	WGNA-040918-RW-4848	sv
320-37999-A-4-A	320-0057050-009	Client	21-Apr-2018 20:05:34	2018.04.21_537A_039.d	35	1.0	WGNA-040918-FRB-4848	sv
CCV L5	320-0057050-010	CCVIS	21-Apr-2018 20:10:16	2018.04.21_537A_040.d	5	1.0		sv
RB	320-0057050-011	RB	21-Apr-2018 20:14:55	2018.04.21_537A_041.d	8	1.0		sv
MB 320-218549/1-A	320-0057050-012	MB	21-Apr-2018 20:19:37	2018.04.21_537A_042.d	36	1.0		sv
LLCS 320-218549/2-A	320-0057050-013	LLCS	21-Apr-2018 20:24:17	2018.04.21_537A_043.d	37	1.0		sv
LLCSD 320-218549/3-A	320-0057050-014	LLCSD	21-Apr-2018 20:28:58	2018.04.21_537A_044.d	38	1.0		sv
190-16025-A-1-A	320-0057050-015	Client	21-Apr-2018 20:33:39	2018.04.21_537A_045.d	39	1.0	Field Blank	sv
190-16025-A-2-A	320-0057050-016	Client	21-Apr-2018 20:38:19	2018.04.21_537A_046.d	40	1.0	Lake Huron Pump Station Raw	sv
190-16014-A-1-A	320-0057050-017	Client	21-Apr-2018 20:43:01	2018.04.21_537A_047.d	41	1.0	Formulation Room, Sink Faucet	sv
CCV L3	320-0057050-018	CCVIS	21-Apr-2018 20:47:41	2018.04.21_537A_048.d	3	1.0		sv
RB	320-0057050-019	RB	21-Apr-2018 20:52:23	2018.04.21_537A_049.d	8	1.0		sv

TestAmerica Laboratories
Worklist Run Log Report

Worklist Name: 21APR2018_537A

Worklist Num: 57049

Instrument: A8_N

Method: 537_A8_N

Batch Directory: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57049.b

Analysis Type: SemiVOA

Creator: Royce, Amani A

Inj Volume: 2.00

Inj Vol Units: ul

Lab ID	Worklist ID	Sample Type	Inj Date/Time	File Name	Vial	Dil Factor	Client ID	Fract
CCVL	320-0057049-001	CCVL	21-Apr-2018 17:22:06	2018.04.21_537A_004.d	2	1.0		sv
CCV L5	320-0057049-002	CCVIS	21-Apr-2018 17:26:46	2018.04.21_537A_005.d	5	1.0		sv
RB	320-0057049-003	RB	21-Apr-2018 17:31:26	2018.04.21_537A_006.d	8	1.0		sv
MB 320-218552/1-A	320-0057049-004	MB	21-Apr-2018 17:36:08	2018.04.21_537A_007.d	11	1.0		sv
LCS 320-218552/2-A	320-0057049-005	LCS	21-Apr-2018 17:40:48	2018.04.21_537A_008.d	12	1.0		sv
LCSD 320-218552/3-A	320-0057049-006	LCSD	21-Apr-2018 17:45:28	2018.04.21_537A_009.d	13	1.0		sv
320-38221-A-1-A	320-0057049-007	Client	21-Apr-2018 17:50:08	2018.04.21_537A_010.d	14	1.0	GC041618-LHWA-BED1E-L	sv
320-38221-A-2-A	320-0057049-008	Client	21-Apr-2018 17:54:48	2018.04.21_537A_011.d	15	1.0	GC041618-LHWA-BED2E-L	sv
320-38221-A-3-A	320-0057049-009	Client	21-Apr-2018 17:59:28	2018.04.21_537A_012.d	16	1.0	GC041618-LHWA-BED2E-L	sv
320-38221-A-4-A	320-0057049-010	Client	21-Apr-2018 18:04:08	2018.04.21_537A_013.d	17	1.0	GC041618-LHWA-BED1W-I	sv
320-38221-A-4-B MS	320-0057049-011	MS	21-Apr-2018 18:08:49	2018.04.21_537A_014.d	18	1.0	GC041618-LHWA-BED1W-I	sv
320-38221-A-4-C MSD	320-0057049-012	MSD	21-Apr-2018 18:13:30	2018.04.21_537A_015.d	19	1.0	GC041618-LHWA-BED1W-I	sv
320-38221-A-5-A	320-0057049-013	Client	21-Apr-2018 18:18:11	2018.04.21_537A_016.d	20	1.0	GC041618-LHWA-BED2W-I	sv
CCV L3	320-0057049-014	CCVIS	21-Apr-2018 18:22:51	2018.04.21_537A_017.d	3	1.0		sv
RB	320-0057049-015	RB	21-Apr-2018 18:27:31	2018.04.21_537A_018.d	8	1.0		sv
320-38221-A-6-A	320-0057049-016	Client	21-Apr-2018 18:32:10	2018.04.21_537A_019.d	21	1.0	GC041618-LHWA-PT	sv
320-38221-A-7-A	320-0057049-017	Client	21-Apr-2018 18:36:50	2018.04.21_537A_020.d	22	1.0	FRB-LH-041618	sv
CCV L5	320-0057049-018	CCVIS	21-Apr-2018 18:41:30	2018.04.21_537A_021.d	5	1.0		sv
RB	320-0057049-019	RB	21-Apr-2018 18:46:09	2018.04.21_537A_022.d	8	1.0		sv
320-34885-A-1-I	320-0057049-020	Client	21-Apr-2018 18:50:50	2018.04.21_537A_023.d	23	1.0	MDL Day 1	sv
MB 320-218811/2-A	320-0057049-021	MB	21-Apr-2018 18:55:30	2018.04.21_537A_024.d	24	1.0		sv
MB 320-218811/3-A	320-0057049-022	MB	21-Apr-2018 19:00:11	2018.04.21_537A_025.d	25	1.0		sv
MDLS 320-218811/4-A	320-0057049-023	MDLS	21-Apr-2018 19:04:51	2018.04.21_537A_026.d	26	1.0		sv
MDLS 320-218811/5-A	320-0057049-024	MDLS	21-Apr-2018 19:09:30	2018.04.21_537A_027.d	27	1.0		sv
MDLS 320-218811/6-A	320-0057049-025	MDLS	21-Apr-2018 19:14:10	2018.04.21_537A_028.d	28	1.0		sv

Lab ID	Worklist ID	Sample Type	Inj Date/Time	File Name	Vial	Dil Factor	Client ID	Fract
CCV L3	320-0057049-026	CCVIS	21-Apr-2018 19:18:50	2018.04.21_537A_029.d	3	1.0		sv
RB	320-0057049-027	RB	21-Apr-2018 19:23:31	2018.04.21_537A_030.d	8	1.0		sv

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-218546

Analyst: Kouchari, Shamiran








Batch Open: 4/18/2018 9:04:00AM

Method Code: 320-537_Prep-320

Batch End: 4/21/2018 11:00:00AM

18 4/21/18
17
and
4/21/18

Extraction of Perfluorinated Alkyl Acids

Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmnt FinAmnt	PHs Rcvd	Adj1	Adj2	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
1 MB-320-218546/1 N/A	N/A		250 mL	7			N/A	N/A	N/A	Chlorine, ND	
			1.00 mL								
2 LCS-320-218546/2 N/A	N/A		250 mL	7			N/A	N/A	N/A	Chlorine, ND	
			1.00 mL								
3 LCSD-320-218546/3 N/A	N/A		250 mL	7			N/A	N/A	N/A	Chlorine, ND	
			1.00 mL								
320-37999-A-1 (537_DOD5)	N/A (320-37999-1)	282.69 g	254.2 mL	7			4/14/18	16_Days	4	Chlorine, ND	
		28.49 g	1.00 mL								
320-37999-A-2 (537_DOD5)	N/A (320-37999-1)	291.65 g	261.8 mL	7			4/14/18	16_Days	4	Chlorine, ND	
		29.86 g	1.00 mL								
6 320-37999-A-3 (537_DOD5)	N/A (320-37999-1)	277.43 g	248.7 mL	7			4/14/18	16_Days	4	Chlorine, ND	
		28.75 g	1.00 mL								
7 320-37999-A-4 (537_DOD5)	N/A (320-37999-1)	277.82 g	249.9 mL	7			4/14/18	16_Days	4	Chlorine, ND	
		27.89 g	1.00 mL								

Page 247 of 254

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-218546

Analyst: Kouchari, Shamiran

Batch Open: 4/18/2018 9:04:00AM

Method Code: 320-537_Prep-320

Batch End: 4/21/2018 11:00:00AM

Batch Notes

Manifold ID	1
pH Indicator ID	3817
Trizma ID	SLBR5241V
SPE Cartridge Lot ID	6369499-12
Methanol ID	1207207
Reagent Water ID	04/18/18
Internal Standard ID#	1208799
Pipette ID	O43093F, I46360G
Analyst ID - TA Reagent Drop	SKD
Analyst ID - TA Reagent Drop Witness	HJA
Analyst ID - SU Reagent Drop	SKD
Analyst ID - SU Reagent Drop Witness	HJA
Analyst ID - IS Reagent Drop	SKD
Analyst ID - IS Reagent Drop Witness	VPM
Analyst ID - Concentration	SKD
Analyst ID - Aliquot Step	SKD
Analyst ID - Final Volume Step	SKD
Batch Comment	Client labels match TA label, 04/18/18 SKD

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LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Instrument ID: A8_N Start Date: 04/21/2018 19:28

Analysis Batch Number: 219245 End Date: 04/21/2018 20:10

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-219245/1 CCVIS		04/21/2018 19:28	1	2018.04.21_537A 031.d	GeminiC18 3x100 3(mm)
MB 320-218546/1-A		04/21/2018 19:37	1	2018.04.21_537A 033.d	GeminiC18 3x100 3(mm)
LCS 320-218546/2-A		04/21/2018 19:42	1	2018.04.21_537A 034.d	GeminiC18 3x100 3(mm)
LCSD 320-218546/3-A		04/21/2018 19:46	1	2018.04.21_537A 035.d	GeminiC18 3x100 3(mm)
320-37999-1		04/21/2018 19:51	1	2018.04.21_537A 036.d	GeminiC18 3x100 3(mm)
320-37999-2		04/21/2018 19:56	1	2018.04.21_537A 037.d	GeminiC18 3x100 3(mm)
320-37999-3		04/21/2018 20:00	1	2018.04.21_537A 038.d	GeminiC18 3x100 3(mm)
320-37999-4		04/21/2018 20:05	1	2018.04.21_537A 039.d	GeminiC18 3x100 3(mm)
CCV 320-219245/10 CCVIS		04/21/2018 20:10	1	2018.04.21_537A 040.d	GeminiC18 3x100 3(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37999-1

SDG No.: _____

Batch Number: 218546 Batch Start Date: 04/18/18 09:04 Batch Analyst: Kouchari, Shamiran

Batch Method: 537 Batch End Date: 04/21/18 11:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-HSP 00029
MB 320-218546/1		537, 537				250 mL	1.00 mL	7 SU	
LCS 320-218546/2		537, 537				250 mL	1.00 mL	7 SU	100 uL
LCSD 320-218546/3		537, 537				250 mL	1.00 mL	7 SU	100 uL
320-37999-A-1	NAWC-040918-RW-359	537, 537	T	282.69 g	28.49 g	254.2 mL	1.00 mL	7 SU	
320-37999-A-2	NAWC-040918-FRB-359	537, 537	T	291.65 g	29.86 g	261.8 mL	1.00 mL	7 SU	
320-37999-A-3	WGNA-040918-RW-4848	537, 537	T	277.43 g	28.75 g	248.7 mL	1.00 mL	7 SU	
320-37999-A-4	WGNA-040918-FRB-4848	537, 537	T	277.82 g	27.89 g	249.9 mL	1.00 mL	7 SU	

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-IS 00067	LC537-SU 00066	AnalysisComment			
MB 320-218546/1		537, 537		100 uL	100 uL	Chlorine, ND			
LCS 320-218546/2		537, 537		100 uL	100 uL	Chlorine, ND			
LCSD 320-218546/3		537, 537		100 uL	100 uL	Chlorine, ND			
320-37999-A-1	NAWC-040918-RW-359	537, 537	T	100 uL	100 uL	Chlorine, ND			
320-37999-A-2	NAWC-040918-FRB-359	537, 537	T	100 uL	100 uL	Chlorine, ND			
320-37999-A-3	WGNA-040918-RW-4848	537, 537	T	100 uL	100 uL	Chlorine, ND			
320-37999-A-4	WGNA-040918-FRB-4848	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.: 320-37999-1

SDG No.: _____

Batch Number: 218546 Batch Start Date: 04/18/18 09:04 Batch Analyst: Kouchari, Shamiran

Batch Method: 537 Batch End Date: 04/21/18 11:00

Batch Notes	
Analyst ID - Aliquot Step	SKD
Batch Comment	Client labels match TA label, 04/18/18 SKD
Analyst ID - Concentration	SKD
Analyst ID - Final Volume Step	SKD
Internal Standard ID#	1208799
Manifold ID	1
Methanol ID	1207207
pH Indicator ID	3817
Pipette ID	043093F, I46360G
Analyst ID - IS Reagent Drop	SKD
Analyst ID - IS Reagent Drop Witness	VPM
Analyst ID - SU Reagent Drop	SKD
Analyst ID - SU Reagent Drop Witness	HJA
Analyst ID - TA Reagent Drop	SKD
Analyst ID - TA Reagent Drop Witness	HJA
SPE Cartridge Lot ID	6369499-12
Trizma ID	SLBR5241V
Reagent Water ID	04/18/18

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 4/11/2018
 Instrument A8_N

Perfluorooctane sulfonic acid

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	Reported RRF
3.95	349354	2429483	28.7	1.04481	1.0432
8.79	715378	2220259	28.7	1.05202	1.0519
19.8	1693810	2380125	28.7	1.03153	1.0326
39.5	3678059	2440107	28.7	1.09520	1.0935
59.3	5081660	2283311	28.7	1.07713	1.0764
79.1	7016962	2316327	28.7	1.09914	1.0989
Average				1.06664	1.0661
Standard Deviation				0.0279	
RSD				0.0262	
%RSD				2.62018	2.6

Continuing Calibration 04/21/2018 @ 17:22

Perfluorooctane sulfonic acid

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	%D	Reported RRF	Reported %D
8.79	724536	2295874	28.7	1.0304	-3.348856	1.03	-3.4

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57049.b\2018.04.21_537A_004.d

Injection Date: 21-Apr-2018 17:22:06

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

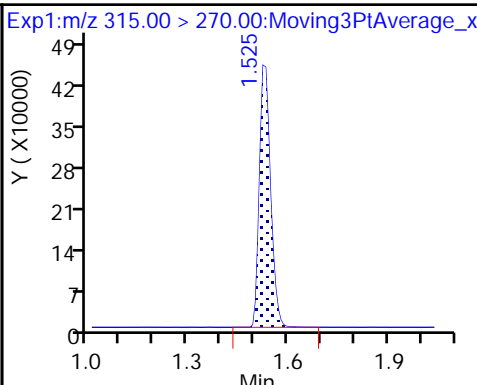
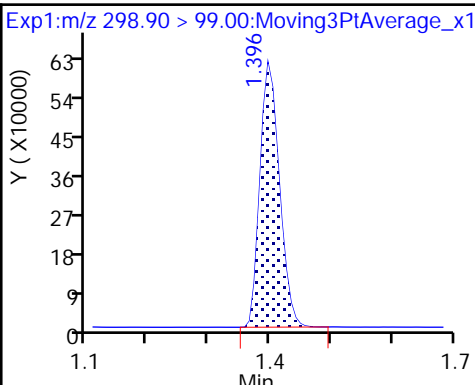
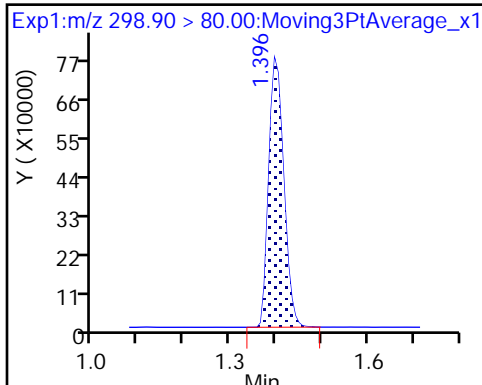
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

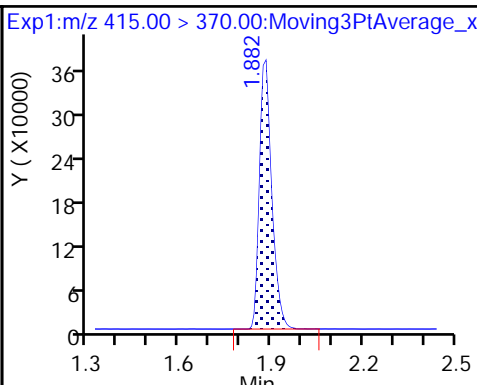
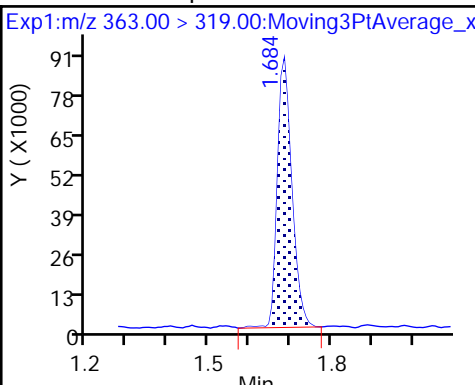
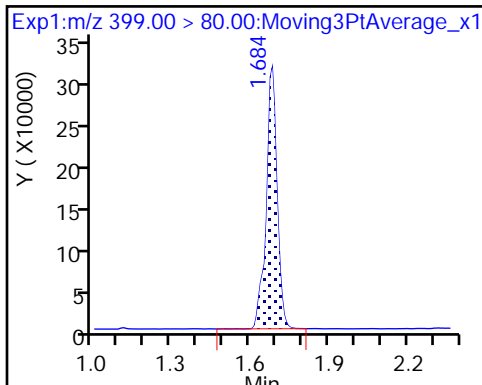
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

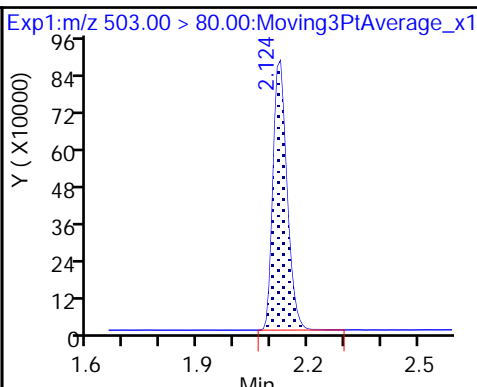
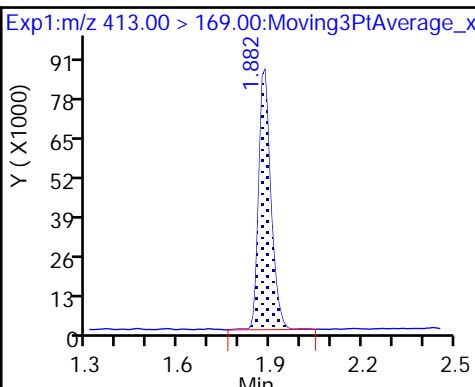
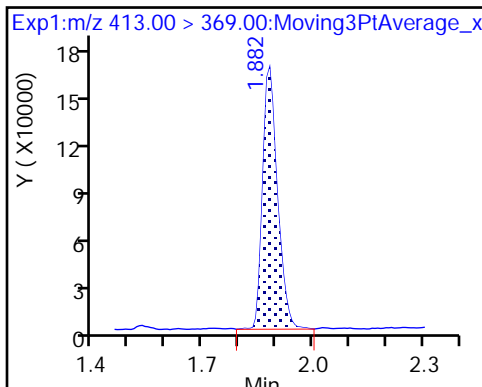
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

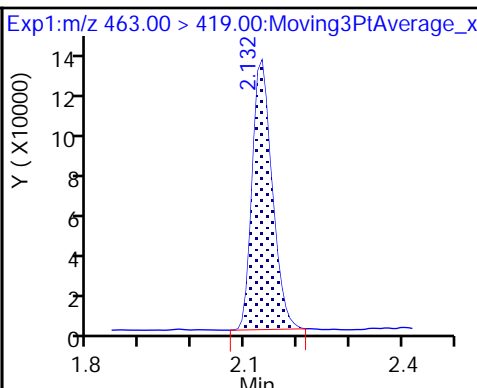
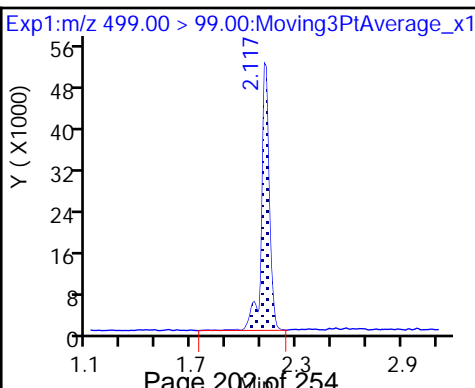
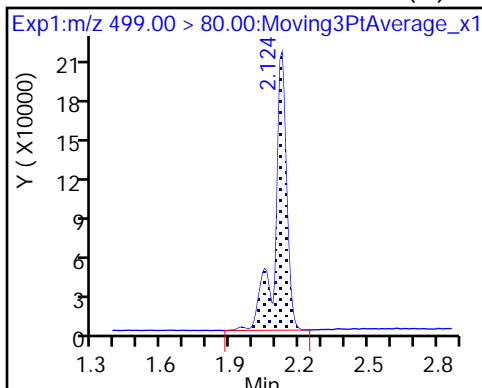
* 7 13C4 PFOS



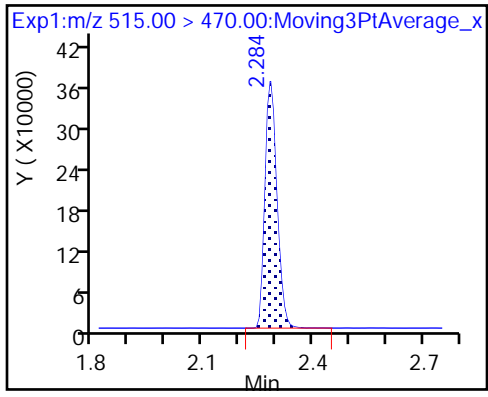
8 Perfluorooctane sulfonic acid (M)

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

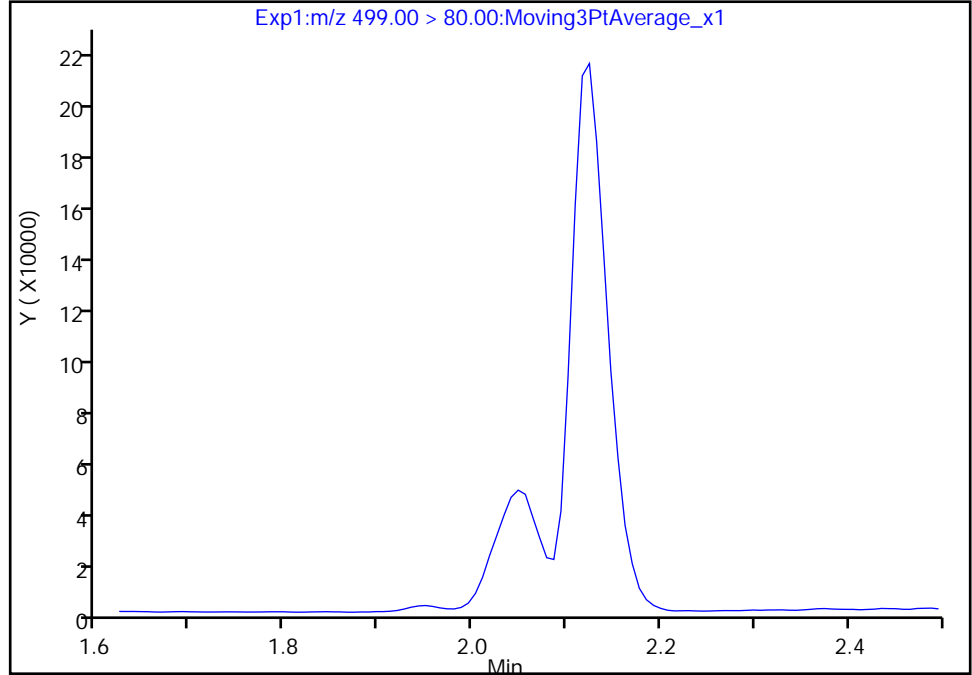
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57049.b\2018.04.21_537A_004.d
Injection Date: 21-Apr-2018 17:22:06 Instrument ID: A8_N
Lims ID: CCVL
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 1
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

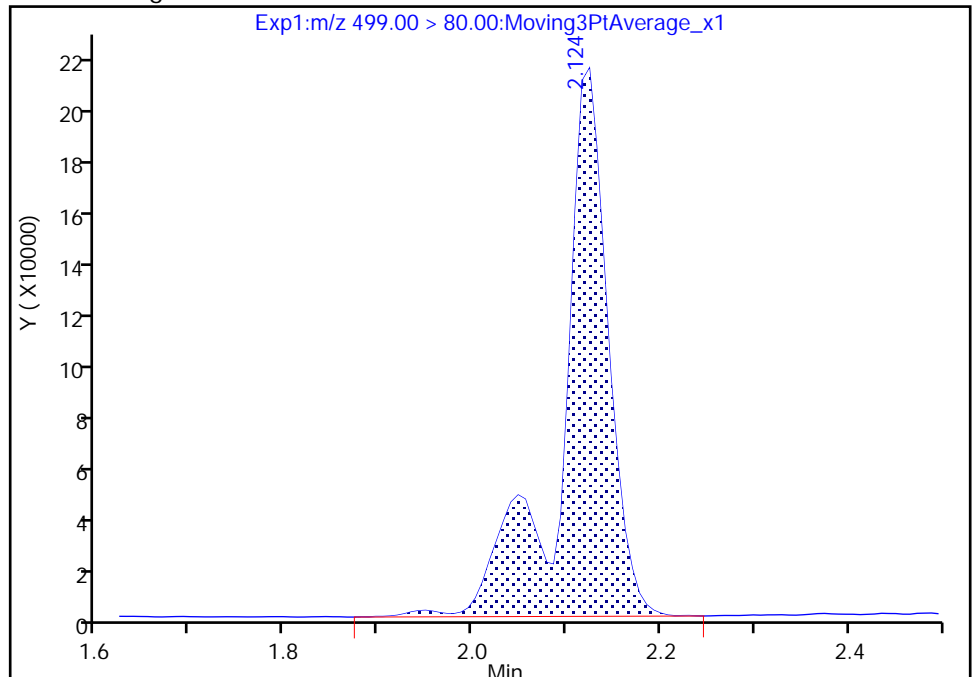
Not Detected
Expected RT: 2.11

Processing Integration Results



RT: 2.12
Area: 724536
Amount: 8.489931
Amount Units: ng/ml

Manual Integration Results



Willow Grove
SDG 320-37999-1

Sample Identification NAWC-040918-RW-359

Compound Perfluorooctanesulfonic acid

Compound Area	2093388
Internal Standard Amount (ng)	28.7
Dilution Factor	1
Internal Standard Area	2431032
Average RRF	1.0661
Sample Volume(L)	0.2542
Volume Extract (ml)	1
Injection Volume (µl)	1
Concentration	91.1943 ng/L

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_036.d

Injection Date: 21-Apr-2018 19:51:34

Instrument ID: A8_N

Lims ID: 320-37999-A-1-A

Lab Sample ID: 320-37999-1

Client ID: NAWC-040918-RW-359

Operator ID: SACINSTLCMS01

ALS Bottle#: 32

Worklist Smp#: 6

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

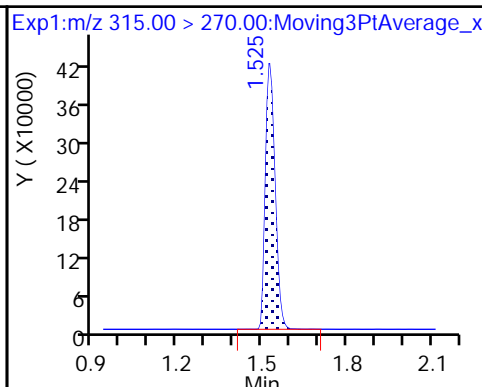
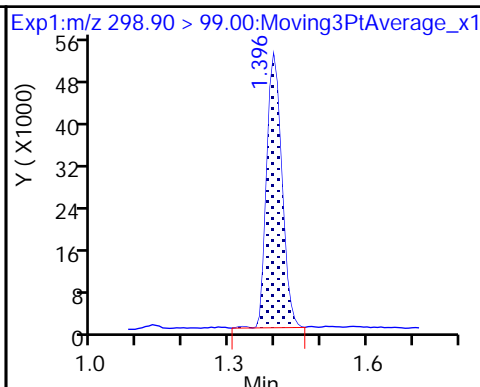
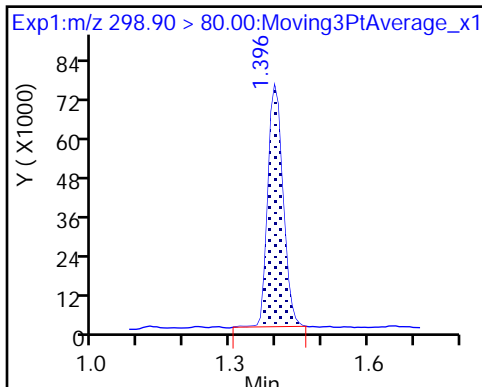
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

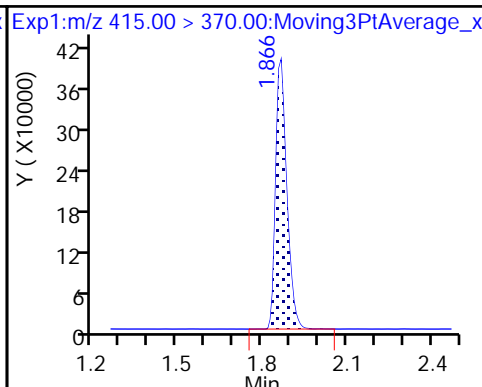
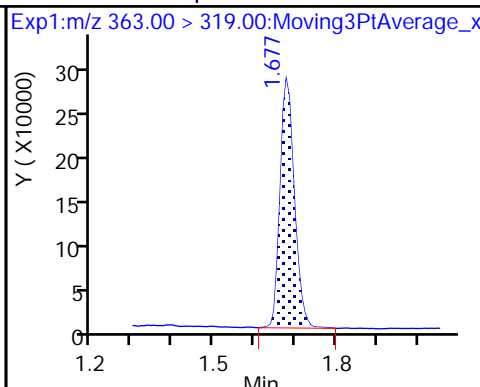
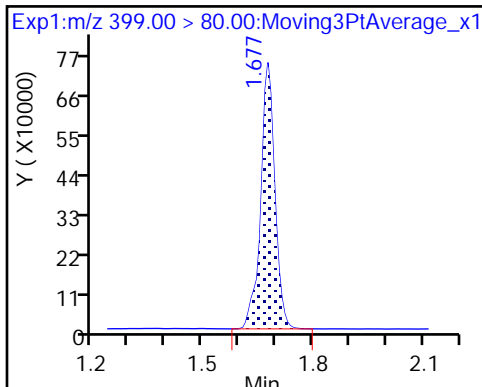
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

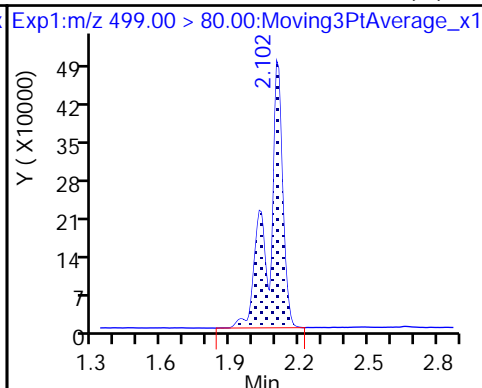
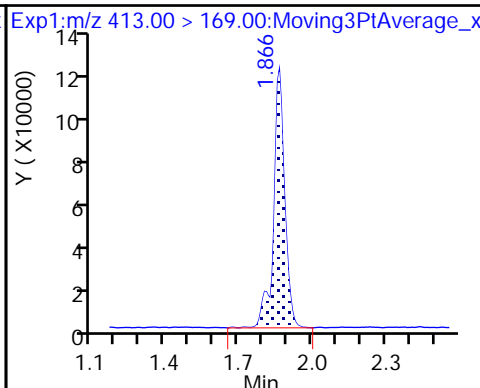
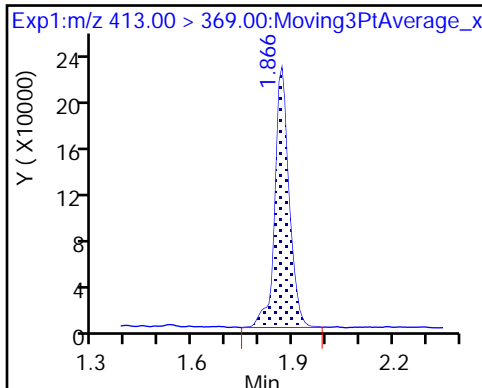
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

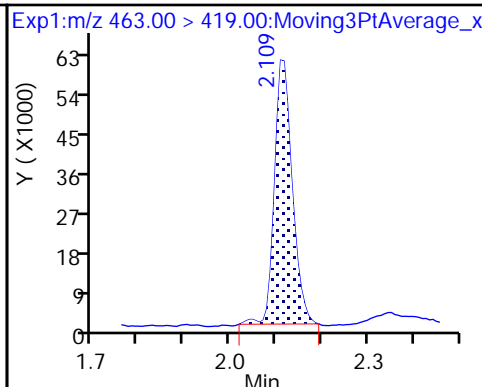
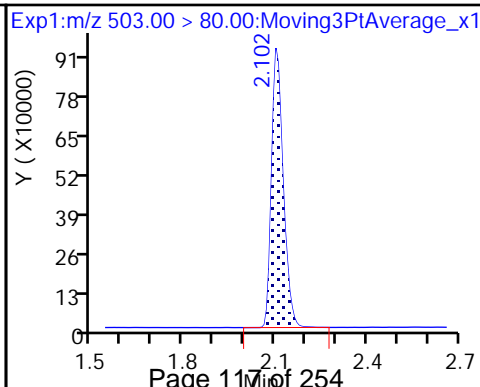
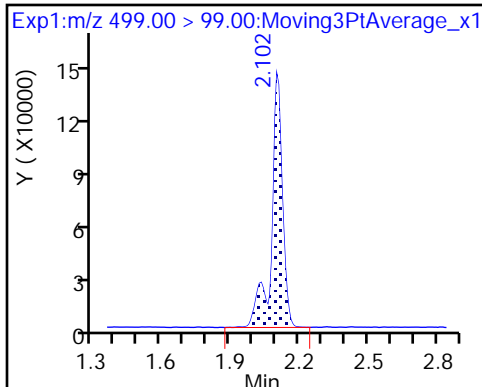
8 Perfluorooctane sulfonic acid (M)



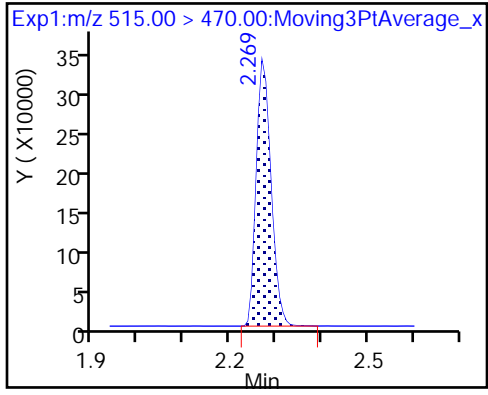
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

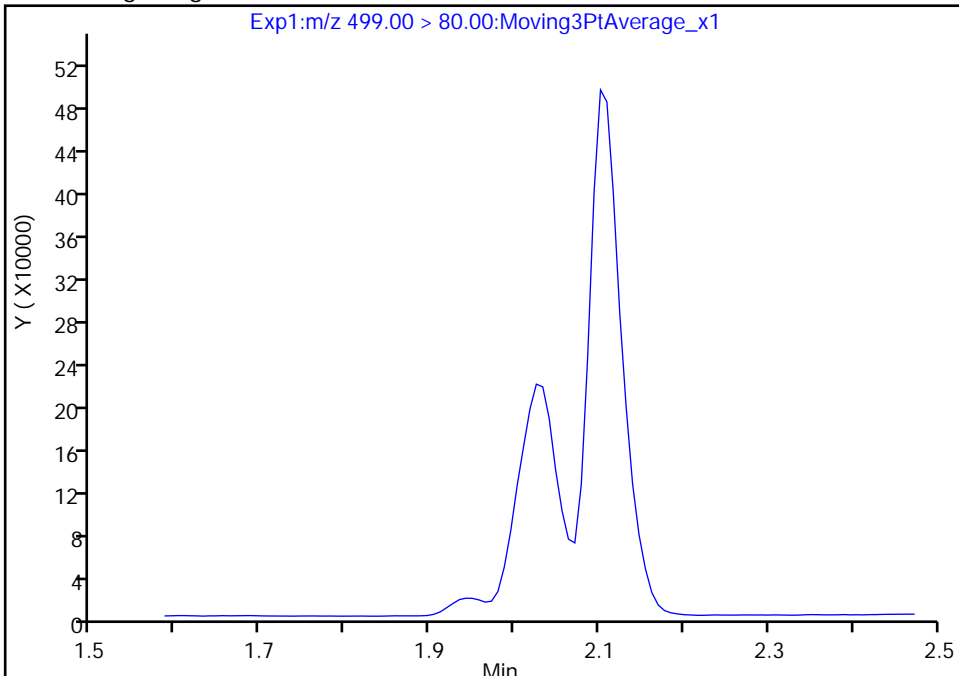
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180423-57050.b\2018.04.21_537A_036.d
Injection Date: 21-Apr-2018 19:51:34 Instrument ID: A8_N
Lims ID: 320-37999-A-1-A Lab Sample ID: 320-37999-1
Client ID: NAWC-040918-RW-359
Operator ID: SACINSTLCMS01 ALS Bottle#: 32 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

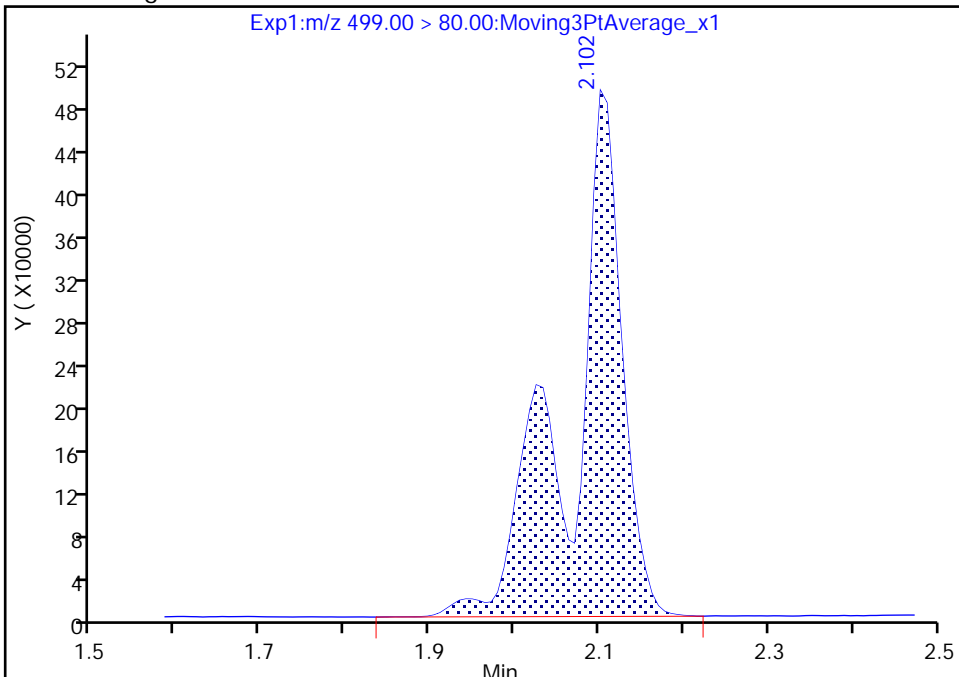
Not Detected
Expected RT: 2.10

Processing Integration Results



RT: 2.10
Area: 2093388
Amount: 23.166014
Amount Units: ng/ml

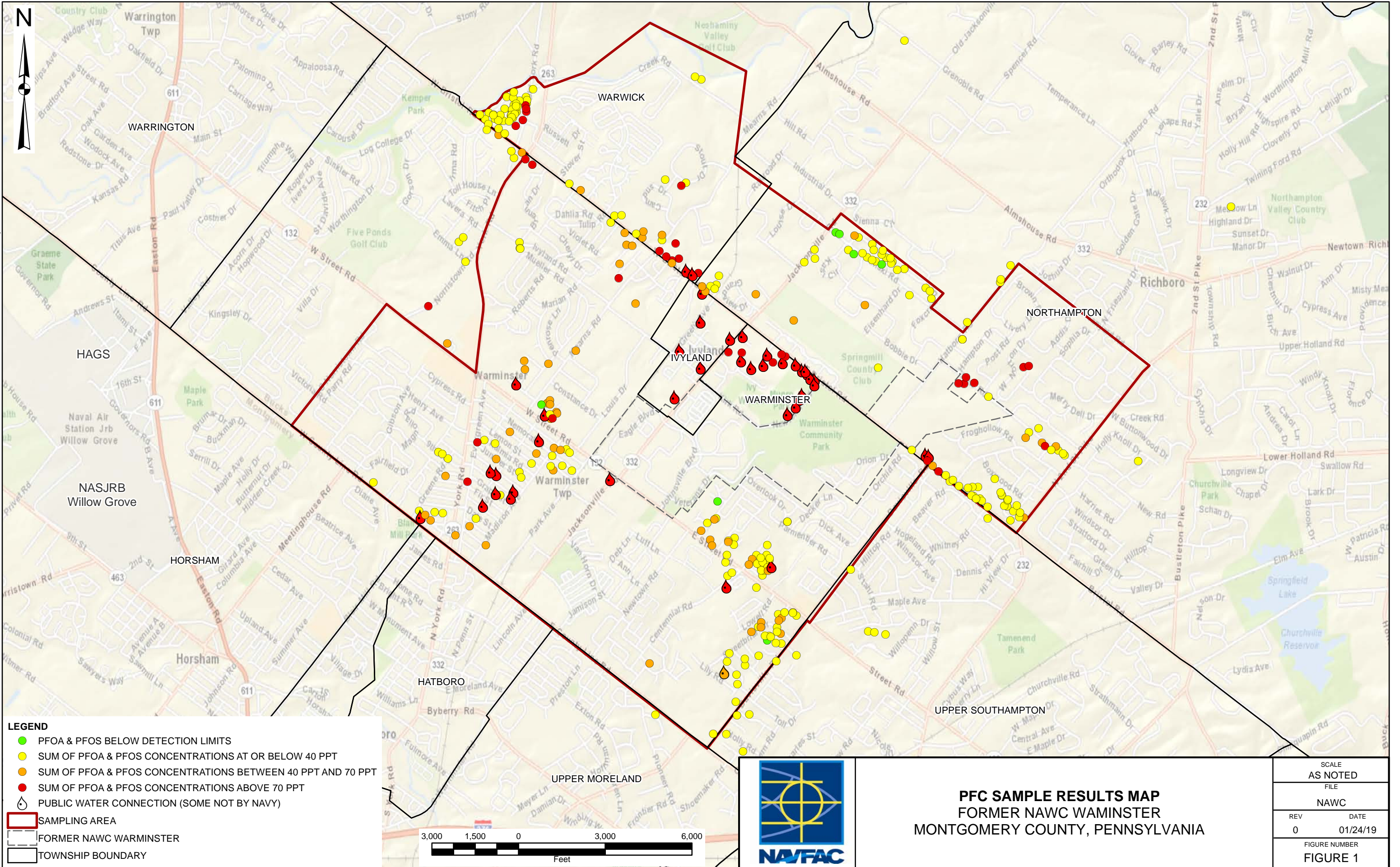
Manual Integration Results



Reviewer: barnettj, 23-Apr-2018 10:39:38
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

C:\AI\Projects\112008005\WE04\F.S.DR.03\NAWC_201901.mxd MKB 1/24/2019



LEGEND

- PFOA & PFOS BELOW DETECTION LIMITS
- SUM OF PFOA & PFOS CONCENTRATIONS AT OR BELOW 40 PPT
- SUM OF PFOA & PFOS CONCENTRATIONS BETWEEN 40 PPT AND 70 PPT
- SUM OF PFOA & PFOS CONCENTRATIONS ABOVE 70 PPT
- 👉 PUBLIC WATER CONNECTION (SOME NOT BY NAVY)
- SAMPLING AREA
- FORMER NAWC WARRINSTER
- TOWNSHIP BOUNDARY



PFC SAMPLE RESULTS MAP
FORMER NAWC WARRINSTER
MONTGOMERY COUNTY, PENNSYLVANIA

SCALE AS NOTED	
FILE	
NAWC	
REV 0	DATE 01/24/19
FIGURE NUMBER	
FIGURE 1	