



**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 320-41028-1**

*Naval Air Station Willow Grove
Willow Grove, Pennsylvania*

August 2019

ANALYTICAL REPORT

Job Number: 320-41028-1

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
7/27/2018 9:00 AM

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07/27/2018

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Definitions/Glossary

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

TestAmerica Job ID: 320-41028-1

Qualifiers

LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
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
320-41028-1

Receipt

The samples were received on 7/11/2018 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.4° 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

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

Detection Summary

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

TestAmerica Job ID: 320-41028-1

Client Sample ID: WGNA-071018-RW-3142 Lab Sample ID: 320-41028-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	17	J M	37	6.4	ng/L	1		537	Total/NA
Perfluorooctanoic acid (PFOA)	12	J	19	2.6	ng/L	1		537	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	7.2	J	28	5.1	ng/L	1		537	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.0	J	9.4	1.8	ng/L	1		537	Total/NA

Client Sample ID: WGNA-071018-FRB-3142 Lab Sample ID: 320-41028-2

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample Results

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

TestAmerica Job ID: 320-41028-1

Client Sample ID: WGNA-071018-RW-3142

Date Collected: 07/10/18 15:10

Date Received: 07/11/18 09:30

Lab Sample ID: 320-41028-1

Matrix: Water

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	17	J M	37	6.4	ng/L	—	07/14/18 08:08	07/25/18 16:04	1
Perfluorooctanoic acid (PFOA)	12	J	19	2.6	ng/L		07/14/18 08:08	07/25/18 16:04	1
Perfluorononanoic acid (PFNA)	19	U	22	7.5	ng/L		07/14/18 08:08	07/25/18 16:04	1
Perfluorohexanesulfonic acid (PFHxS)	7.2	J	28	5.1	ng/L		07/14/18 08:08	07/25/18 16:04	1
Perfluoroheptanoic acid (PFHpA)	3.0	J	9.4	1.8	ng/L		07/14/18 08:08	07/25/18 16:04	1
Perfluorobutanesulfonic acid (PFBS)	34	U	84	15	ng/L		07/14/18 08:08	07/25/18 16:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	74		70 - 130				07/14/18 08:08	07/25/18 16:04	1
13C2 PFDA	85		70 - 130				07/14/18 08:08	07/25/18 16:04	1

Client Sample ID: WGNA-071018-FRB-3142

Date Collected: 07/10/18 15:05

Date Received: 07/11/18 09:30

Lab Sample ID: 320-41028-2

Matrix: Water

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	—	07/14/18 08:08	07/25/18 16:09	1
Perfluorooctanoic acid (PFOA)	8.0	U	20	2.8	ng/L		07/14/18 08:08	07/25/18 16:09	1
Perfluorononanoic acid (PFNA)	20	U	24	8.0	ng/L		07/14/18 08:08	07/25/18 16:09	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	30	5.5	ng/L		07/14/18 08:08	07/25/18 16:09	1
Perfluoroheptanoic acid (PFHpA)	4.0	U	10	1.9	ng/L		07/14/18 08:08	07/25/18 16:09	1
Perfluorobutanesulfonic acid (PFBS)	36	U	90	16	ng/L		07/14/18 08:08	07/25/18 16:09	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	85		70 - 130				07/14/18 08:08	07/25/18 16:09	1
13C2 PFDA	84		70 - 130				07/14/18 08:08	07/25/18 16:09	1

Default Detection Limits

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-41028-1

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

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: 320-41028-1

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

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	PFHxA	PFDA				
		(70-130)	(70-130)				
320-41028-1	WGNA-071018-RW-3142	74	85				
320-41028-2	WGNA-071018-FRB-3142	85	84				
LCS 320-234028/2-A	Lab Control Sample	86	88				
MB 320-234028/1-A	Method Blank	78	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: 320-41028-1

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

Lab Sample ID: MB 320-234028/1-A

Matrix: Water

Analysis Batch: 236171

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 234028

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	16	U	40	6.8	ng/L		07/14/18 08:08	07/25/18 15:36	1
Perfluorooctanoic acid (PFOA)	8.0	U	20	2.8	ng/L		07/14/18 08:08	07/25/18 15:36	1
Perfluorononanoic acid (PFNA)	20	U	24	8.0	ng/L		07/14/18 08:08	07/25/18 15:36	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	30	5.5	ng/L		07/14/18 08:08	07/25/18 15:36	1
Perfluoroheptanoic acid (PFHpA)	4.0	U	10	1.9	ng/L		07/14/18 08:08	07/25/18 15:36	1
Perfluorobutanesulfonic acid (PFBS)	36	U	90	16	ng/L		07/14/18 08:08	07/25/18 15:36	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	78		70 - 130	07/14/18 08:08	07/25/18 15:36	1
13C2 PFDA	87		70 - 130	07/14/18 08:08	07/25/18 15:36	1

Lab Sample ID: LCS 320-234028/2-A

Matrix: Water

Analysis Batch: 235922

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 234028

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanesulfonic acid (PFOS)	220	214	M	ng/L		97	70 - 130
Perfluorooctanoic acid (PFOA)	110	102		ng/L		93	70 - 130
Perfluorononanoic acid (PFNA)	110	104		ng/L		94	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	168	155		ng/L		92	70 - 130
Perfluoroheptanoic acid (PFHpA)	54.0	47.7		ng/L		88	70 - 130
Perfluorobutanesulfonic acid (PFBS)	500	384		ng/L		77	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
13C2 PFHxA	86		70 - 130
13C2 PFDA	88		70 - 130

QC Association Summary

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-41028-1

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

LCMS

Prep Batch: 234028

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-41028-1	WGNA-071018-RW-3142	Total/NA	Water	537	
320-41028-2	WGNA-071018-FRB-3142	Total/NA	Water	537	
MB 320-234028/1-A	Method Blank	Total/NA	Water	537	
LCS 320-234028/2-A	Lab Control Sample	Total/NA	Water	537	

Analysis Batch: 235922

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 320-234028/2-A	Lab Control Sample	Total/NA	Water	537	234028

Analysis Batch: 236171

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-41028-1	WGNA-071018-RW-3142	Total/NA	Water	537	234028
320-41028-2	WGNA-071018-FRB-3142	Total/NA	Water	537	234028
MB 320-234028/1-A	Method Blank	Total/NA	Water	537	234028

Lab Chronicle

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

TestAmerica Job ID: 320-41028-1

Client Sample ID: WGNA-071018-RW-3142

Date Collected: 07/10/18 15:10

Date Received: 07/11/18 09:30

Lab Sample ID: 320-41028-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			234028	07/14/18 08:08	SK	TAL SAC
Total/NA	Analysis	537		1	236171	07/25/18 16:04	JRB	TAL SAC

Client Sample ID: WGNA-071018-FRB-3142

Date Collected: 07/10/18 15:05

Date Received: 07/11/18 09:30

Lab Sample ID: 320-41028-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			234028	07/14/18 08:08	SK	TAL SAC
Total/NA	Analysis	537		1	236171	07/25/18 16:09	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.

TestAmerica Job ID: 320-41028-1

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

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD ELAP		L2468	01-20-21
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-19
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-19
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Illinois	NELAP	5	200060	03-17-19
Kansas	NELAP	7	E-10375	10-31-18
Louisiana	NELAP	6	30612	06-30-19
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-18 *
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-19
New York	NELAP	2	11666	03-31-19
Oregon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-19
Texas	NELAP	6	T104704399	05-31-19
US Fish & Wildlife	Federal		LE148388-0	07-31-18 *
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-19
Vermont	State Program	1	VT-4040	04-30-19
Virginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-19
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

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

TestAmerica Sacramento

Method Summary

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

TestAmerica Job ID: 320-41028-1

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: 320-41028-1

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

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-41028-1	WGNA-071018-RW-3142	Water	07/10/18 15:10	07/11/18 09:30
320-41028-2	WGNA-071018-FRB-3142	Water	07/10/18 15:05	07/11/18 09:30

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

SDG No.: _____

Instrument ID: A8_N Analysis Batch Number: 235370Lab Sample ID: IC 320-235370/3 Client Sample ID: _____Date Analyzed: 07/21/18 12:21 Lab File ID: 2018.07.21_537CURVE_003.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluoroheptanoic acid (PFHpA)	1.62	Baseline	roycea	07/21/18 12:57
Perfluorooctanesulfonic acid (PFOS)	2.06	Assign Peak	roycea	07/21/18 12:57

Lab Sample ID: IC 320-235370/4 Client Sample ID: _____Date Analyzed: 07/21/18 12:26 Lab File ID: 2018.07.21_537CURVE_004.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluoroheptanoic acid (PFHpA)	1.62	Baseline	roycea	07/21/18 12:58
Perfluorooctanesulfonic acid (PFOS)	2.06	Assign Peak	roycea	07/21/18 12:58

Lab Sample ID: IC 320-235370/5 Client Sample ID: _____Date Analyzed: 07/21/18 12:31 Lab File ID: 2018.07.21_537CURVE_005.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluoroheptanoic acid (PFHpA)	1.62	Baseline	roycea	07/21/18 12:59
Perfluorooctanesulfonic acid (PFOS)	2.06	Baseline	roycea	07/21/18 12:59

Lab Sample ID: IC 320-235370/6 ICISAV Client Sample ID: _____Date Analyzed: 07/21/18 12:35 Lab File ID: 2018.07.21_537CURVE_006.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.05	Peak assignment corrected	roycea	07/21/18 13:00

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

SDG No.: _____

Instrument ID: A8_N Analysis Batch Number: 235370Lab Sample ID: IC 320-235370/7 Client Sample ID: _____Date Analyzed: 07/21/18 12:40 Lab File ID: 2018.07.21_537CURVE_007.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.06	Peak assignment corrected	roycea	07/21/18 13:00

Lab Sample ID: IC 320-235370/8 Client Sample ID: _____Date Analyzed: 07/21/18 12:45 Lab File ID: 2018.07.21_537CURVE_008.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.06	Peak assignment corrected	roycea	07/21/18 13:01

Lab Sample ID: CCVL 320-235370/11 Client Sample ID: _____Date Analyzed: 07/21/18 12:54 Lab File ID: 2018.07.21_537CURVE_010.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluoroheptanoic acid (PFHpA)	1.62	Baseline	roycea	07/21/18 13:03
Perfluorooctanesulfonic acid (PFOS)	2.06	Peak assignment corrected	roycea	07/21/18 13:03

Lab Sample ID: ICV 320-235370/13 Client Sample ID: _____Date Analyzed: 07/21/18 13:03 Lab File ID: 2018.07.21_537CURVE_012.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.06	Peak assignment corrected	roycea	07/21/18 14:24

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

SDG No.: _____

Instrument ID: A8_N Analysis Batch Number: 235918Lab Sample ID: CCVL 320-235918/2 Client Sample ID: _____Date Analyzed: 07/24/18 08:18 Lab File ID: 2018.07.24_537A_003.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.01	Peak assignment corrected	barnettj	07/25/18 13:30

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

SDG No.: _____

Instrument ID: A8_N Analysis Batch Number: 235922Lab Sample ID: CCV 320-235922/22 CCVIS Client Sample ID: _____Date Analyzed: 07/24/18 09:56 Lab File ID: 2018.07.24_537A_024.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.01	Peak assignment corrected	barnettj	07/25/18 13:31

Lab Sample ID: LCS 320-234028/2-A Client Sample ID: _____Date Analyzed: 07/24/18 10:10 Lab File ID: 2018.07.24_537A_027.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.01	Peak assignment corrected	barnettj	07/25/18 13:39

Lab Sample ID: CCV 320-235922/34 CCVIS Client Sample ID: _____Date Analyzed: 07/24/18 10:52 Lab File ID: 2018.07.24_537A_036.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.00	Peak assignment corrected	barnettj	07/25/18 13:32

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

SDG No.: _____

Instrument ID: A8_N Analysis Batch Number: 236171Lab Sample ID: CCVL 320-236171/2 Client Sample ID: _____Date Analyzed: 07/25/18 15:18 Lab File ID: 2018.07.25_537A_003.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.04	Peak assignment corrected	barnettj	07/26/18 10:45

Lab Sample ID: CCV 320-236171/3 CCVIS Client Sample ID: _____Date Analyzed: 07/25/18 15:22 Lab File ID: 2018.07.25_537A_004.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.04	Peak assignment corrected	barnettj	07/26/18 10:45

Lab Sample ID: 320-41028-1 Client Sample ID: WGNA-071018-RW-3142Date Analyzed: 07/25/18 16:04 Lab File ID: 2018.07.25_537A_013.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.03	Peak assignment corrected	barnettj	07/26/18 10:48

Lab Sample ID: CCV 320-236171/14 CCVIS Client Sample ID: _____Date Analyzed: 07/25/18 16:14 Lab File ID: 2018.07.25_537A_015.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.03	Peak assignment corrected	barnettj	07/26/18 10:45

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

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_00032	08/15/18	06/23/18	MeOH/H2O, Lot 197626	10 mL	LC537-IS_00074	1000 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
.LC537-IS_00074	12/16/18	06/16/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL
..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-ICV_00032	08/15/18	06/23/18	MeOH/H2O, Lot 197626	10 mL	LC537-SU_00072	1000 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
					LC537ICIM2_00001	400 uL	Perfluorobutanesulfonic acid (PFBS)	100.092 ng/mL
							Perfluoroheptanoic acid (PFHpA)	10 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	20.1619 ng/mL
							Perfluorononanoic acid (PFNA)	20.1641 ng/mL
							Perfluorooctanoic acid (PFOA)	20.167 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	20.1702 ng/mL
.LC537-SU_00072	12/16/18	06/16/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
.LC537ICIM2_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.: 320-41028-1

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_00074	12/16/18	06/16/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL
	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.: 320-41028-1

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-SU_00064	500 uL	13C2 PFDA	10 ng/mL
.LC537-IS_00065	10/02/18	04/02/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL
..LCM2PFOA_00010	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
..LCMPFOS_00024	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LC537-MSP_00033	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	509 uL	Perfluorobutanesulfonic acid (PFBS)	749.927 ng/mL
					LCPFHpA_00009	48 uL	Perfluoroheptanoic acid (PFHpA)	80 ng/mL
					LCPFHxS-br_00005	165 uL	Perfluorohexanesulfonic acid (PFHxS)	250.25 ng/mL
					LCPFNA_00009	99 uL	Perfluorononanoic acid (PFNA)	165 ng/mL
					LCPFOA_00010	99 uL	Perfluorooctanoic acid (PFOA)	165 ng/mL
					LCPFOS-br_00005	213 uL	Perfluorooctanesulfonic acid (PFOS)	329.44 ng/mL
					..LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116	
..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
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFHxA	0.1 ug/mL
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFDA	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
					LC537-SU_00064	2 mL	13C4 PFOS	28.68 ng/mL
							13C2 PFDA	10 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

SDG No.: _____

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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-41028-1

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.: 320-41028-1

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.: 320-41028-1

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.: 320-41028-1

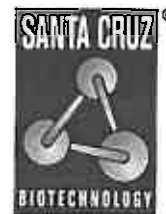
SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration		
					Reagent ID	Volume Added				
					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-SU_00073	01/05/19	07/05/18	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

PFHe A

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

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

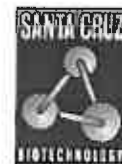
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ThermoFisher
SCIENTIFIC

Reagent

LC537_PFHxS2_00002



The Future is Now

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: $C_{13}F_{27}KO_2S$
 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)	$\geq 98.0\%$	100.4%

$PFH_x S-K$

$C_{13}F_{27}SO_3K$ 438.201

$C_{13}F_{27}SO_3H$ 400.111

$$MW \text{ correction} = \frac{400.11}{438.201} = 0.91307 \quad \frac{PFH_x S}{\text{cas\# 355-46-4}}$$

$$\text{Purity} \div MW \text{ correction} = 90.9\%$$

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Reagent

LC537_PFNA2_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:

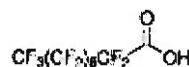
C₉H₇F₁₇O₂

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 SW

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

PFOA

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

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ThermoFisher
SCIENTIFIC

Reagent

LC537_PFOS2_00002

V: 6.14.17 SKV

SIGMA-ALDRICH

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

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: $\text{CF}_3(\text{CF}_2)_6\text{CF}_2\text{SO}_3\text{N}(\text{C}_2\text{H}_5)_4$
Formula Weight: 629.37
Quality Release Date: 11 JUN 2015

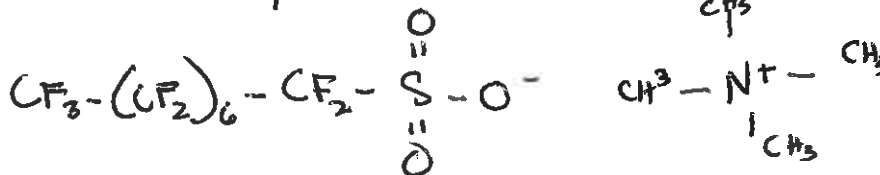
TEST	SPECIFICATION	RESULT
APPEARANCE (COLOR)	WHITE TO OFF WHITE	OFF-WHITE
APPEARANCE (FORM)	POWDER OR POWDER WITH CHUNK(S)	POWDER
CARBON CONTENT	29.77 % - 31.29 %	29.97 %
INFRARED SPECTRUM	CONFORMS TO STRUCTURE	CONFORMS

Claudia Geitner

Dr. Claudia Geitner
Manager Quality Control
Buchs, Switzerland

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

$$\text{Purity \& mw correction} = 77.87\%$$



C = 12.011	96.088
F = 18.998	322.966
S = 32.066	32.066
O = 15.999	47.997
H = 1.008	1.008
N = 14.007	—
	500.125



96.088

20.460

14.007

130.255

Reagent

LCM2PFOA_00010



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

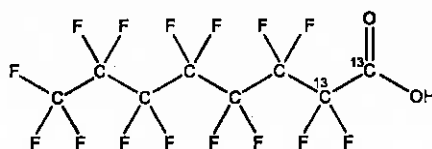
M2PFOA

LOT NUMBER:

M2PFOA0216

COMPOUND:Perfluoro-n-[1,2-¹³C₂]octanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₂¹²C₆HF₁₆O₂**CONCENTRATION:**

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

416.05

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99%¹³C**LAST TESTED:** (mm/dd/yyyy)

02/12/2016

EXPIRY DATE: (mm/dd/yyyy)

02/12/2021

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 02/24/2016

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

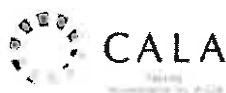
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

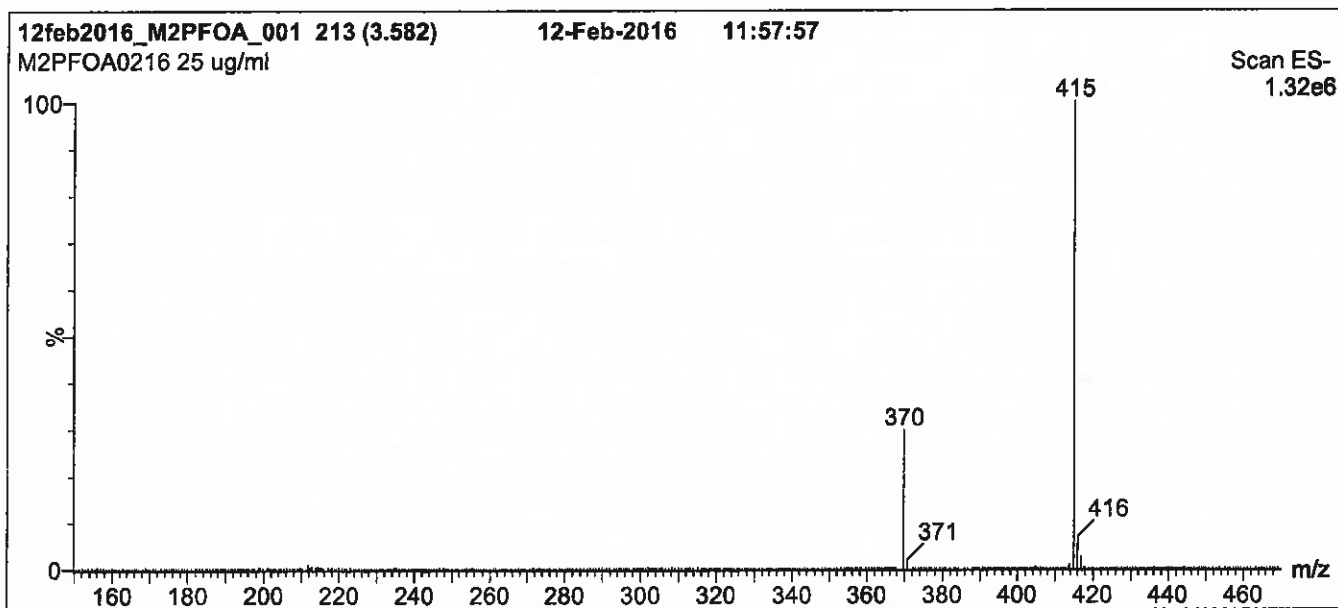
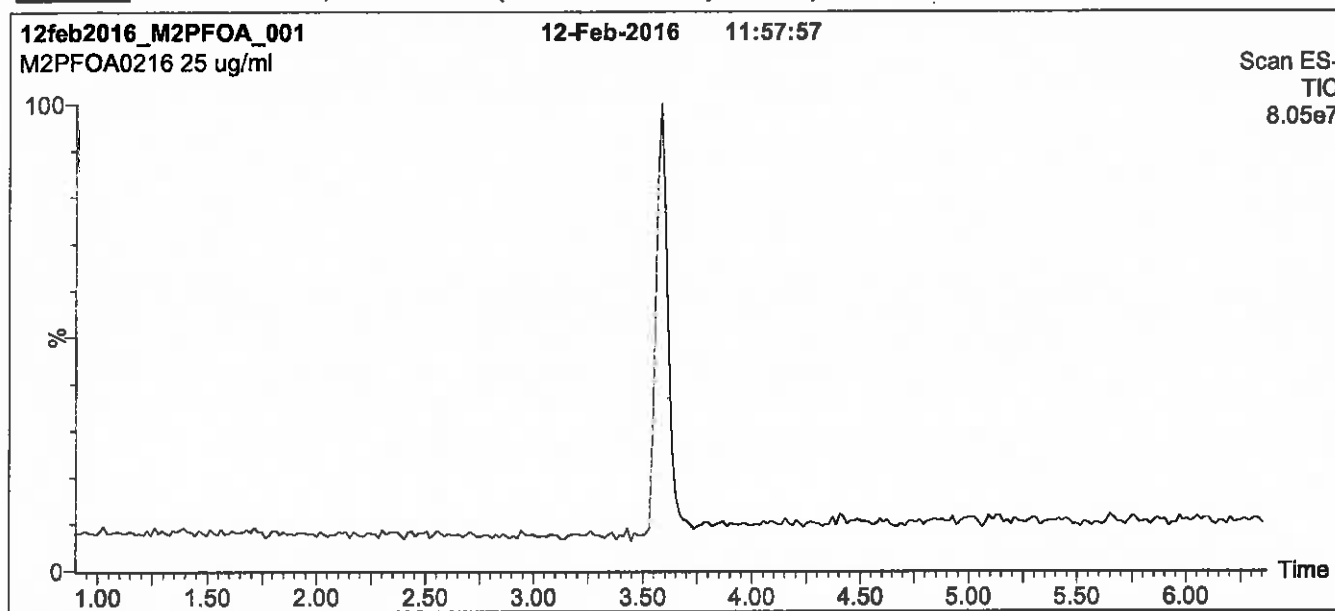
QUALITY MANAGEMENT:

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



For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com 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

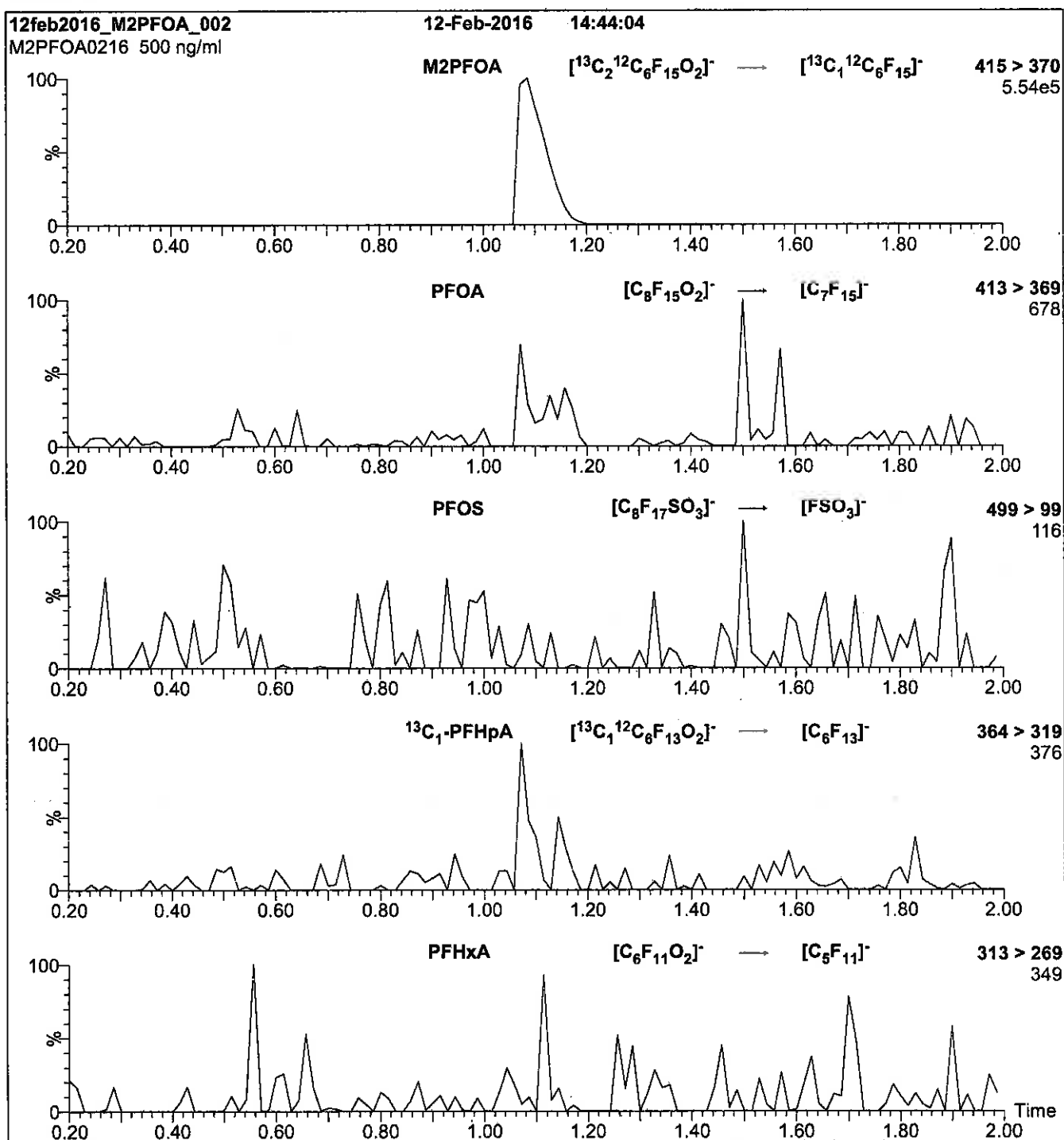
Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm
Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

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% 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 Prod: SBC

13C2-Perfluorodecanoic acid



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFDA

LOT NUMBER:

MPFDA0916

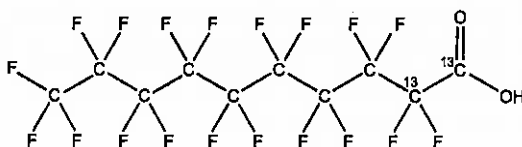
COMPOUND:

Perfluoro-n-[1,2-¹³C₂]decanoic acid

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

¹³C₂¹²C₈H₁₈O₂

MOLECULAR WEIGHT:

516.07

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99% ¹³C

LAST TESTED: (mm/dd/yyyy)

09/30/2016

(1,2-¹³C₂)

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. Chittim

Date: 10/07/2016

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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:

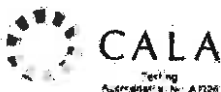
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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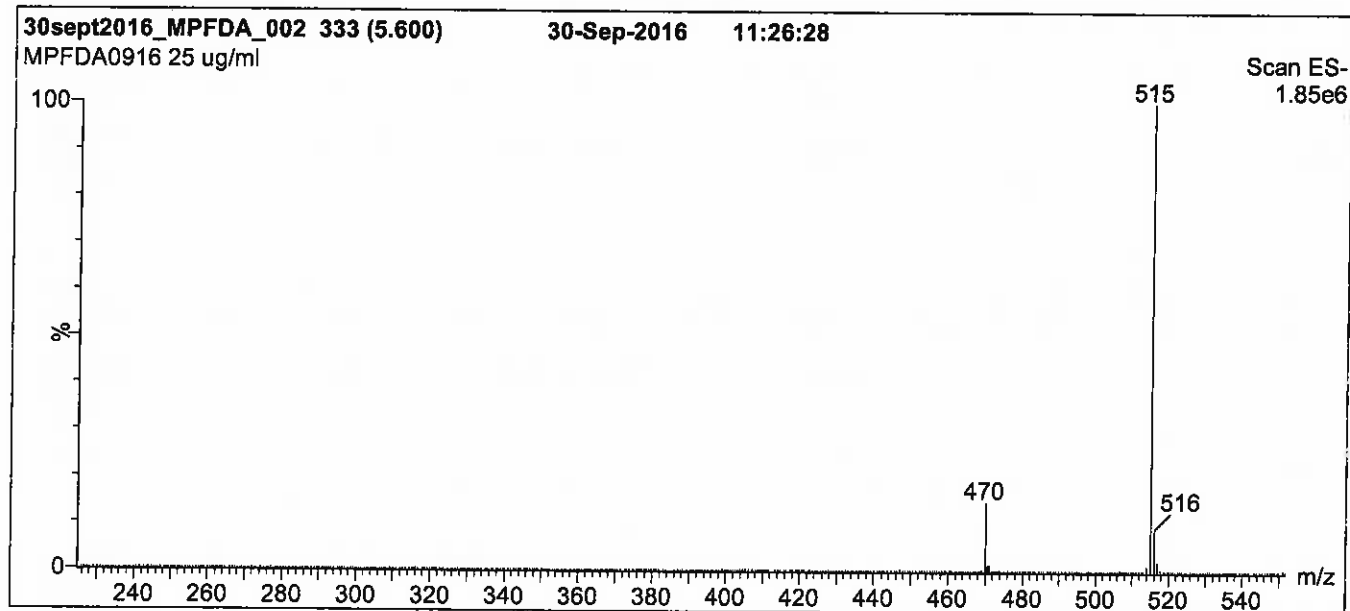
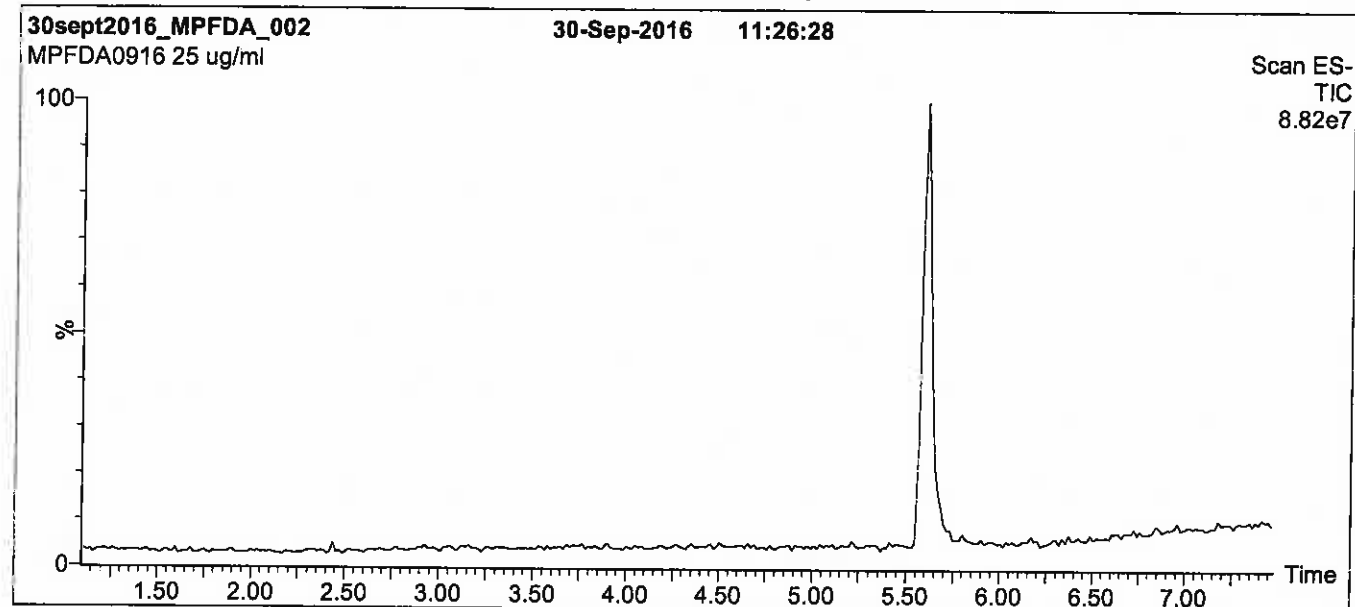
QUALITY MANAGEMENT:

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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

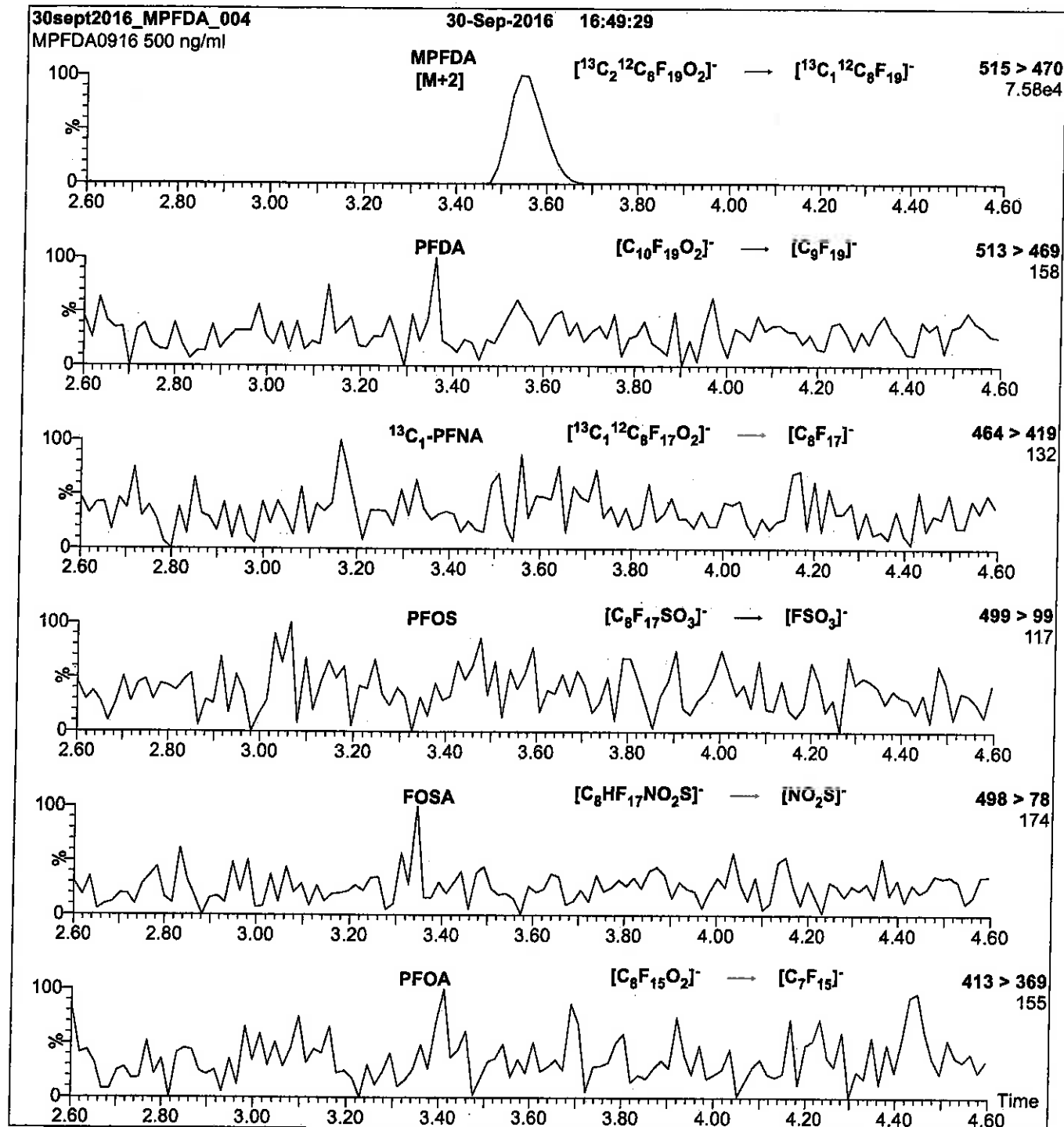
Flow: 300 μ l/min

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



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFHxA

LOT NUMBER:

MPFHxA1116

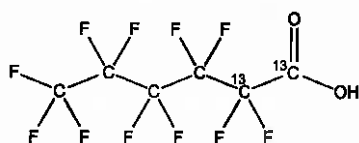
COMPOUND:

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

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

Water (<1%)

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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EXPIRY DATE / PERIOD OF VALIDITY:

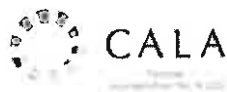
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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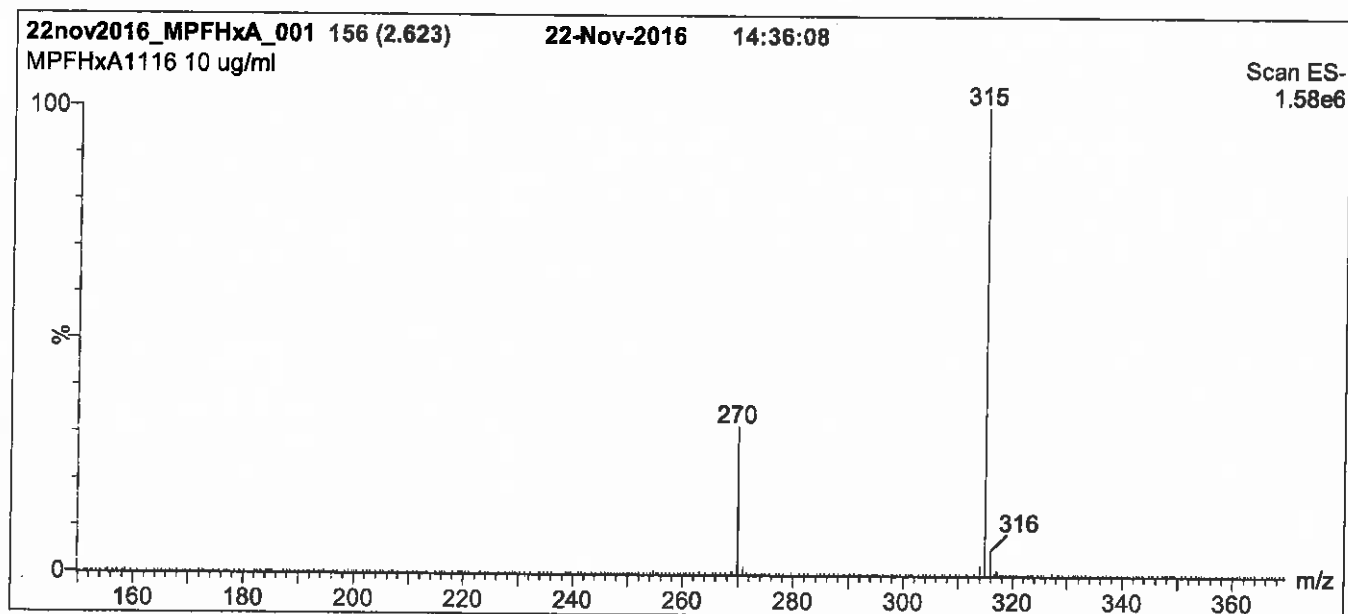
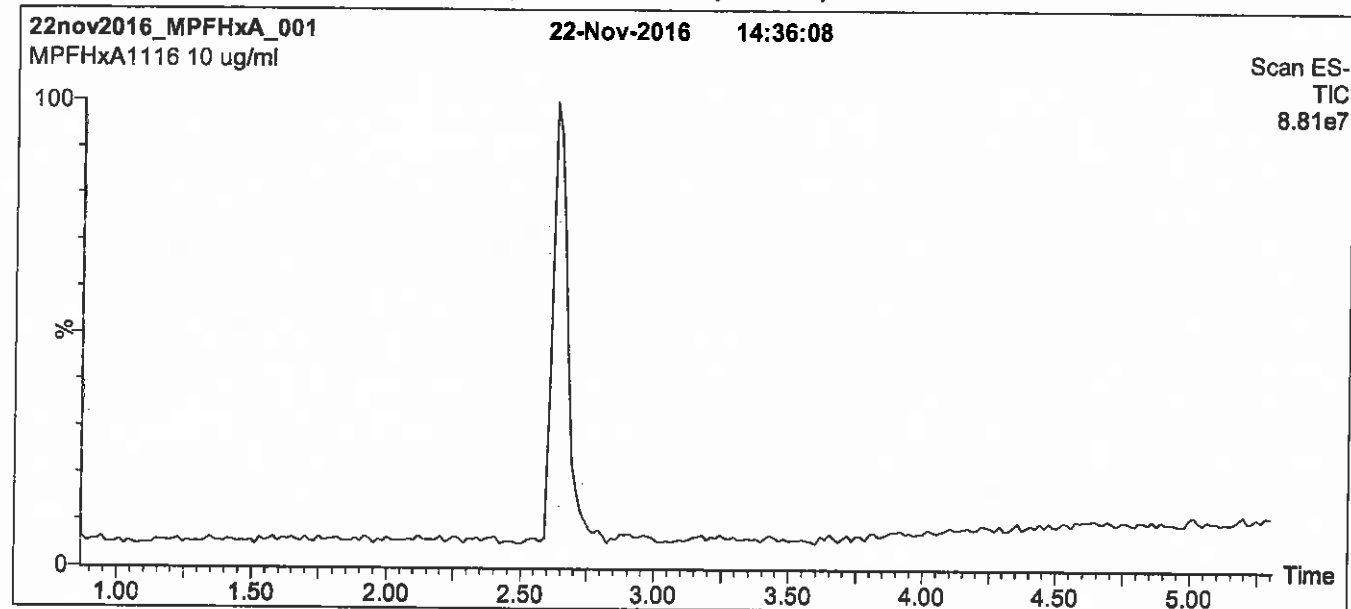
QUALITY MANAGEMENT:

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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 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 over 0.5 min.
Time: 10 min

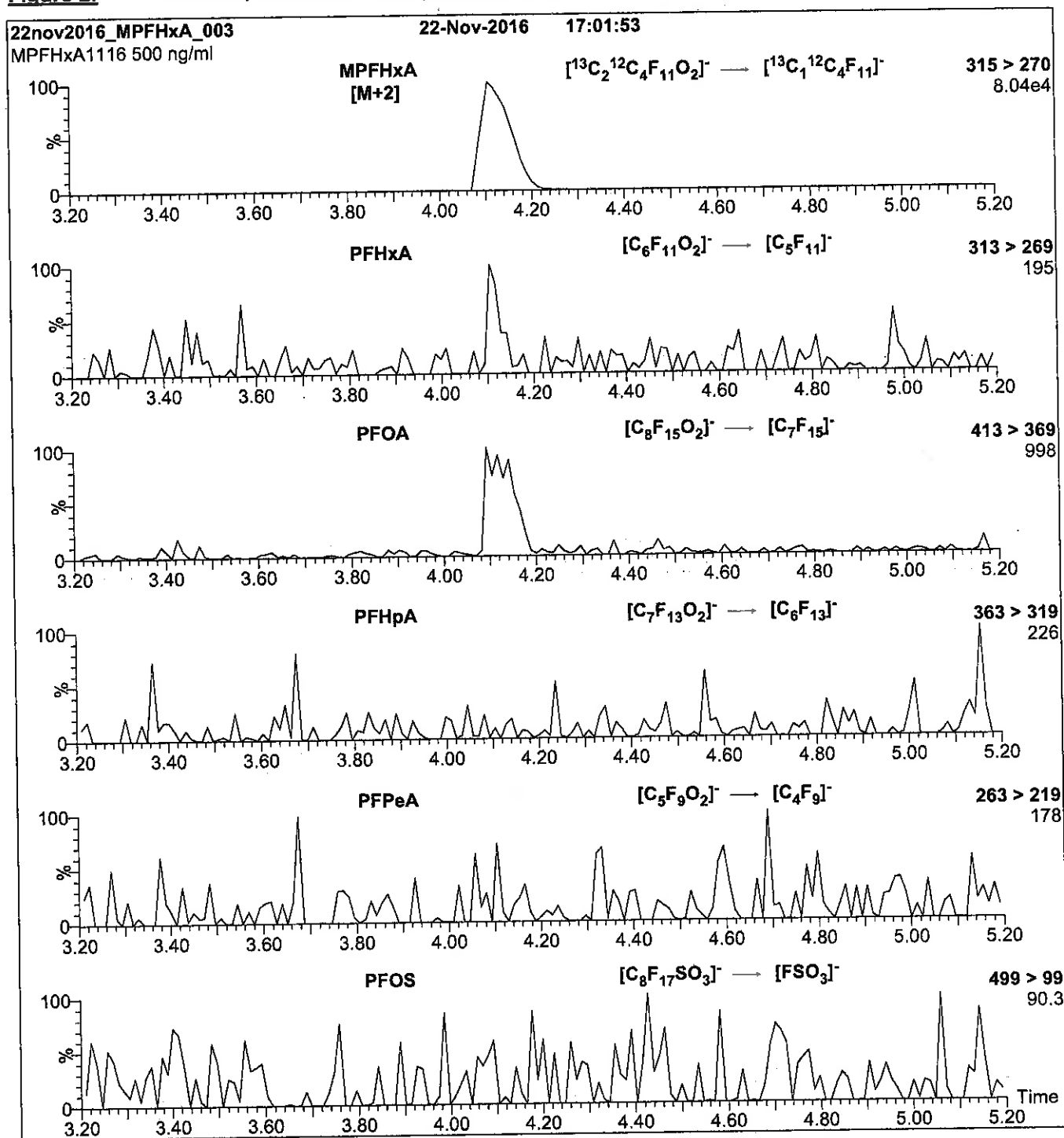
Flow: 300 μ l/min

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 μl (500 ng/ml MPFHxA)

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

Reagent

LCMPFOS_00024

r: 8/2/17 SKJ



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFOS

LOT NUMBER:

MPFOS0517

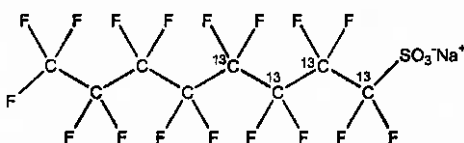
COMPOUND:

Sodium perfluoro-1-[1,2,3,4-¹³C₄]octanesulfonate

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

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)

05/19/2017

(1,2,3,4-¹³C₄)

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

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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:

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

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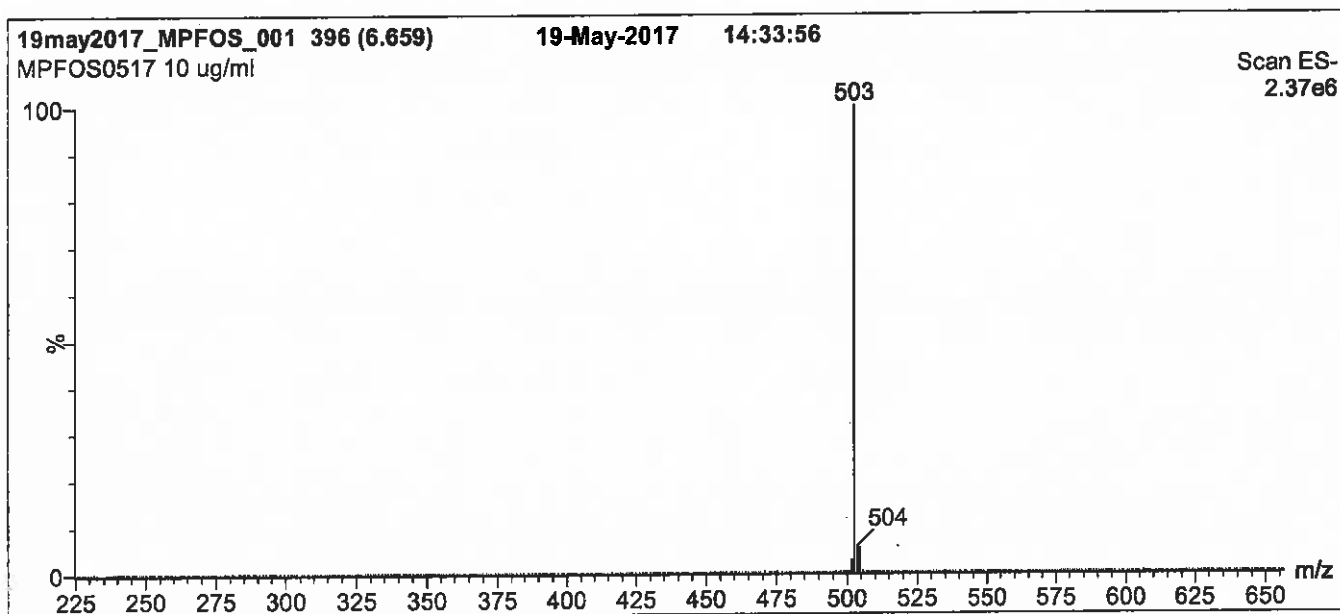
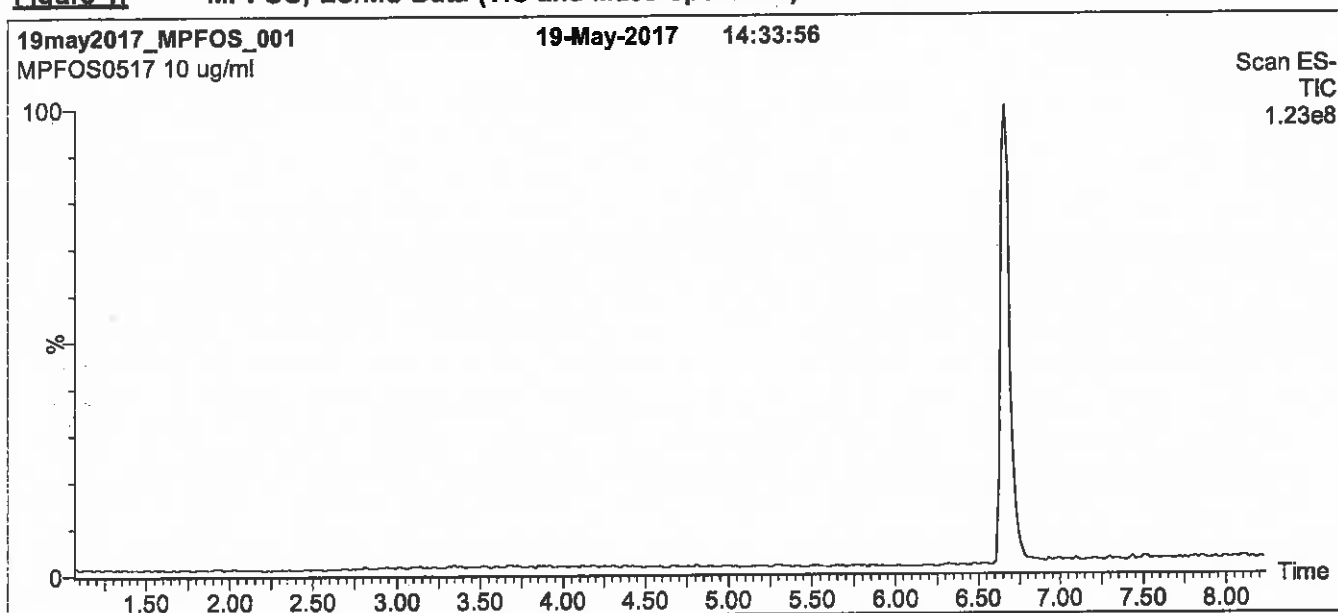
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Figure 1: MPFOS; LC/MS Data (TIC and Mass Spectrum)



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

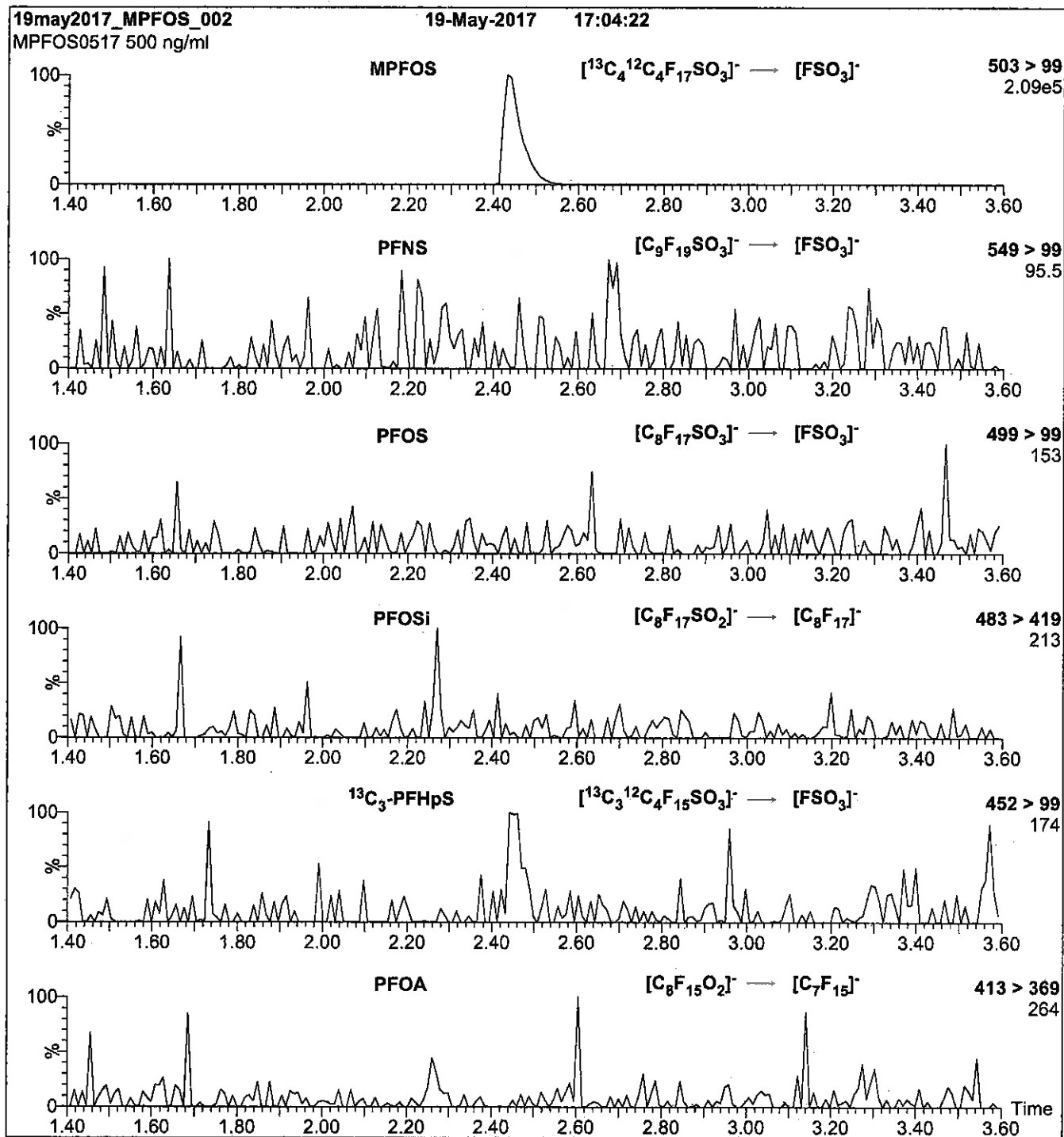
Flow: 300 μ l/min

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) = 60
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: 4/2/17 SKW



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

L-PFBS

LOT NUMBER:

LPFBS1116

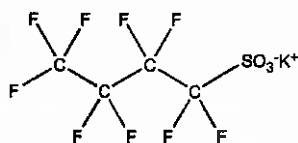
COMPOUND:

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:

B.G. Chittim

Date: 12/05/2016

(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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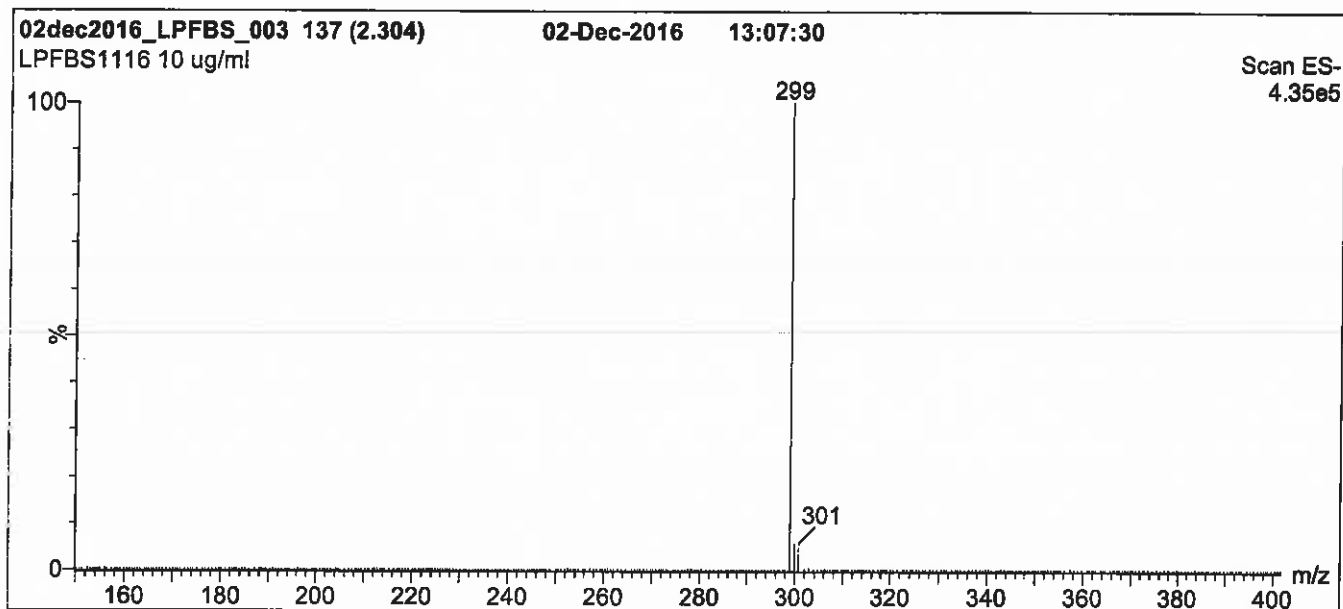
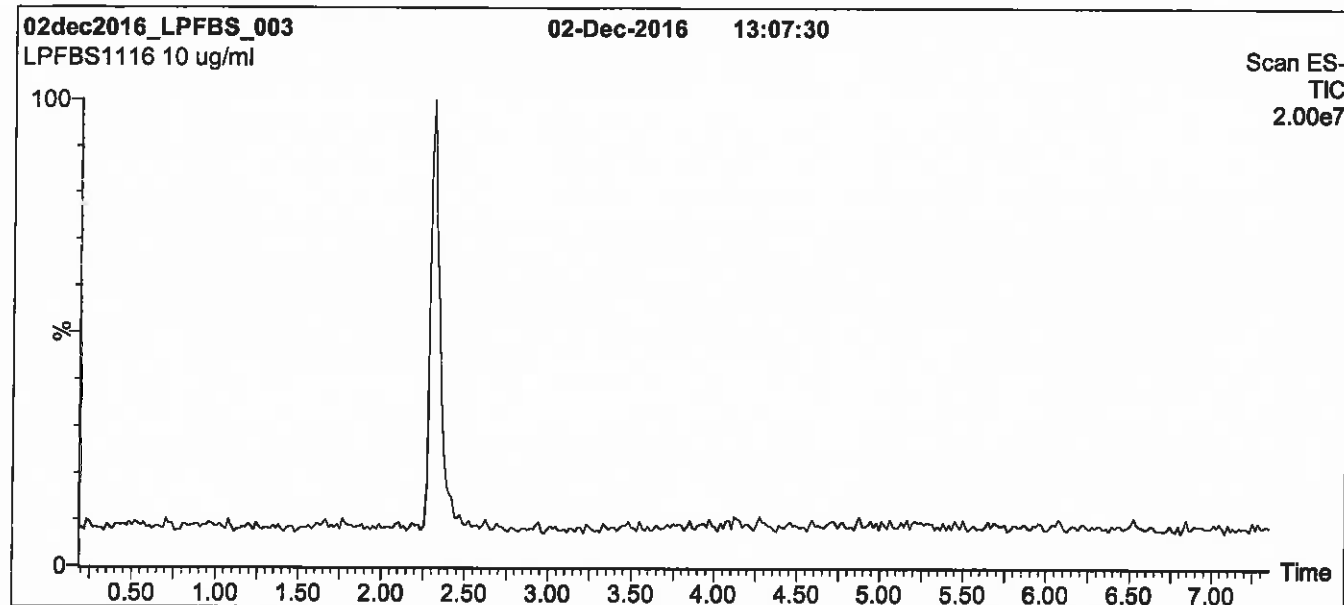
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MS: Micromass Quattro *micro* API MS

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1.7 μ m, 2.1 x 100 mm

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Start: 40% (80:20 MeOH:ACN) / 60% H₂O
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Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

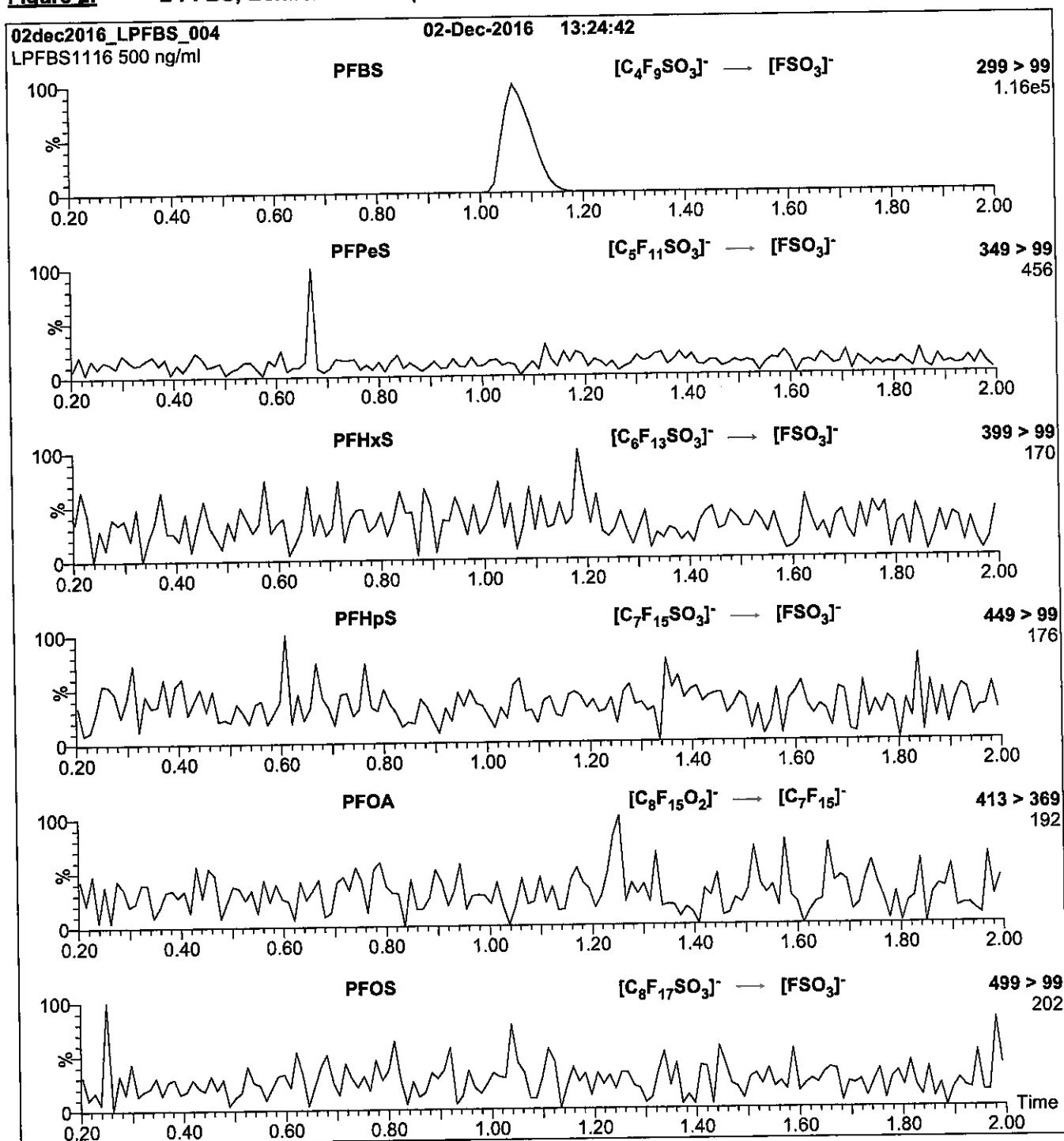
Flow: 300 μ l/min

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% H_2O
(both with 10 mM NH_4OAc 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

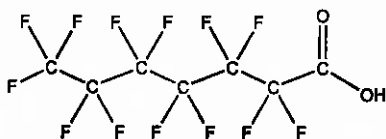
LOT NUMBER: PFHpA1216

COMPOUND:

Perfluoro-n-heptanoic acid

STRUCTURE:

CAS #: 375-85-9



MOLECULAR FORMULA:

$C_7H_{13}O_2$

MOLECULAR WEIGHT: 364.06

CONCENTRATION:

$50 \pm 2.5 \mu\text{g/ml}$

SOLVENT(S): Methanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

12/02/2016

EXPIRY DATE: (mm/dd/yyyy)

12/02/2021

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

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

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

INTENDED USE:

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

HAZARDS:

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

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:

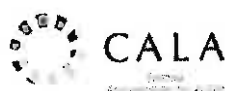
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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.

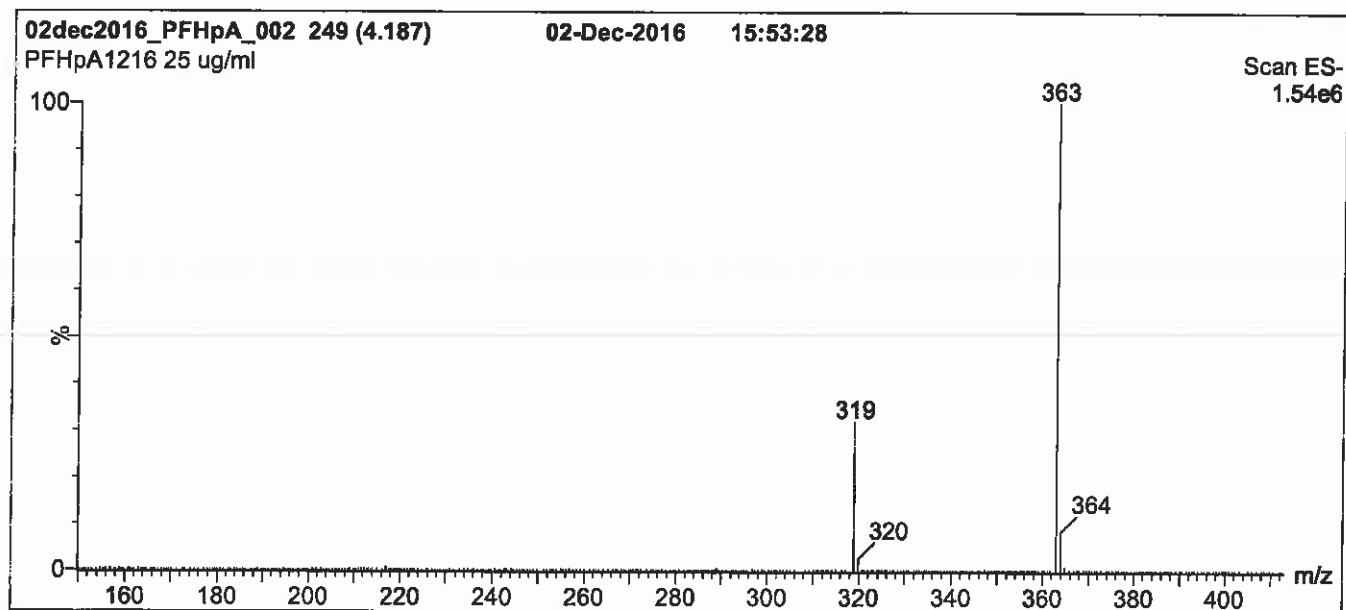
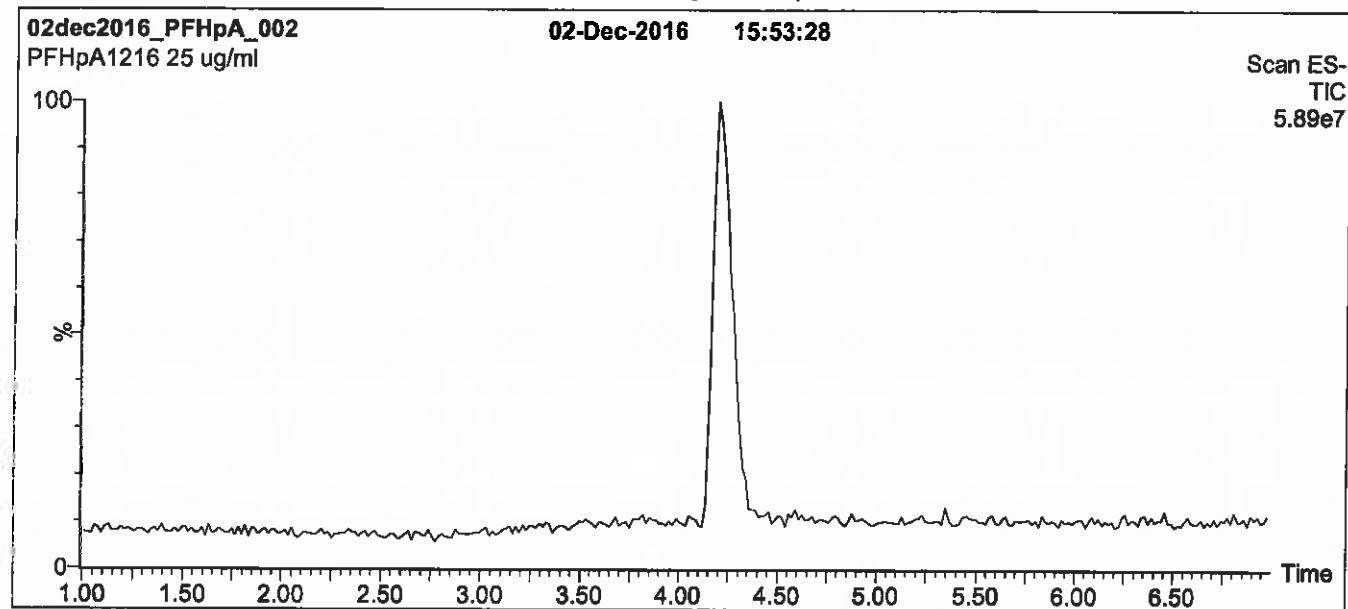
QUALITY MANAGEMENT:

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: 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

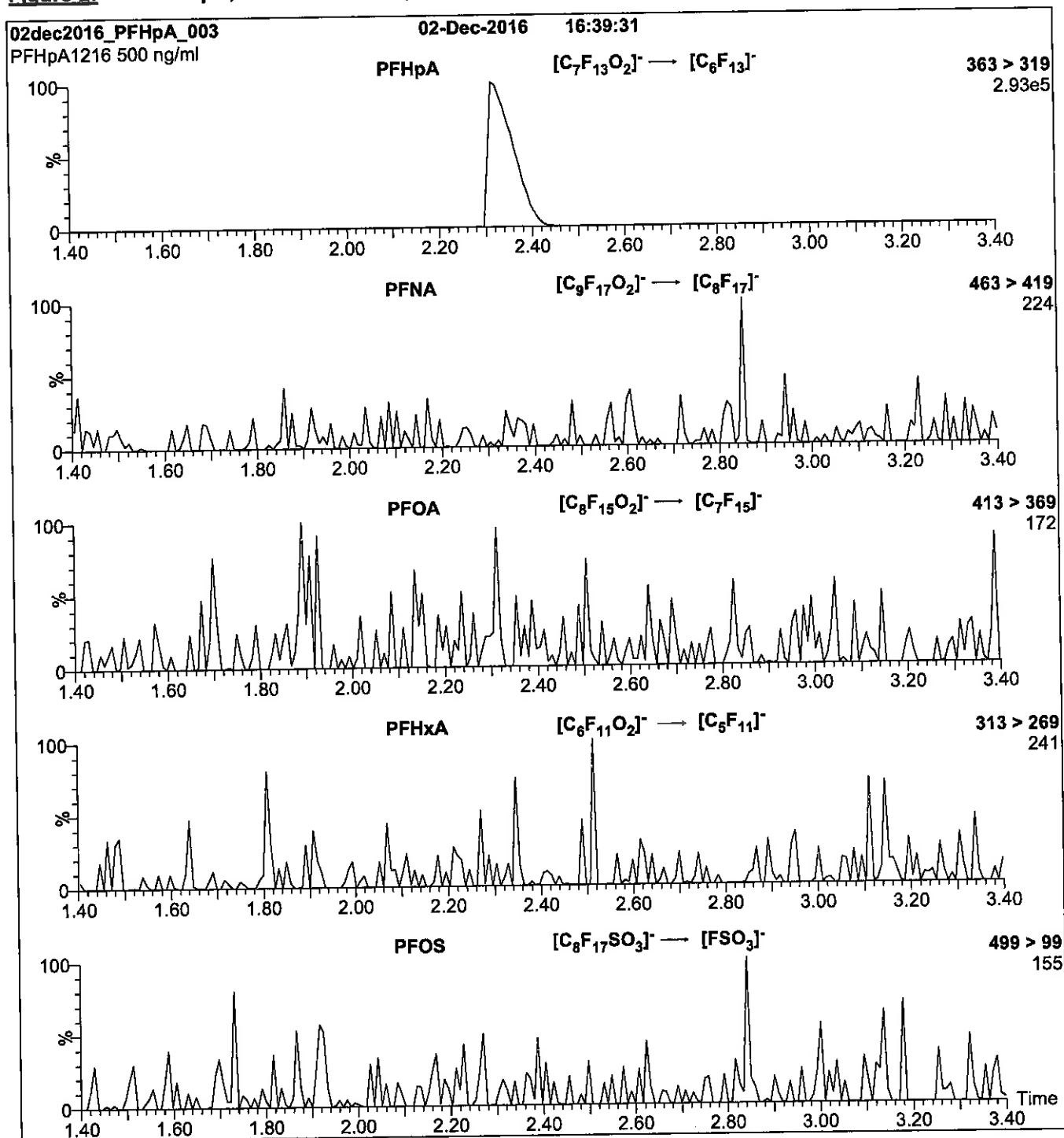
Flow: 300 μ l/min

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



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

br-PFHxSK

Potassium Perfluorohexanesulfonate Solution/Mixture of Linear and Branched Isomers

<u>PRODUCT CODE:</u>	br-PFHxSK
<u>LOT NUMBER:</u>	brPFHxSK0117
<u>CONCENTRATION:</u>	50.0 ± 2.5 µg/ml (total potassium salt) 45.5 ± 2.3 µg/ml (total PFHxS anion)
<u>SOLVENT(S):</u>	Methanol
<u>DATE PREPARED:</u> (mm/dd/yyyy)	01/03/2017
<u>LAST TESTED:</u> (mm/dd/yyyy)	01/04/2017
<u>EXPIRY DATE:</u> (mm/dd/yyyy)	01/04/2022
<u>RECOMMENDED STORAGE:</u>	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).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

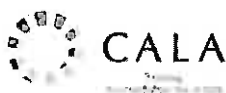
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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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**	CF ₃ CF ₂ CF ₂ CF ₂ CF(SO ₃ ⁻ K ⁺)CF ₃	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	CF ₃ CF ₂ CF ₂ CF(CF ₃)CF ₂ SO ₃ ⁻ K ⁺	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	CF ₃ CF ₂ CF(CF ₃)CF ₂ CF ₂ SO ₃ ⁻ K ⁺	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	CF ₃ CF(CF ₃)CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	CF ₃ CF(CF ₃)CF(CF ₃)CF ₂ SO ₃ ⁻ K ⁺	0.2
7	Other Unidentified Isomers		0.5

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

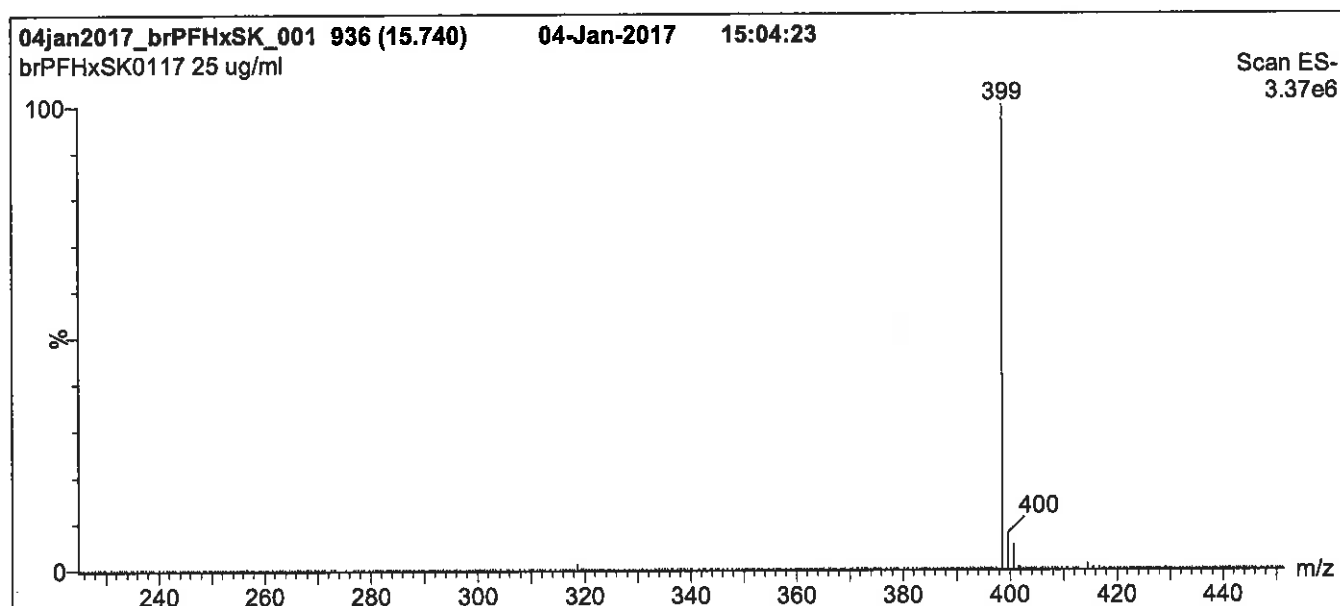
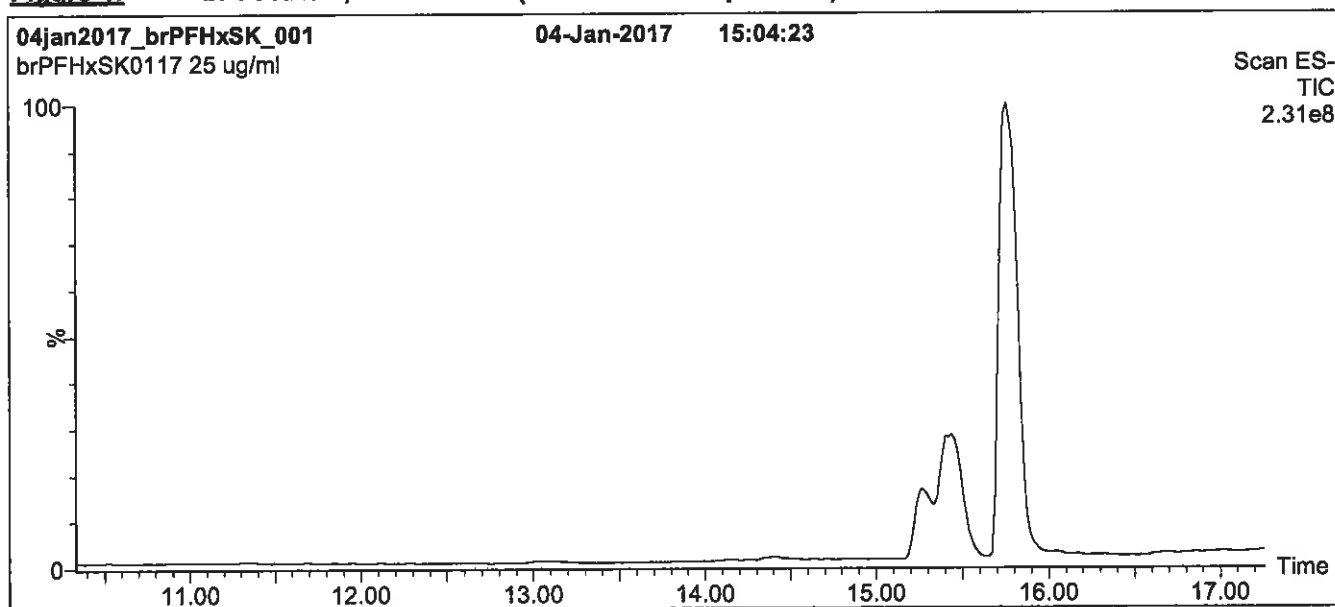
Certified By:


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

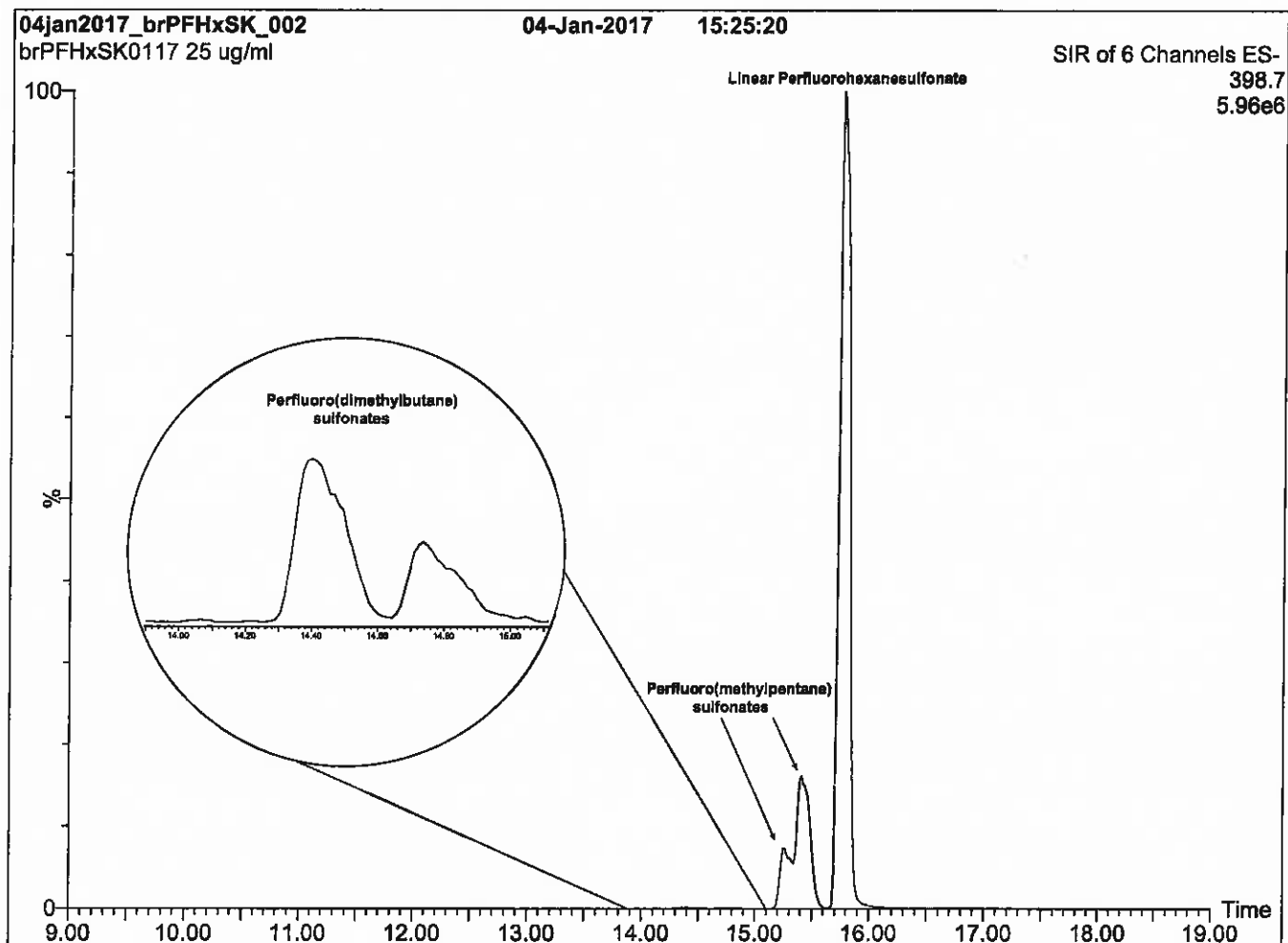
Flow: 300 μ l/min

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 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

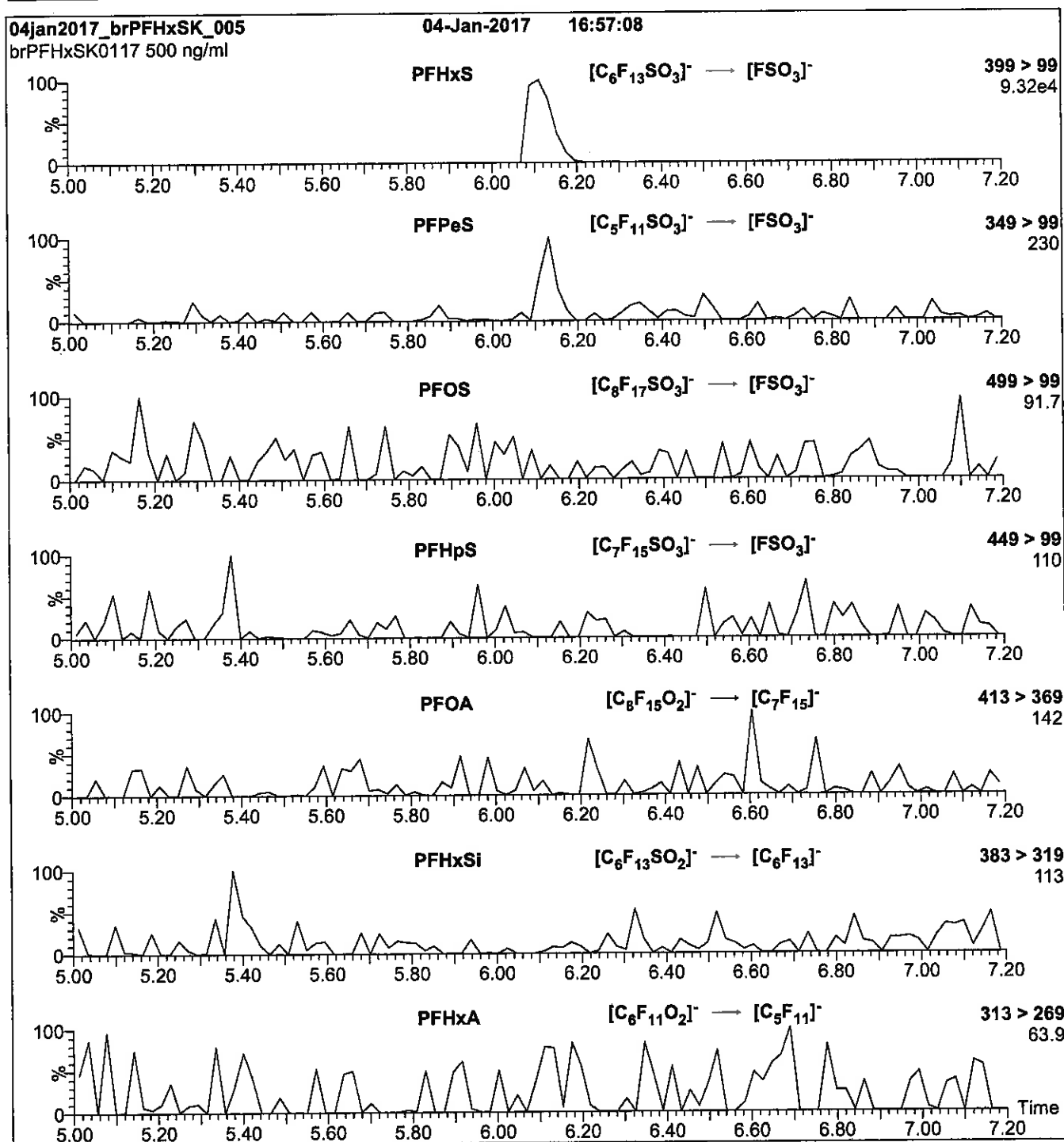
Flow: 300 μ l/min

MS Parameters

Experiment: 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: 9/21/17 skv



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

PFNA

LOT NUMBER:

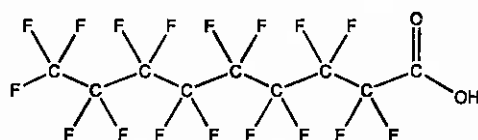
PFNA0717

COMPOUND:

Perfluoro-n-nonanoic acid

STRUCTURE:**CAS #:**

375-95-1

**MOLECULAR FORMULA:** $C_9H_{17}O_2$ **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

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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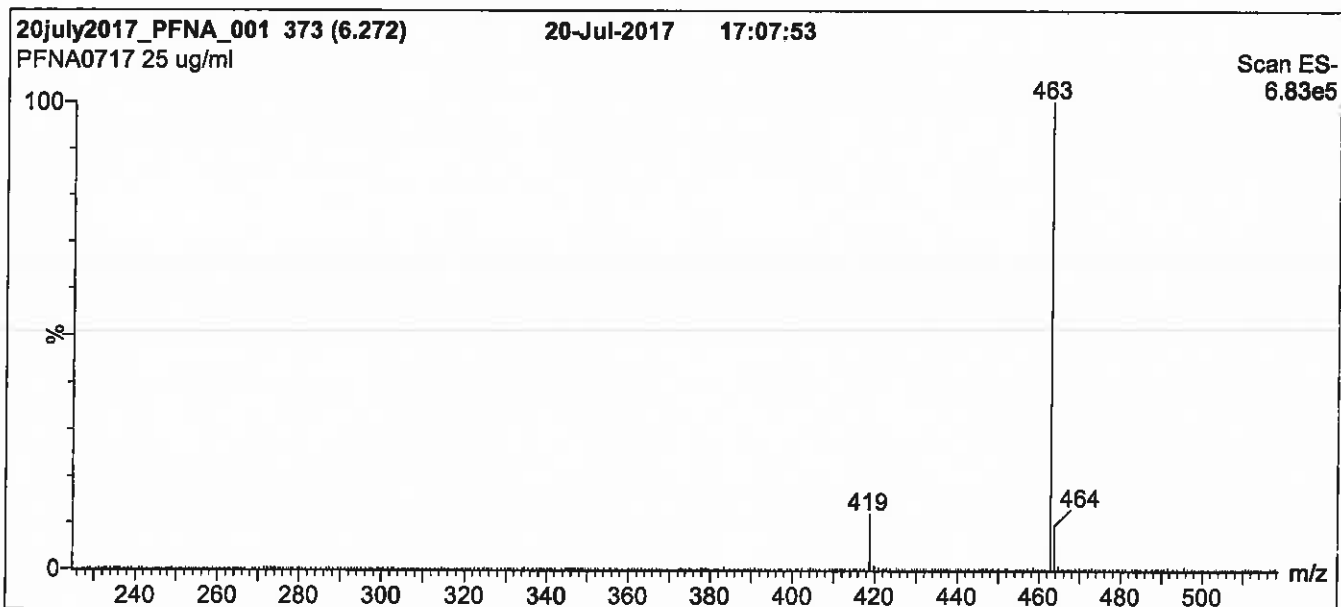
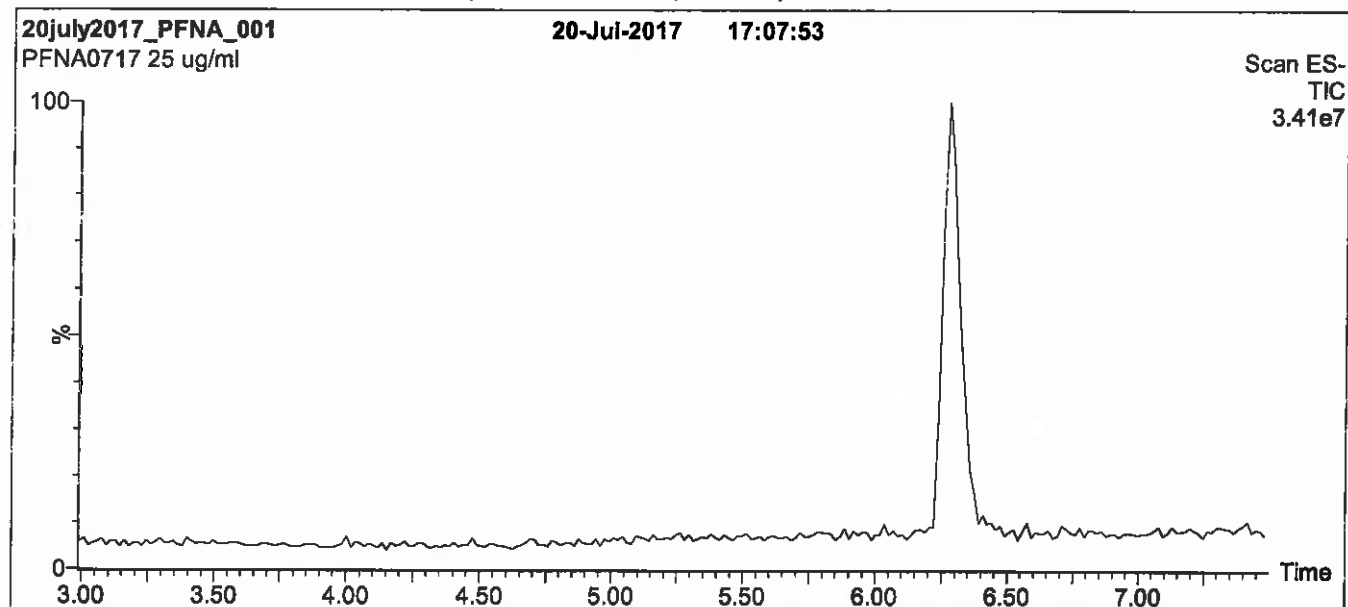
QUALITY MANAGEMENT:

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: 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)

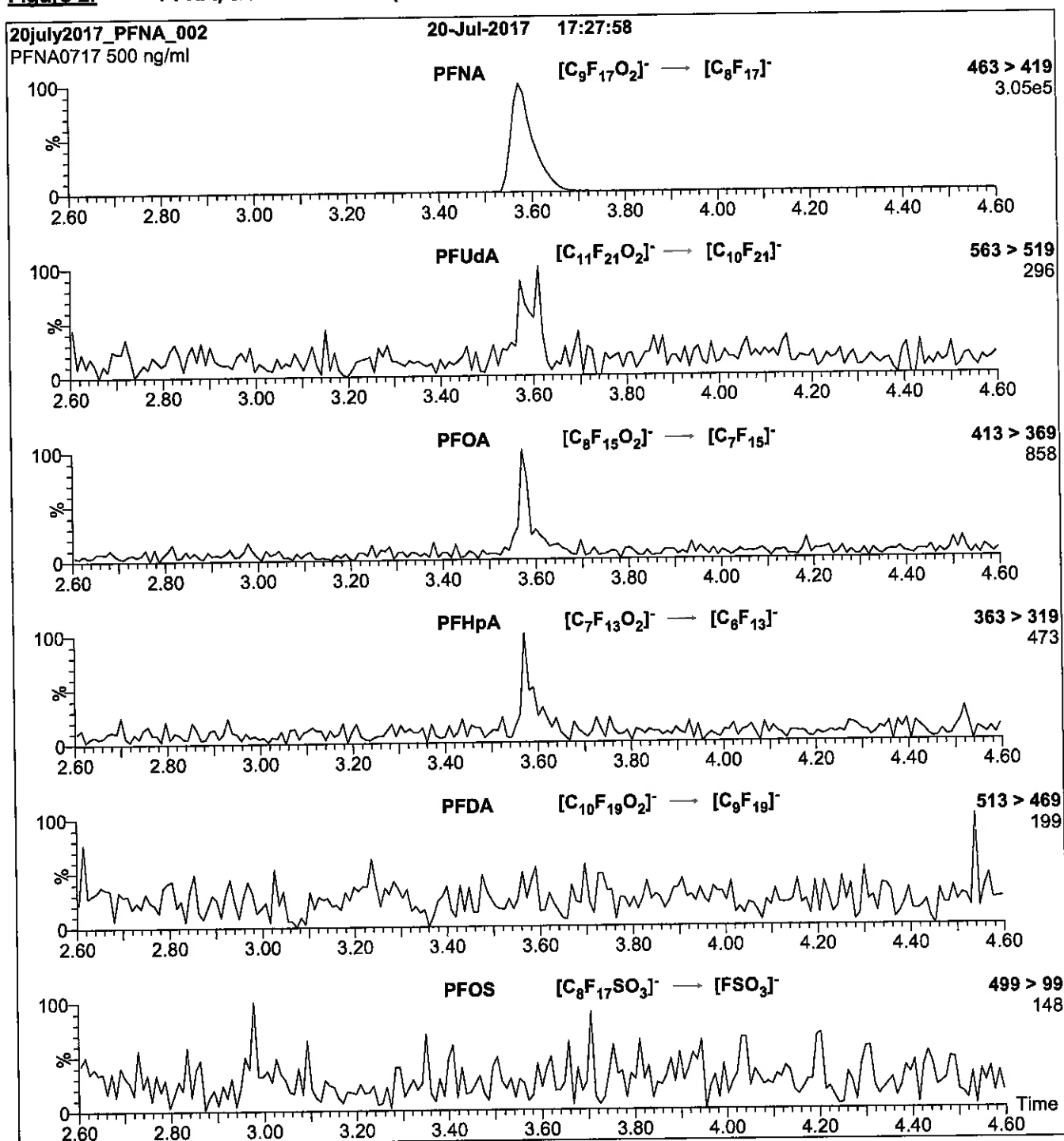
Capillary Voltage (kV) = 2.00

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

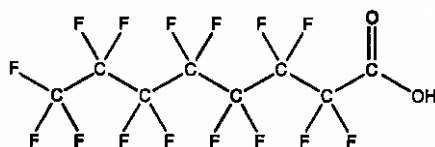
LOT NUMBER: PFOA0917

COMPOUND:

Perfluoro-n-octanoic acid

STRUCTURE:

CAS #: 335-67-1



MOLECULAR FORMULA:

$C_8H_{15}O_2$

MOLECULAR WEIGHT: 414.07

CONCENTRATION:

$50 \pm 2.5 \mu\text{g/ml}$

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

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:

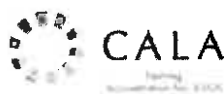
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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.

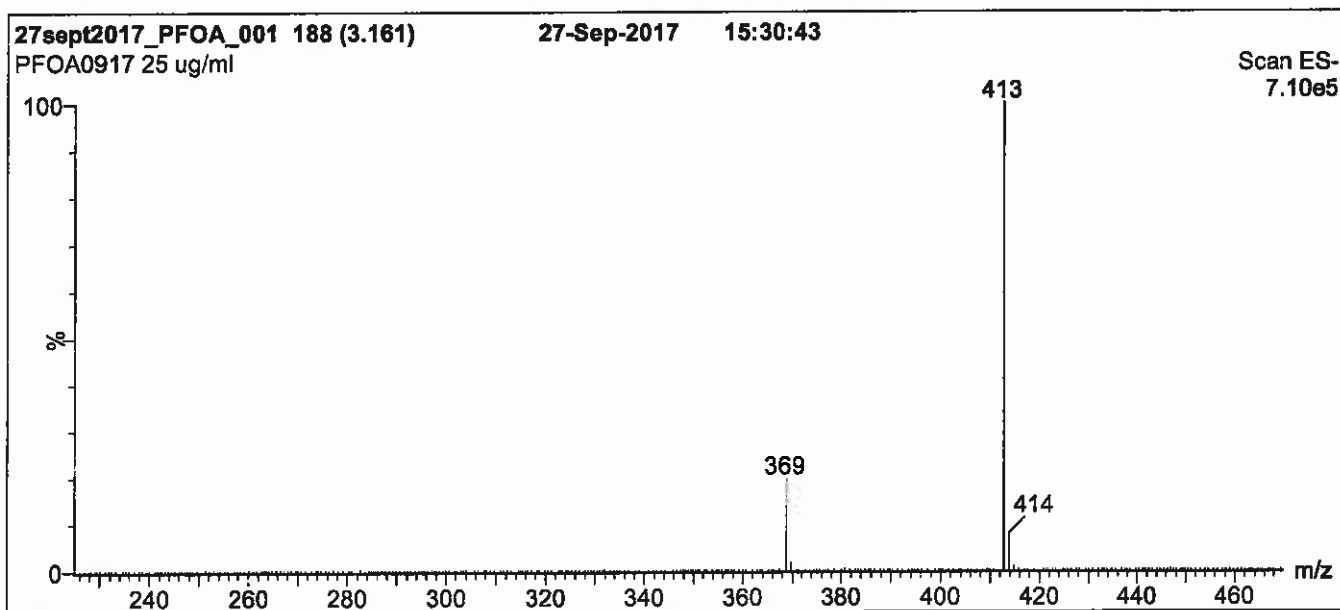
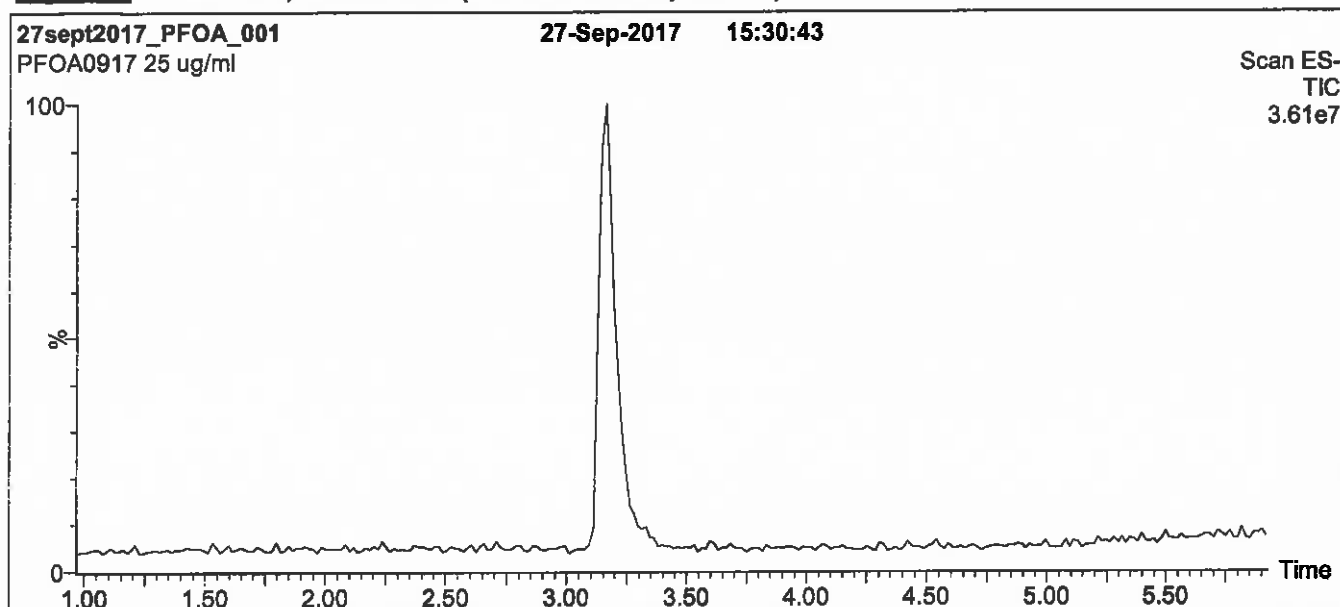
QUALITY MANAGEMENT:

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: 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

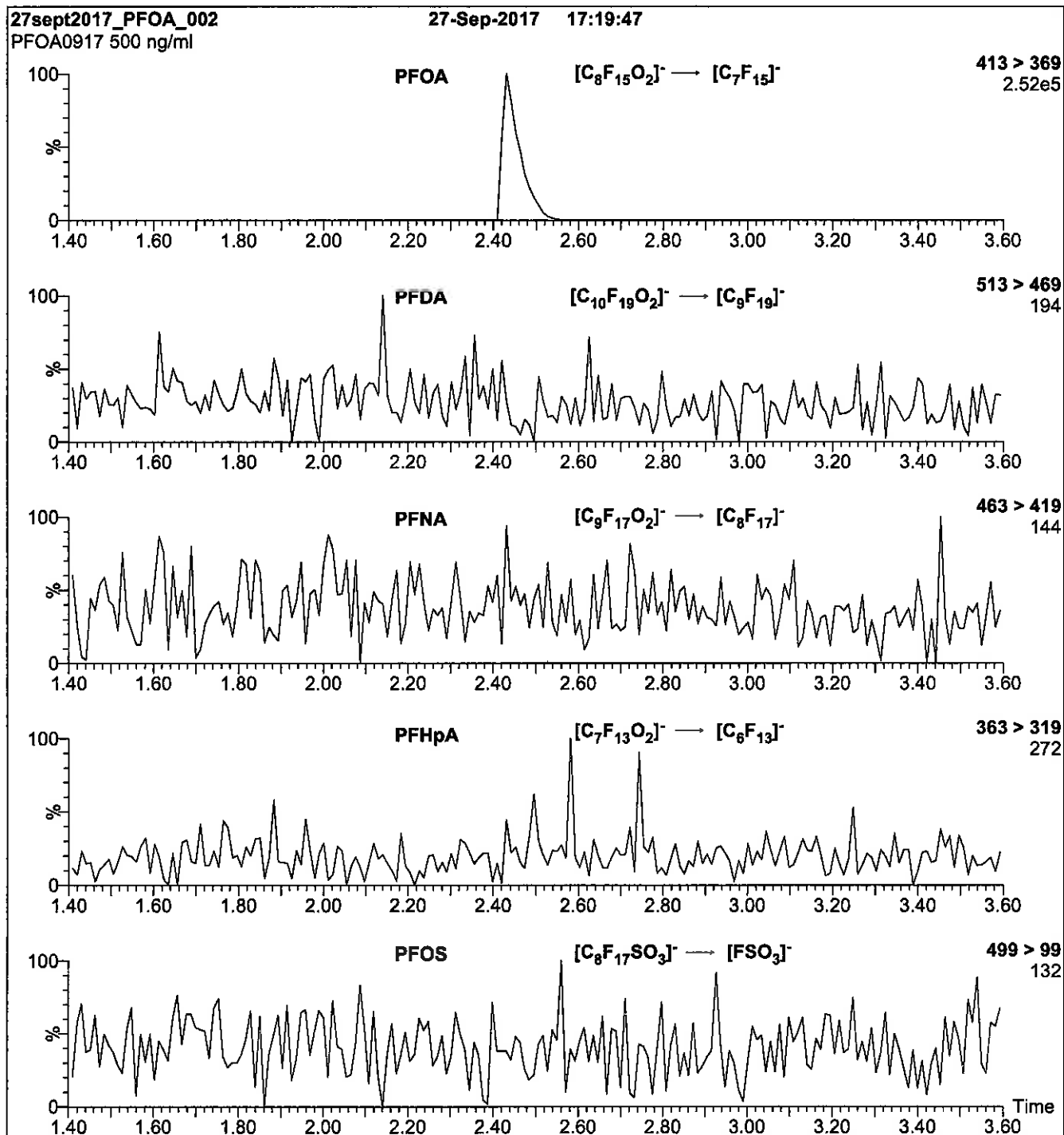
Flow: 300 μ l/min

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:

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EXPIRY DATE / PERIOD OF VALIDITY:

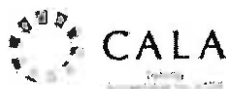
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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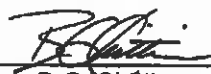
Table A: br-PFOSK; Isomeric Components and Percent Composition (by ¹⁹F-NMR)*

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 SO ₃ ⁻ K ⁺	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF ₂ CF ₃ SO ₃ ⁻ K ⁺	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF ₂ CF(CF ₃)SO ₃ ⁻ K ⁺	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	CF ₃ CF ₂ CF ₂ CF ₂ CF(CF ₃)CF ₂ SO ₃ ⁻ K ⁺	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	CF ₃ CF ₂ CF ₂ CF(CF ₃)CF ₂ CF ₂ SO ₃ ⁻ K ⁺	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	CF ₃ CF ₂ CF(CF ₃)CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	CF ₃ CF(CF ₃)CF ₂ CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	CF ₃ CF(CF ₃)CF ₂ CF ₂ CF ₂ SO ₃ ⁻ K ⁺	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	CF ₃ CF ₂ CF(CF ₃)CF ₂ CF ₂ SO ₃ ⁻ K ⁺	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	CF ₃ CF(CF ₃)CF(CF ₃)CF ₂ CF ₂ SO ₃ ⁻ K ⁺	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	CF ₃ CF(CF ₃)CF ₂ CF(CF ₃)CF ₂ SO ₃ ⁻ K ⁺	0.07

* Percent of total perfluorooctanesulfonate isomers only. Isomers are labelled in Figure 2.

** Systematic Name: Potassium perfluorooctane-2-sulfonate.

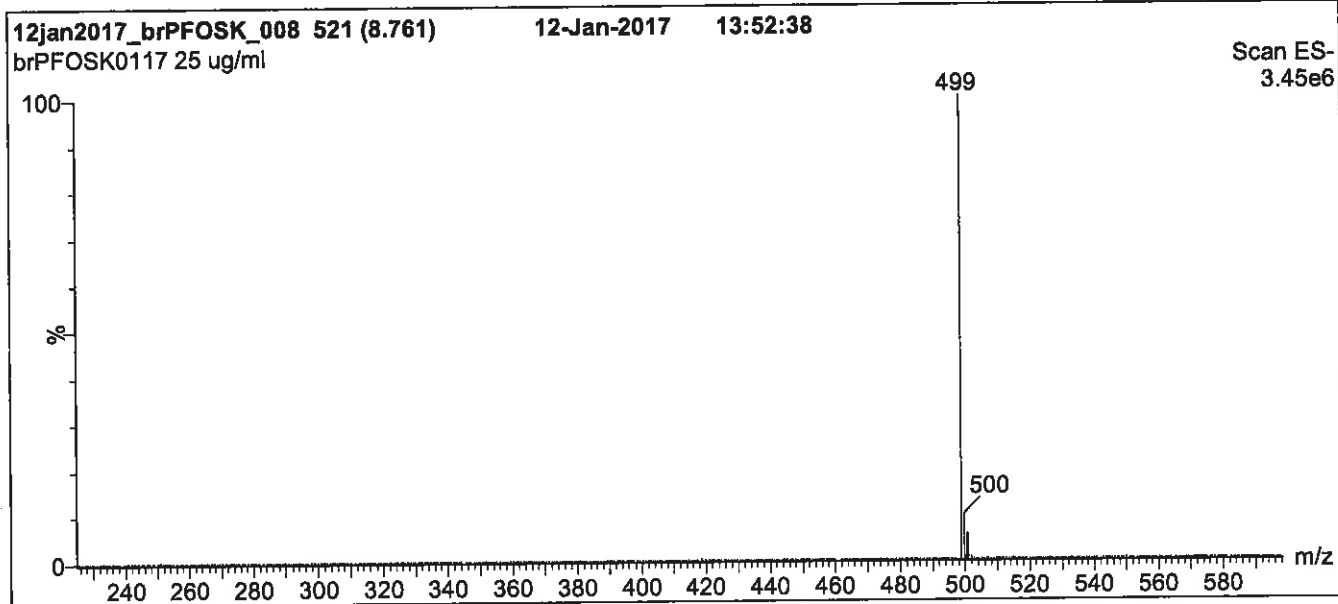
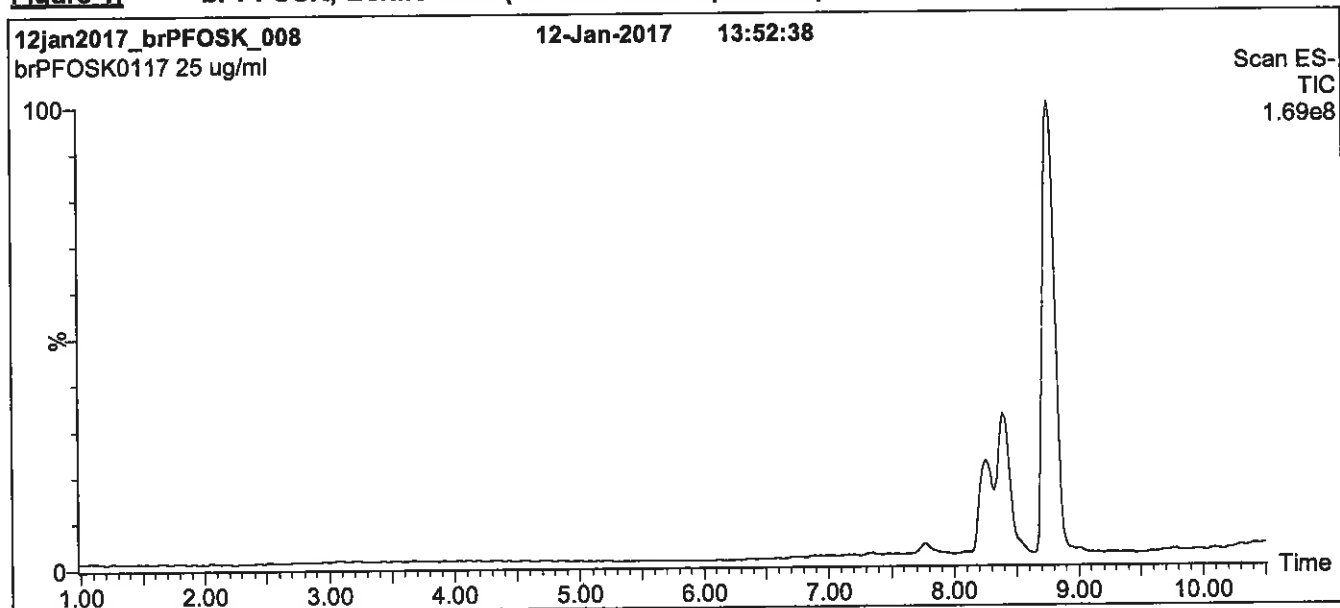
Certified By:


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

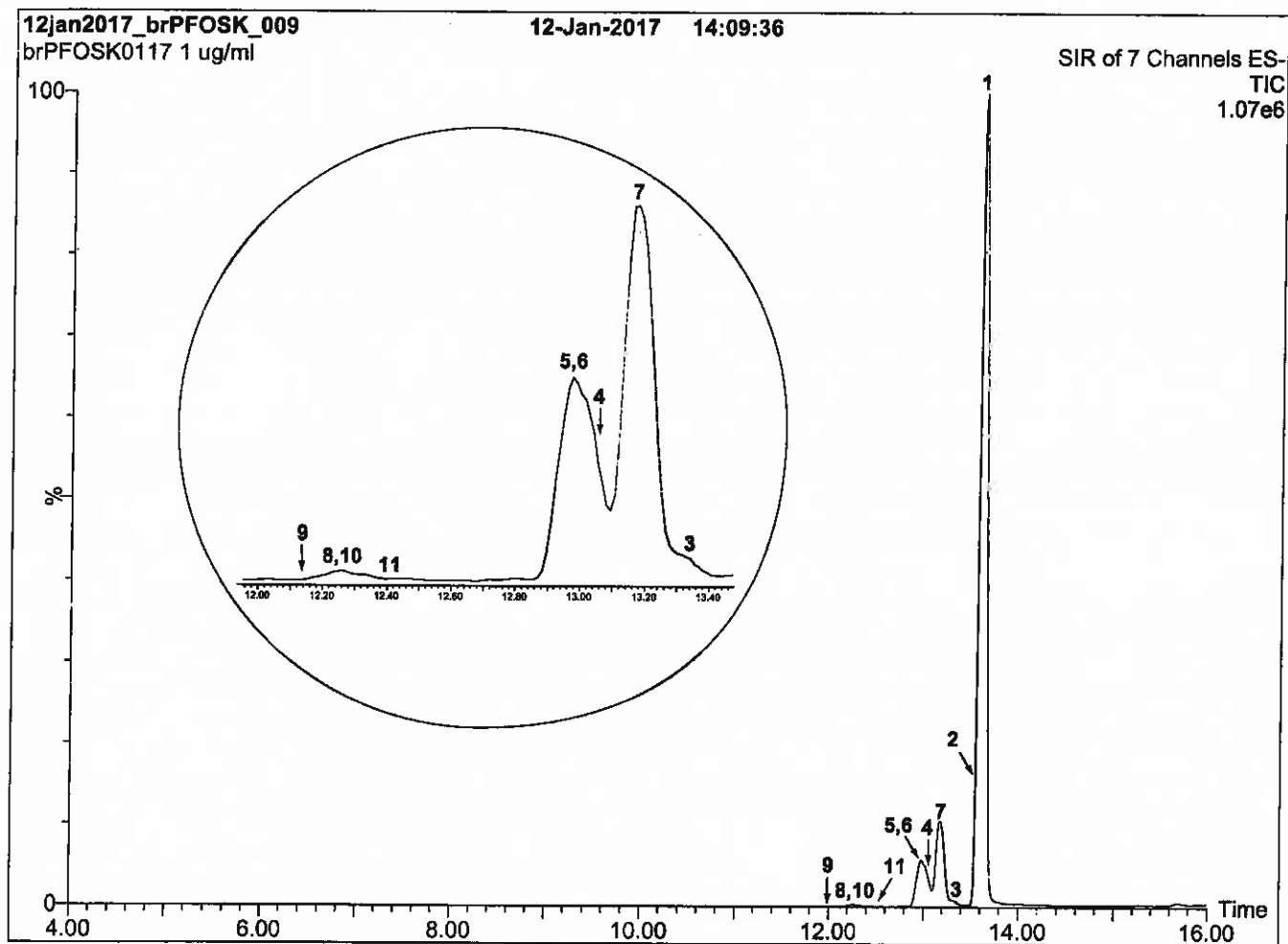
Flow: 300 μ l/min

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

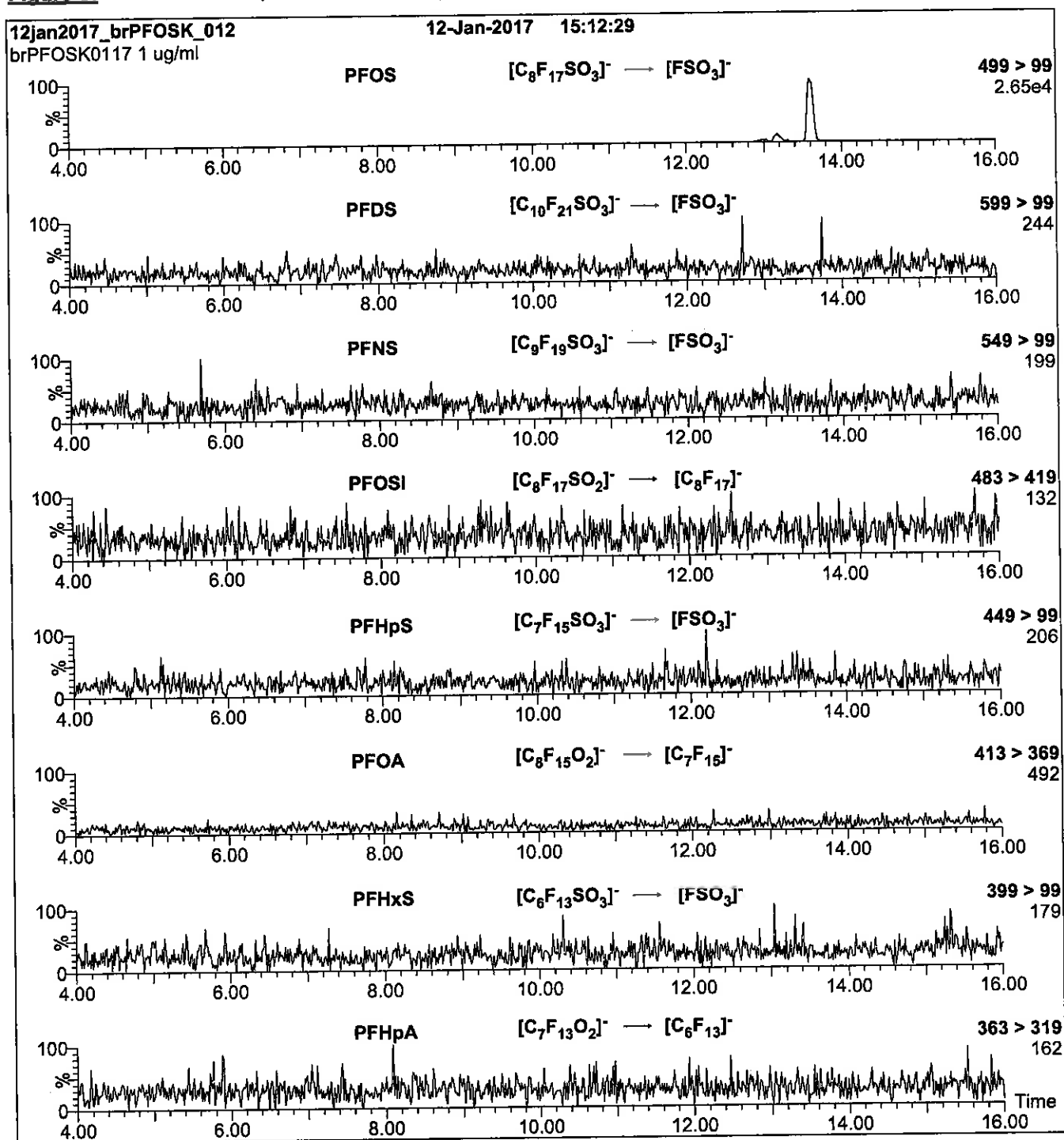
Chromatographic Conditions:

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.: 320-41028-1

SDG No.: _____

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
WGNA-071018-RW-314 2	320-41028-1	74	85
WGNA-071018-FRB-31 42	320-41028-2	85	84
	MB 320-234028/1-A	78	87
	LCS 320-234028/2-A	86	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.: 320-41028-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 2018.07.24_537A_027.d
 Lab ID: LCS 320-234028/2-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	220	214	97	70-130	M
Perfluorooctanoic acid (PFOA)	110	102	93	70-130	
Perfluorononanoic acid (PFNA)	110	104	94	70-130	
Perfluorohexanesulfonic acid (PFHxS)	168	155	92	70-130	
Perfluoroheptanoic acid (PFHpA)	54.0	47.7	88	70-130	
Perfluorobutanesulfonic acid (PFBS)	500	384	77	70-130	

Column to be used to flag recovery and RPD values

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
SDG No.: _____
Lab File ID: 2018.07.25_537A_007.d Lab Sample ID: MB 320-234028/1-A
Matrix: Water Date Extracted: 07/14/2018 08:08
Instrument ID: A8_N Date Analyzed: 07/25/2018 15:36
Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-234028/2-A	2018.07.24_537A_027.d	07/24/2018 10:10
WGNA-071018-RW-3142	320-41028-1	2018.07.25_537A_013.d	07/25/2018 16:04
WGNA-071018-FRB-3142	320-41028-2	2018.07.25_537A_014.d	07/25/2018 16:09

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Instrument ID: A8_N Calibration Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 07/21/2018 12:45
 Calibration ID: 40229

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1182254	1.80	2951502	2.06		
UPPER LIMIT		1773381	2.30	4427253	2.56		
LOWER LIMIT		591127	1.30	1475751	1.56		
LAB SAMPLE ID	CLIENT SAMPLE ID						
CCVL 320-235370/11		1220813	1.80	2998753	2.05		
ICV 320-235370/13		1160905	1.81	2863082	2.06		
CCVL 320-235918/2		1293103	1.77	3041132	2.01		
CCV 320-235922/22 CCVIS		1099648	1.77	2754805	2.01		
LCS 320-234028/2-A		1493913	1.77	3780803	2.01		
CCV 320-235922/34 CCVIS		1129599	1.76	2724199	2.00		
CCVL 320-236171/2		1330079	1.79	3161499	2.04		
CCV 320-236171/3 CCVIS		1238255	1.79	2908789	2.04		
MB 320-234028/1-A		1611038	1.78	3986531	2.03		
320-41028-1	WGNA-071018-RW-3142	1554295	1.78	3865534	2.03		
320-41028-2	WGNA-071018-FRB-3142	1553792	1.78	3932583	2.02		
CCV 320-236171/14 CCVIS		1230742	1.78	2984072	2.03		

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

Area Limit = 50%-150% of internal standard area
 RT Limit = $\pm$ 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.: 320-41028-1
 SDG No.: _____
 Sample No.: CCV 320-235922/22 Date Analyzed: 07/24/2018 09:56
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2018.07.24_537A_024 Heated Purge: (Y/N) N
 Calibration ID: 40229

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	1099648	1.77	2754805	2.01		
UPPER LIMIT	1539507	2.27	3856727	2.51		
LOWER LIMIT	769754	1.27	1928364	1.51		
LAB SAMPLE ID	CLIENT SAMPLE ID					
LCS 320-234028/2-A		1493913	1.77	3780803	2.01	

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

Area Limit = 70%-140% of internal standard area
 RT Limit = $\pm$ 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.: 320-41028-1
 SDG No.: _____
 Sample No.: CCV 320-235922/34 Date Analyzed: 07/24/2018 10:52
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2018.07.24_537A_036 Heated Purge: (Y/N) N
 Calibration ID: 40229

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	1129599	1.76	2724199	2.00		
UPPER LIMIT	1581439	2.26	3813879	2.50		
LOWER LIMIT	790719	1.26	1906939	1.50		
LAB SAMPLE ID	CLIENT SAMPLE ID					
LCS 320-234028/2-A		1493913	1.77	3780803	2.01	

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

Area Limit = 70%-140% of internal standard area
 RT Limit = $\pm$ 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.: 320-41028-1
 SDG No.: _____
 Sample No.: CCV 320-236171/3 Date Analyzed: 07/25/2018 15:22
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2018.07.25_537A_004 Heated Purge: (Y/N) N
 Calibration ID: 40229

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	1238255	1.79	2908789	2.04		
UPPER LIMIT	1733557	2.29	4072305	2.54		
LOWER LIMIT	866779	1.29	2036152	1.54		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-234028/1-A		1611038	1.78	3986531	2.03	
320-41028-1	WGNA-071018-RW-3142	1554295	1.78	3865534	2.03	
320-41028-2	WGNA-071018-FRB-3142	1553792	1.78	3932583	2.02	

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

Area Limit = 70%-140% of internal standard area
 RT Limit = $\pm$ 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.: 320-41028-1
 SDG No.: _____
 Sample No.: CCV 320-236171/14 Date Analyzed: 07/25/2018 16:14
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2018.07.25_537A_015 Heated Purge: (Y/N) N
 Calibration ID: 40229

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	1230742	1.78	2984072	2.03		
UPPER LIMIT	1723039	2.28	4177701	2.53		
LOWER LIMIT	861519	1.28	2088850	1.53		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-234028/1-A		1611038	1.78	3986531	2.03	
320-41028-1	WGNA-071018-RW-3142	1554295	1.78	3865534	2.03	
320-41028-2	WGNA-071018-FRB-3142	1553792	1.78	3932583	2.02	

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

Area Limit = 70%-140% of internal standard area
 RT Limit = $\pm$ 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.: 320-41028-1
 SDG No.: _____
 Client Sample ID: WGNA-071018-RW-3142 Lab Sample ID: 320-41028-1
 Matrix: Water Lab File ID: 2018.07.25_537A_013.d
 Analysis Method: 537 Date Collected: 07/10/2018 15:10
 Extraction Method: 537 Date Extracted: 07/14/2018 08:08
 Sample wt/vol: 267.2 (mL) Date Analyzed: 07/25/2018 16:04
 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.: 236171 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	17	J M	37	15	6.4
335-67-1	Perfluorooctanoic acid (PFOA)	12	J	19	7.5	2.6
375-95-1	Perfluorononanoic acid (PFNA)	19	U	22	19	7.5
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	7.2	J	28	11	5.1
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.0	J	9.4	3.7	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	34	U	84	34	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	74		70-130
STL00996	13C2 PFDA	85		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_013.d
 Lims ID: 320-41028-A-1-A
 Client ID: WGNA-071018-RW-3142
 Sample Type: Client
 Inject. Date: 25-Jul-2018 16:04:51 ALS Bottle#: 8 Worklist Smp#: 12
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-41028-a-1-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 26-Jul-2018 11:35:14 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d
 Column 1 : Det: EXP1
 Process Host: XAWRK022

First Level Reviewer: barnettj

Date: 26-Jul-2018 10:49:06

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.358	1.358	0.0	1.000	160718	1.01		194	
298.90 > 99.00	1.350	1.358	-0.008	0.994	106927		1.50(0.00-0.00)	193	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.472	1.479	-0.007	1.000	1233530	7.37		14355	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.608	1.616	-0.008	1.000	442549	1.92		201	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.608	1.616	-0.008	1.000	130035	0.7933		16.7	
* 6 13C2-PFOA									
415.00 > 370.00	1.783	1.791	-0.008		1554295	10.0		12554	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.783	1.791	-0.008	1.000	528442	3.15		47.0	
413.00 > 169.00	1.783	1.791	-0.008	1.000	312747		1.69(0.00-0.00)	540	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.026	2.018	0.008	1.000	652680	4.55		346	a
499.00 > 99.00	2.026	2.018	0.008	1.000	110783		5.89(0.00-0.00)	109	a
* 7 13C4 PFOS									
503.00 > 80.00	2.026	2.041	-0.015		3865534	28.7		4003	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.231	2.238	-0.007	1.000	915806	8.47		8270	

QC Flag Legend

Review Flags

a - User Assigned ID

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_013.d

Injection Date: 25-Jul-2018 16:04:51

Instrument ID: A8_N

Lims ID: 320-41028-A-1-A

Lab Sample ID: 320-41028-1

Client ID: WGNA-071018-RW-3142

Operator ID: SACINSTLCMS01

ALS Bottle#: 8

Worklist Smp#: 12

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

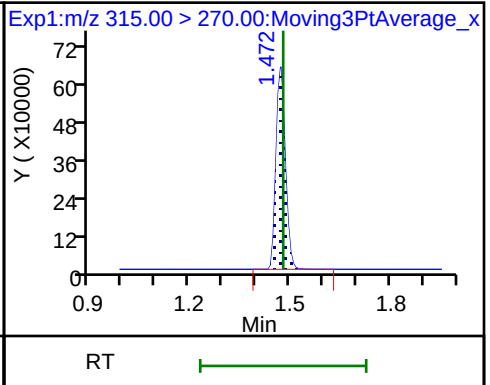
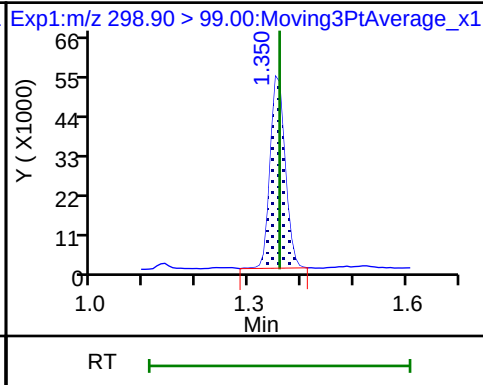
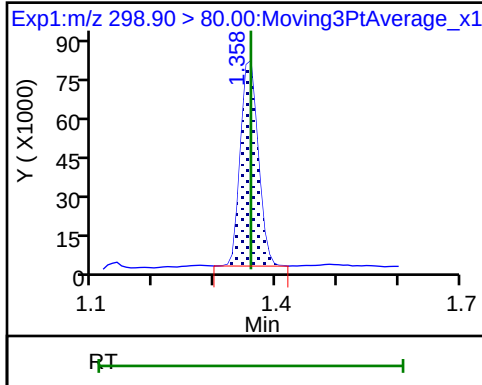
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

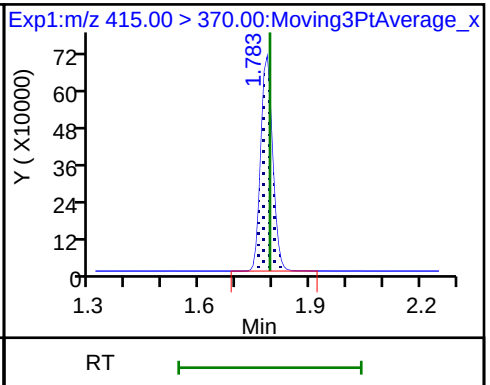
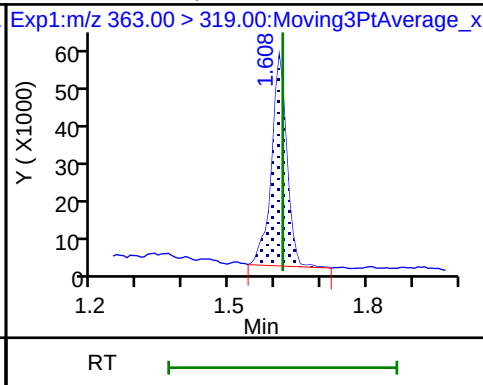
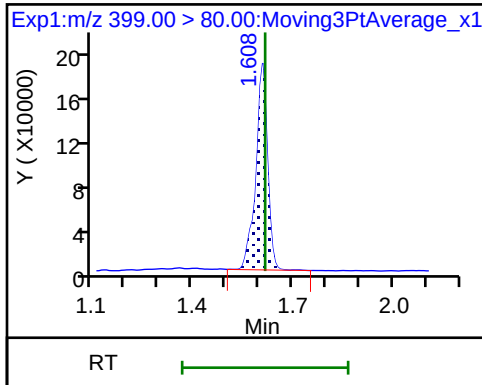
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

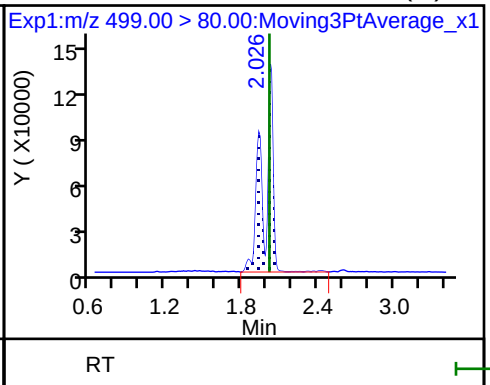
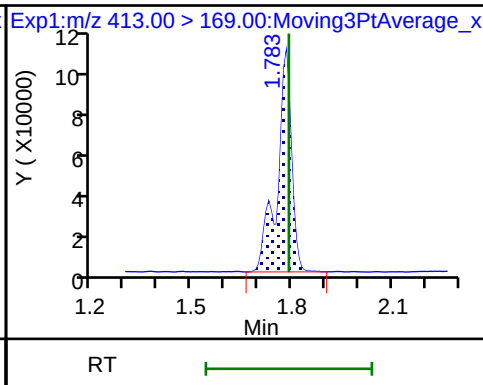
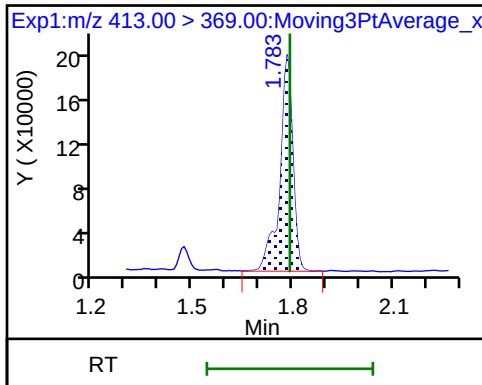
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

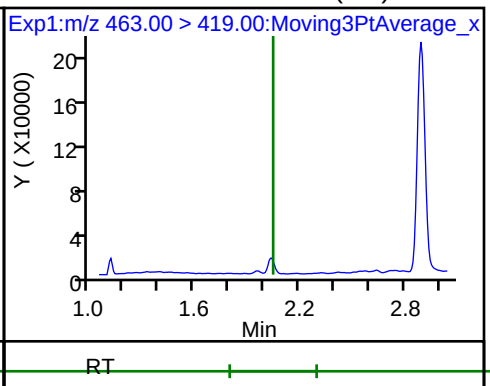
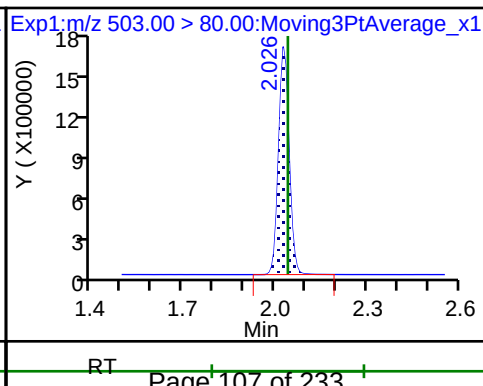
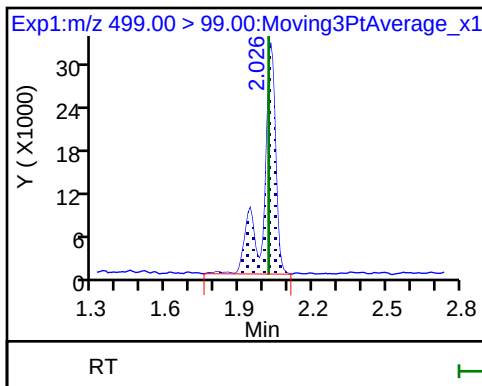
8 Perfluorooctane sulfonic acid (M)



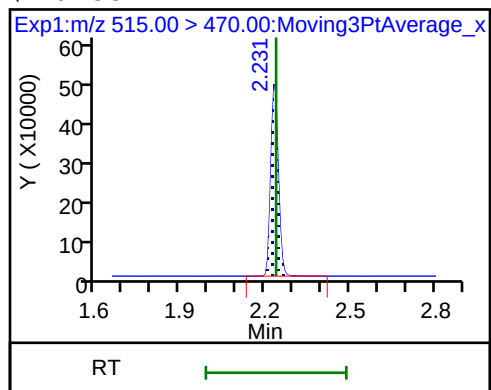
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_013.d
Lims ID: 320-41028-A-1-A
Client ID: WGNA-071018-RW-3142
Sample Type: Client
Inject. Date: 25-Jul-2018 16:04:51 ALS Bottle#: 8 Worklist Smp#: 12
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-41028-a-1-a
Misc. Info.: Plate: 1 Rack: 2
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Method: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 26-Jul-2018 11:35:14 Calib Date: 21-Jul-2018 12:45:07
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d
Column 1 : Det: EXP1
Process Host: XAWRK022

First Level Reviewer: barnettj

Date: 26-Jul-2018 10:49:06

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	7.37	73.74
\$ 10 13C2 PFDA	10.0	8.47	84.70

TestAmerica Sacramento

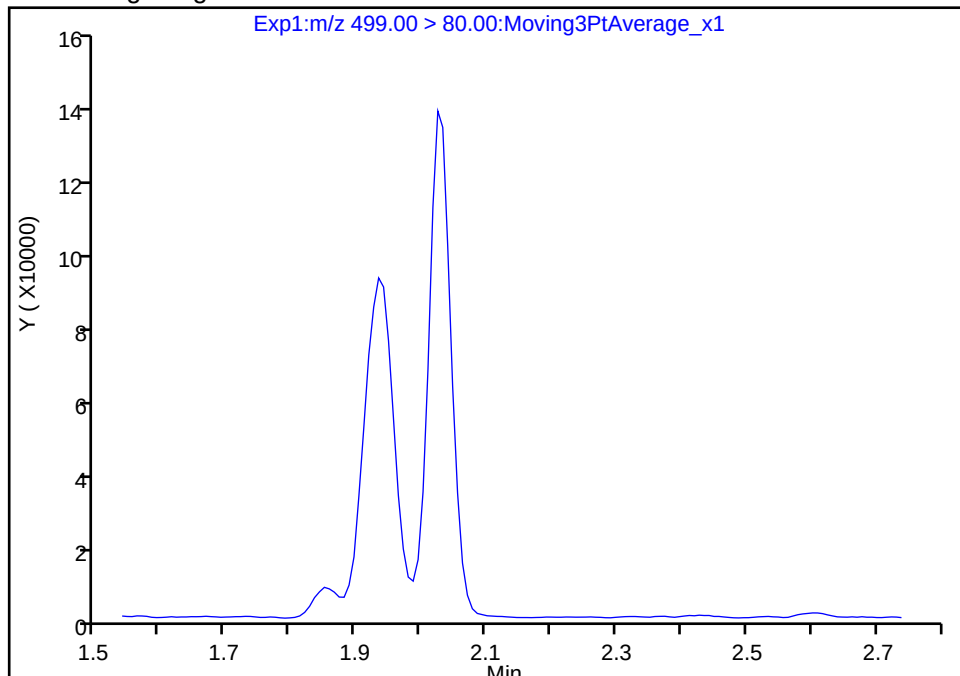
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_013.d				
Injection Date:	25-Jul-2018 16:04:51	Instrument ID:	A8_N		
Lims ID:	320-41028-A-1-A	Lab Sample ID:	320-41028-1		
Client ID:	WGNA-071018-RW-3142				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	8	Worklist Smp#:	12
Injection 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

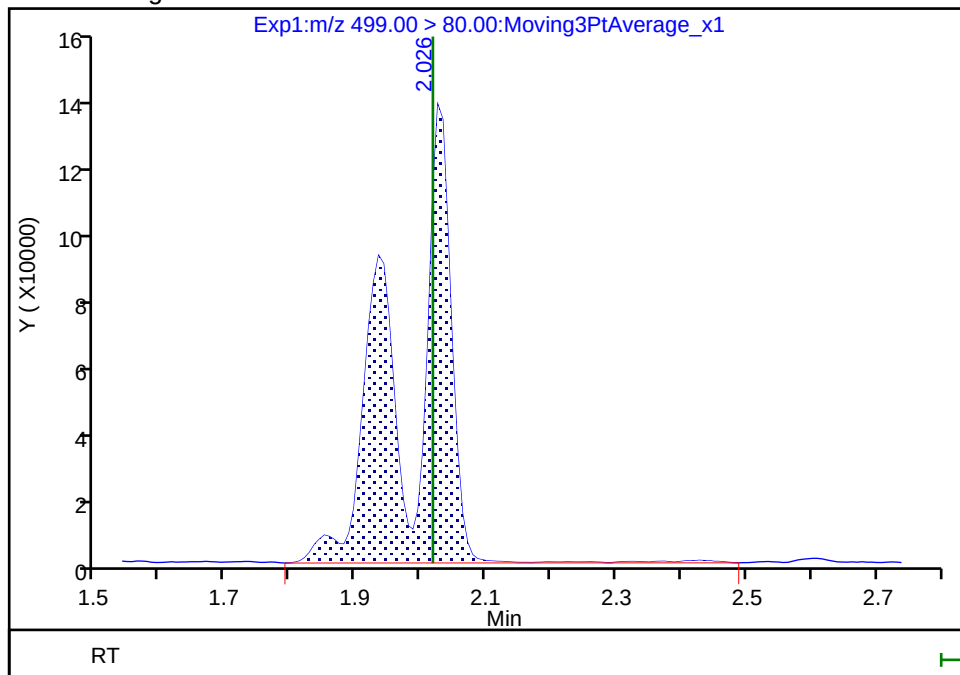
Signal: 1

Not Detected
Expected RT: 2.02

Processing Integration Results



Manual Integration Results



Reviewer: barnettj, 26-Jul-2018 10:48:56

Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-41028-1</u>
SDG No.: _____	
Client Sample ID: <u>WGNA-071018-FRB-3142</u>	Lab Sample ID: <u>320-41028-2</u>
Matrix: <u>Water</u>	Lab File ID: <u>2018.07.25_537A_014.d</u>
Analysis Method: <u>537</u>	Date Collected: <u>07/10/2018 15:05</u>
Extraction Method: <u>537</u>	Date Extracted: <u>07/14/2018 08:08</u>
Sample wt/vol: <u>250.7(mL)</u>	Date Analyzed: <u>07/25/2018 16:09</u>
Con. Extract Vol.: <u>1.00(mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>2(uL)</u>	GC Column: <u>GeminiC18 3x100 ID: 3(mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>236171</u>	Units: <u>ng/L</u>

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	85		70-130
STL00996	13C2 PFDA	84		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_014.d
 Lims ID: 320-41028-A-2-A
 Client ID: WGNA-071018-FRB-3142
 Sample Type: Client
 Inject. Date: 25-Jul-2018 16:09:32 ALS Bottle#: 9 Worklist Smp#: 13
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-41028-a-2-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 26-Jul-2018 11:35:14 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.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	1.464	1.479	-0.015	1.000	1428608	8.54		15941	
* 6 13C2-PFOA									
415.00 > 370.00	1.775	1.791	-0.016		1553792	10.0		13310	
* 7 13C4 PFOS									
503.00 > 80.00	2.018	2.041	-0.023		3932583	28.7		6065	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.231	2.238	-0.007	1.000	908705	8.41		9430	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_014.d

Injection Date: 25-Jul-2018 16:09:32

Instrument ID: A8_N

Lims ID: 320-41028-A-2-A

Lab Sample ID: 320-41028-2

Client ID: WGNA-071018-FRB-3142

Operator ID: SACINSTLCMS01

ALS Bottle#: 9

Worklist Smp#: 13

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

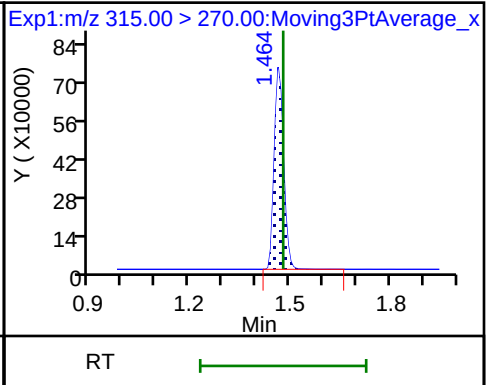
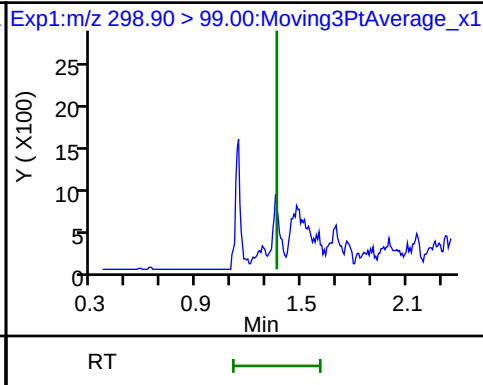
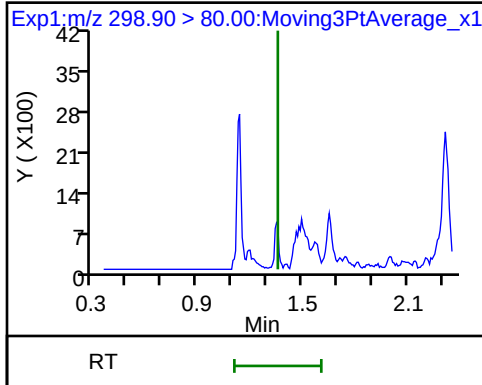
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid (ND)

1 Perfluorobutanesulfonic acid (ND)

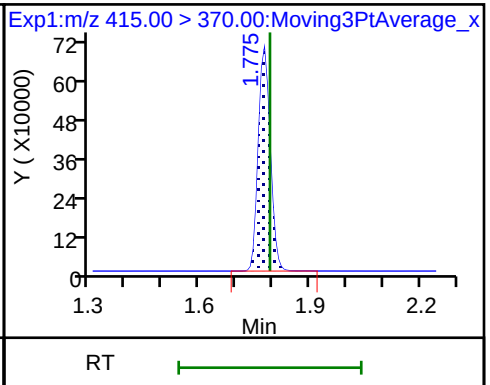
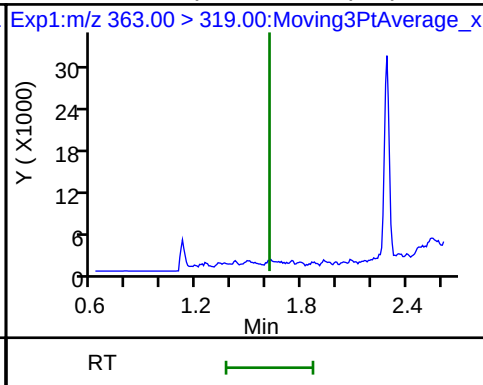
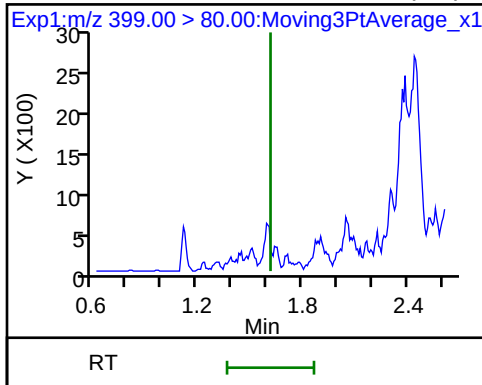
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid (ND)

4 Perfluoroheptanoic acid (ND)

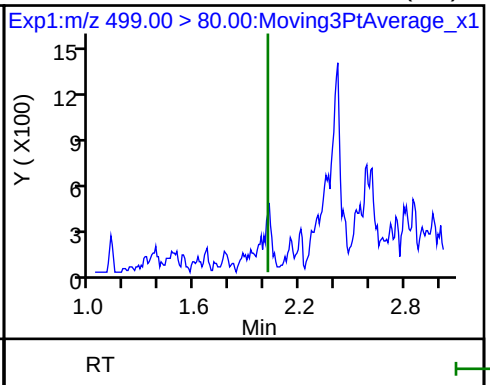
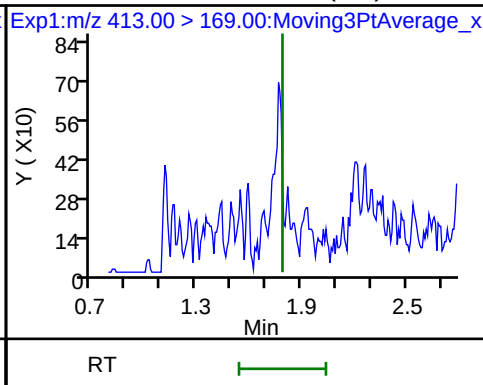
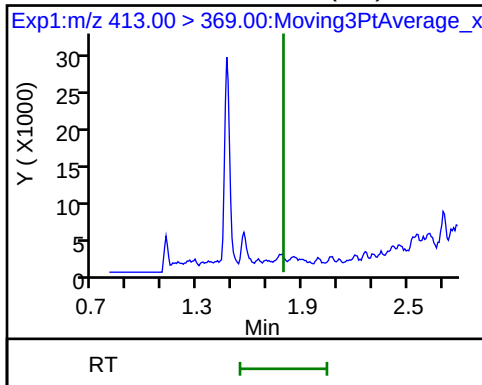
* 6 13C2-PFOA



5 Perfluorooctanoic acid (ND)

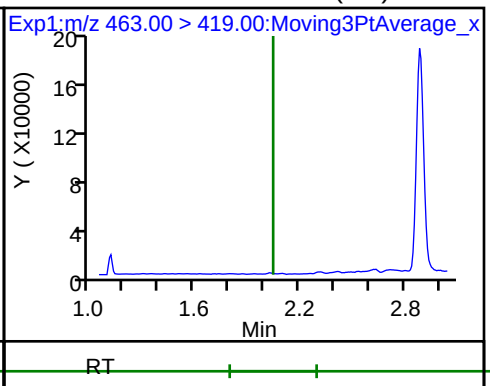
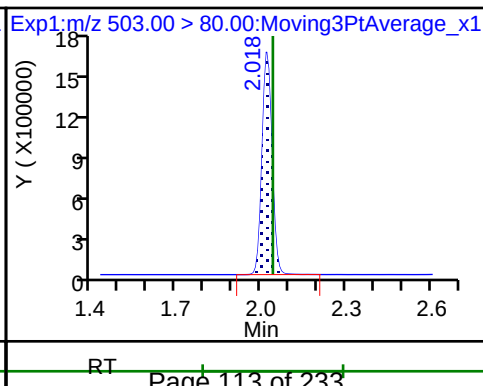
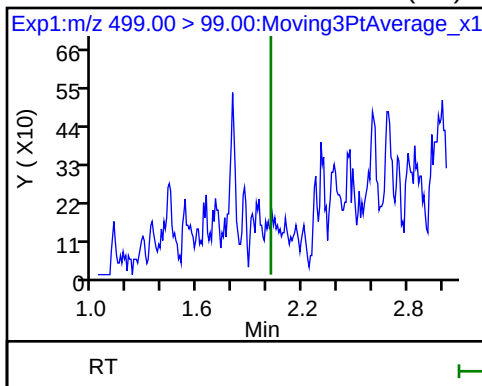
5 Perfluorooctanoic acid (ND)

8 Perfluorooctane sulfonic acid (ND)

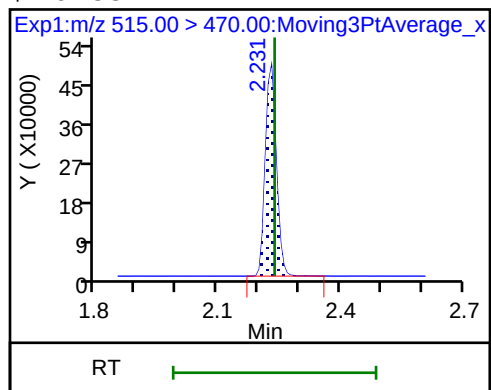


8 Perfluorooctane sulfonic acid (ND) * 7 13C4 PFOS

9 Perfluorononanoic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_014.d
Lims ID: 320-41028-A-2-A
Client ID: WGNA-071018-FRB-3142
Sample Type: Client
Inject. Date: 25-Jul-2018 16:09:32 ALS Bottle#: 9 Worklist Smp#: 13
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-41028-a-2-a
Misc. Info.: Plate: 1 Rack: 2
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Method: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 26-Jul-2018 11:35:14 Calib Date: 21-Jul-2018 12:45:07
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK022

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	8.54	85.43
\$ 10 13C2 PFDA	10.0	8.41	84.07

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

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1 Analy Batch No.: 235370

SDG No.: _____

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

Calibration Start Date: 07/21/2018 12:21 Calibration End Date: 07/21/2018 12:45 Calibration ID: 40229

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-235370/3	2018.07.21_537CURVE_003.d
Level 2	IC 320-235370/4	2018.07.21_537CURVE_004.d
Level 3	IC 320-235370/5	2018.07.21_537CURVE_005.d
Level 4	IC 320-235370/6	2018.07.21_537CURVE_006.d
Level 5	IC 320-235370/7	2018.07.21_537CURVE_007.d
Level 6	IC 320-235370/8	2018.07.21_537CURVE_008.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanesulfonic acid (PFBS)	1.2841 0.9803	1.2507	1.2835	1.1823	1.0785	Ave		1.1766				10.5		30.0			
Perfluorohexanesulfonic acid (PFHxS)	1.7376 1.6801	1.6578	1.6904	1.7641	1.7310	Ave		1.7102				2.4		30.0			
Perfluoroheptanoic acid (PFHpA)	1.0605 1.0815	1.0202	1.0617	1.0668	1.0373	Ave		1.0547				2.1		30.0			
Perfluorooctanoic acid (PFOA)	1.1368 1.0843	1.0080	1.0656	1.0950	1.0783	Ave		1.0780				3.9		30.0			
Perfluorooctanesulfonic acid (PFOS)	1.0575 1.0736	1.0083	1.0628	1.0977	1.0913	Ave		1.0652				3.0		30.0			
Perfluorononanoic acid (PFNA)	0.8343 0.7942	0.7572	0.7864	0.8079	0.7724	Ave		0.7921				3.4		30.0			
13C2 PFHxA	1.1056 1.1532	1.0045	1.0481	1.1035	1.0426	Ave		1.0762				5.0		30.0			
13C2 PFDA	0.7178 0.7112	0.6728	0.6860	0.7012	0.6847	Ave		0.6956				2.5		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.: 320-41028-1 Analy Batch No.: 235370

SDG No.: _____

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

Calibration Start Date: 07/21/2018 12:21 Calibration End Date: 07/21/2018 12:45 Calibration ID: 40229

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-235370/3	2018.07.21_537CURVE_003.d
Level 2	IC 320-235370/4	2018.07.21_537CURVE_004.d
Level 3	IC 320-235370/5	2018.07.21_537CURVE_005.d
Level 4	IC 320-235370/6	2018.07.21_537CURVE_006.d
Level 5	IC 320-235370/7	2018.07.21_537CURVE_007.d
Level 6	IC 320-235370/8	2018.07.21_537CURVE_008.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5
Perfluorobutanesulfonic acid (PFBS)	PFOS	Ave	1132773 17778336	2723028	6349004	10832159	14336242	9.00 180	20.0	45.0	90.1	135
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	511502 10233792	1212277	2808334	5428281	7728080	3.00 60.5	6.72	15.1	30.2	45.4
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	112443 2367732	282953	652127	1194139	1759394	0.960 19.4	2.16	4.86	9.72	14.6
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	248606 4835518	569483	1333317	2496915	3725583	1.98 39.6	4.40	9.90	19.8	29.7
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	409813 8546272	963630	2307715	4414336	6367762	3.95 79.1	8.79	19.8	39.5	59.3
Perfluorononanoic acid (PFNA)	13PF OA	Ave	182463 3541730	427768	984001	1842282	2668663	1.98 39.6	4.40	9.90	19.8	29.7
13C2 PFHxA	13PF OA	Ave	1221139 1298612	1289770	1324630	1270784	1212894	10.0 10.0	10.0	10.0	10.0	10.0
13C2 PFDA	13PF OA	Ave	792860 800909	863900	867028	807504	796607	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.: 320-41028-1 Analy Batch No.: 235370

SDG No.: _____

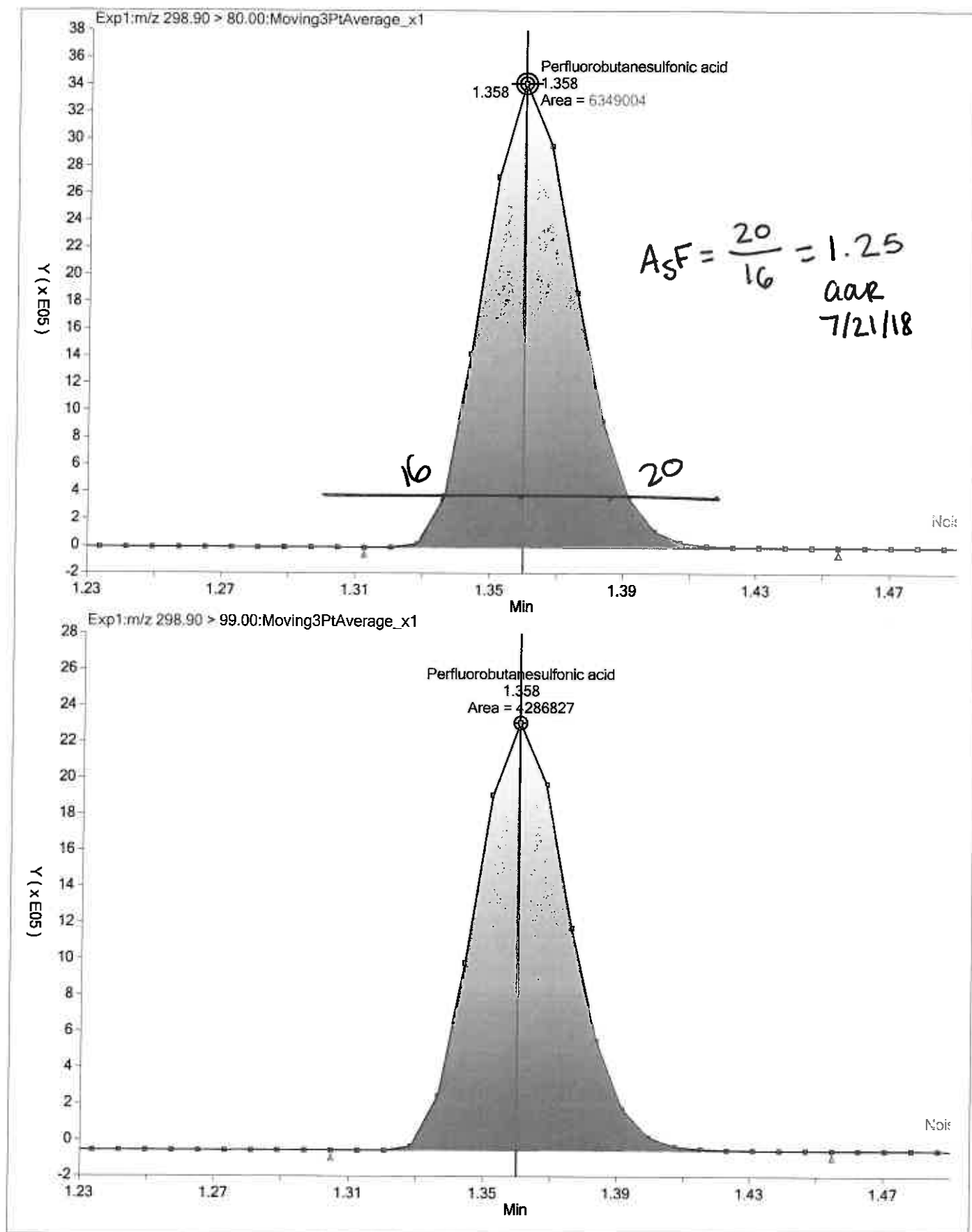
Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

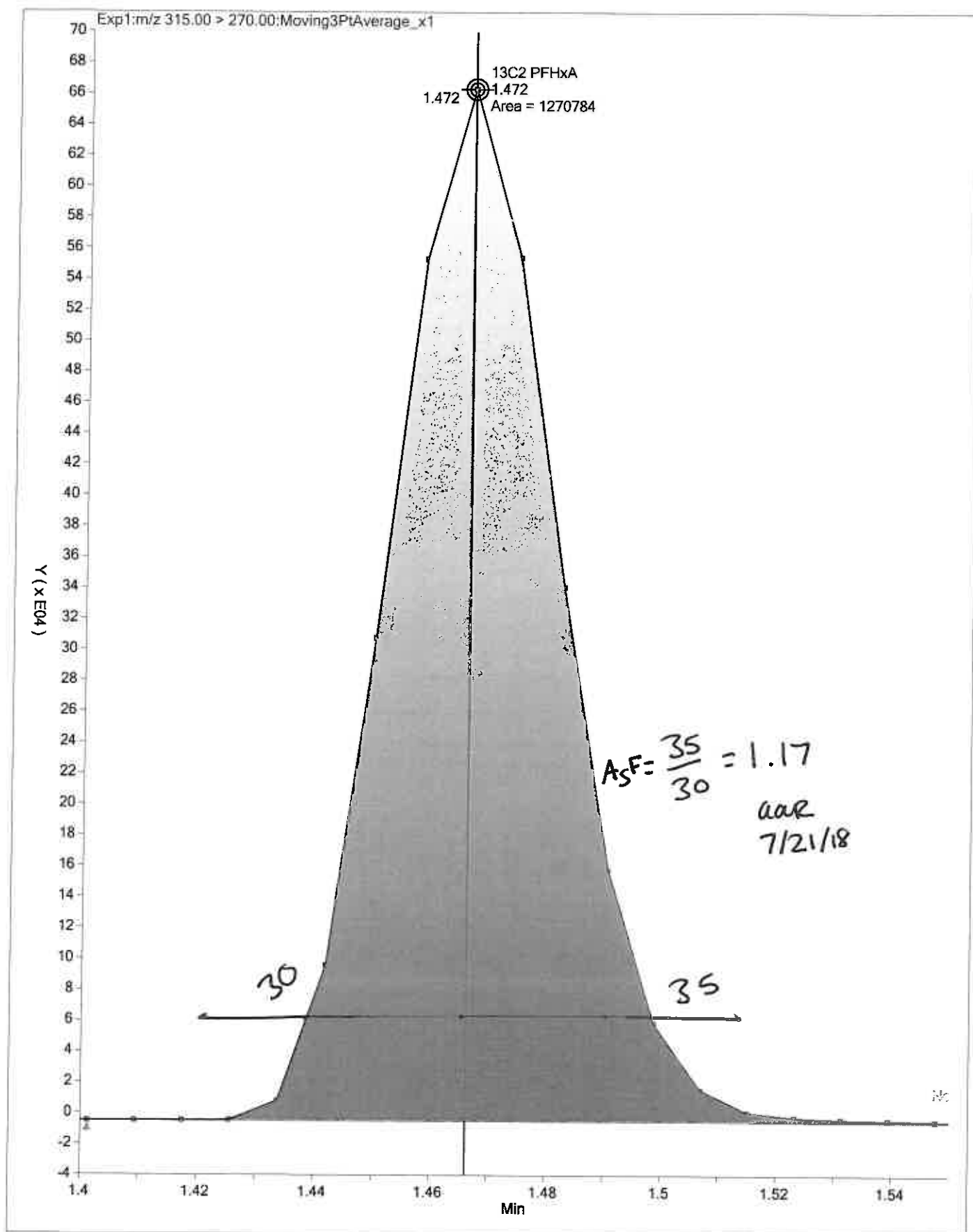
Calibration Start Date: 07/21/2018 12:21 Calibration End Date: 07/21/2018 12:45 Calibration ID: 40229

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-235370/3	2018.07.21_537CURVE_003.d
Level 2	IC 320-235370/4	2018.07.21_537CURVE_004.d
Level 3	IC 320-235370/5	2018.07.21_537CURVE_005.d
Level 4	IC 320-235370/6	2018.07.21_537CURVE_006.d
Level 5	IC 320-235370/7	2018.07.21_537CURVE_007.d
Level 6	IC 320-235370/8	2018.07.21_537CURVE_008.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanesulfonic acid (PFBS)	9.1	6.3	9.1	0.5	-8.3	-16.7	50	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	1.6	-3.1	-1.2	3.2	1.2	-1.8	50	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	0.6	-3.3	0.7	1.2	-1.6	2.5	50	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	5.5	-6.5	-1.2	1.6	0.0	0.6	50	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	-0.7	-5.3	-0.2	3.0	2.5	0.8	50	30	30	30	30	30
Perfluorononanoic acid (PFNA)	5.3	-4.4	-0.7	2.0	-2.5	0.3	50	30	30	30	30	30
13C2 PFHxA	2.7	-6.7	-2.6	2.5	-3.1	7.1	30	30	30	30	30	30
13C2 PFDA	3.2	-3.3	-1.4	0.8	-1.6	2.2	30	30	30	30	30	30





TestAmerica Laboratories
Istd/Surrogate Recovery Report

Worklist Name: 21JUL2018_537_ICAL

Worklist Num: 61414

Instrument: A8_N

Method: 537_A8_N

Batch Directory: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b

Limit Group: LC 537 ICAI

Analysis Type: SemiVOA

Inj Volume: 2.00

Inj Vol Units: ul

Lims Batch: 235370

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
#3 IC L1	21-Jul-2018 12:21:44	1.48	2.25	1.81	2.06
IS Std		103.30	103.40	1104504> 100.0*	2811428> 100.0*
#4 IC L2	21-Jul-2018 12:26:23	1.48	2.25	1.81	2.06
		93.81	96.88	1284004> 116.3*	3120086> 111.0*
#5 IC L3	21-Jul-2018 12:31:04	1.48	2.25	1.81	2.06
		97.88	98.77	1263898> 114.4*	3150414> 112.1*
#6 IC L4	21-Jul-2018 12:35:44	1.47	2.25	1.80	2.05
		102.50	100.80	1151615> 104.3*	2917514> 103.8*
#7 IC L5	21-Jul-2018 12:40:26	1.48	2.25	1.81	2.06
		96.87	98.43	1163367> 105.3*	2821978> 100.4*
#8 IC L6	21-Jul-2018 12:45:07	1.47	2.25	1.80	2.06
		107.10	102.20	1126134> 102.0*	2887592> 102.7*
IS Std				1263898 1.81	3150414 2.06
#10 RB	21-Jul-2018 12:49:46			1.80	2.06
				1225771 97.0	3347058 106.2
IS Std				1151615 1.80	2917514 2.05
#11 CCVL	21-Jul-2018 12:54:25	1.47	2.25	1.80	2.05
		99.46	97.35	1220813 106.0	2998753 102.8
IS Std				1220813 1.80	2998753 2.05
#12 ICB	21-Jul-2018 12:59:06			1.80	2.05
				1199738 98.3	3260483 108.7
IS Std				1151615 1.80	2917514 2.05
#13 ICV	21-Jul-2018 13:03:44	1.48	2.25	1.81	2.06
		95.50	94.54	1160905 100.8	2863082 98.1

13C2 PFOA

$$RPD = \frac{1284004 - 1104504}{\left(\frac{1284004 + 1104504}{2}\right)} \times 100 = 15.0\%$$

13C4 PFOS

$$RPD = \frac{3150414 - 2811425}{\left(\frac{3150414 + 2811425}{2}\right)} \times 100 = 11.4\%$$

acc 7/21/18

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_003.d
 Lims ID: IC L1
 Client ID:
 Sample Type: IC Calib Level: 1
 Inject. Date: 21-Jul-2018 12:21:44 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\20180721-61414.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 21-Jul-2018 14:51:34 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK022

First Level Reviewer: roycea

Date: 21-Jul-2018 12:58:01

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.358	1.357	0.001	1.000	1132773	9.82		1074	
298.90 > 99.00	1.358	1.357	0.001	1.000	782964		1.45(0.00-0.00)	1021	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.479	1.477	0.002	1.000	1221139	10.3		13523	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.624	1.620	0.004	1.000	511502	3.05		469	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.624	1.621	0.003	1.000	112443	0.9653		13.0	M
* 6 13C2-PFOA									
415.00 > 370.00	1.806	1.803	0.003		1104504	10.0		8257	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.806	1.803	0.003	1.000	248606	2.09		31.1	
413.00 > 169.00	1.806	1.803	0.003	1.000	132166		1.88(0.00-0.00)	317	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.064	2.056	0.008	1.000	409813	3.92		540	Ma
499.00 > 99.00	2.064	2.056	0.008	1.000	91353		4.49(0.00-0.00)	181	M
* 7 13C4 PFOS									
503.00 > 80.00	2.064	2.056	0.008		2811428	28.7		5391	
9 Perfluorononanoic acid									
463.00 > 419.00	2.071	2.065	0.006	1.000	182463	2.09		38.2	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.253	2.247	0.006	1.000	792860	10.3		8101	

QC Flag Legend

Review Flags

M - Manually Integrated

a - User Assigned ID

Reagents:

LC537-L1_00022

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_003.d

Injection Date: 21-Jul-2018 12:21:44

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

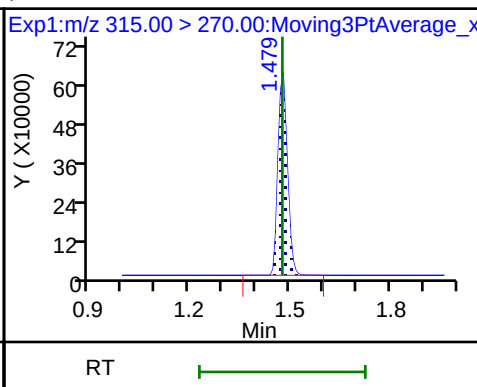
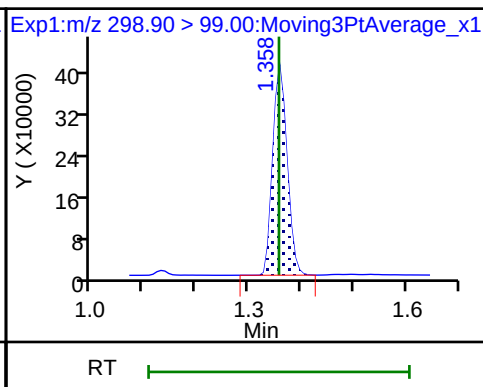
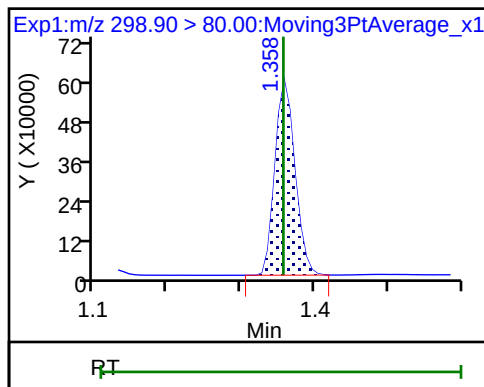
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

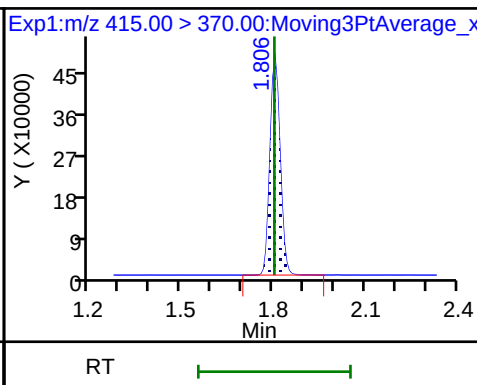
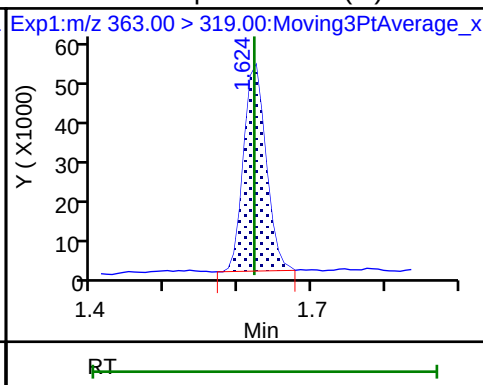
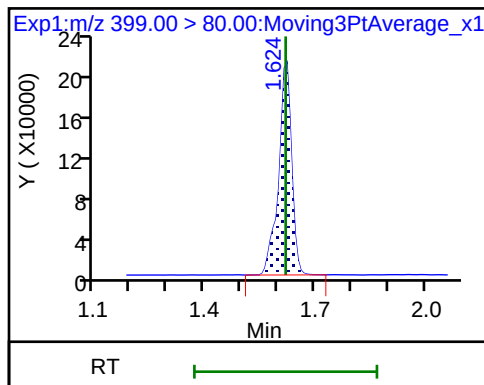
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid (M)

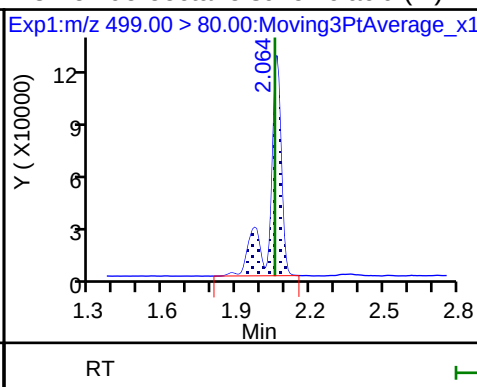
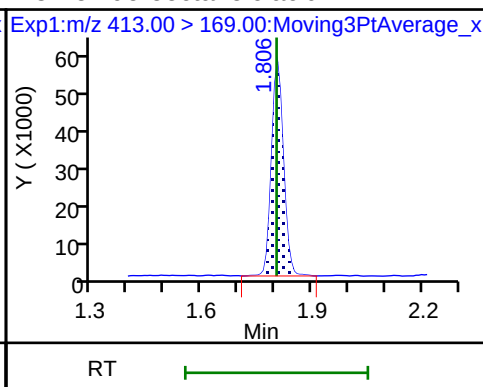
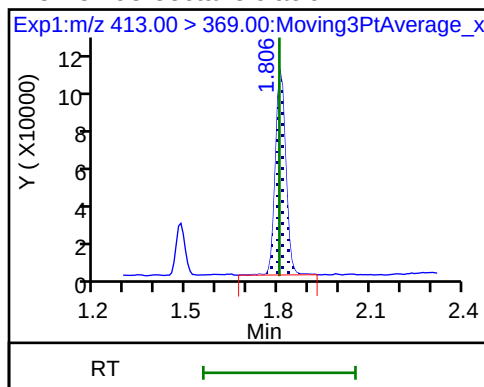
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

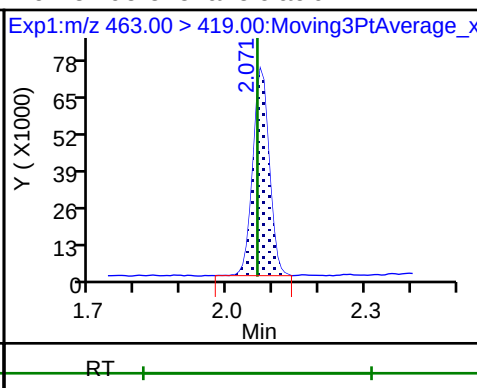
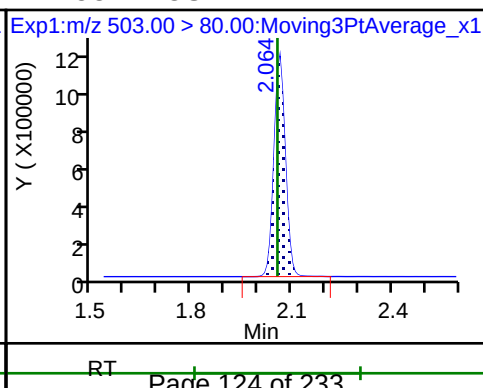
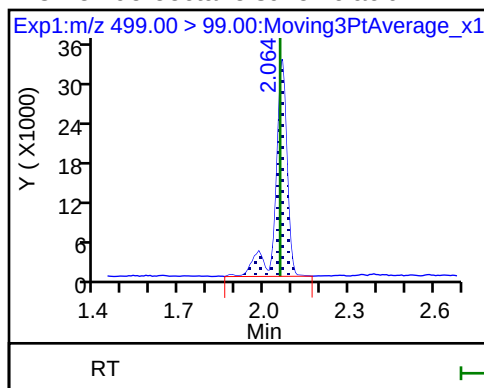
8 Perfluorooctane sulfonic acid (M)



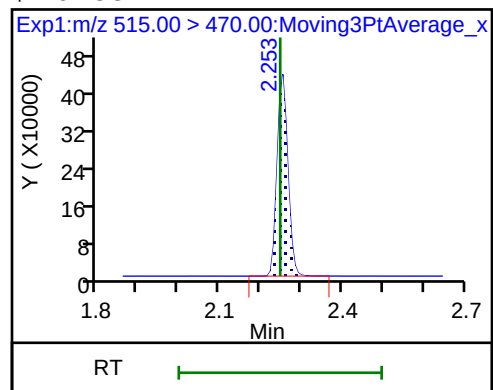
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

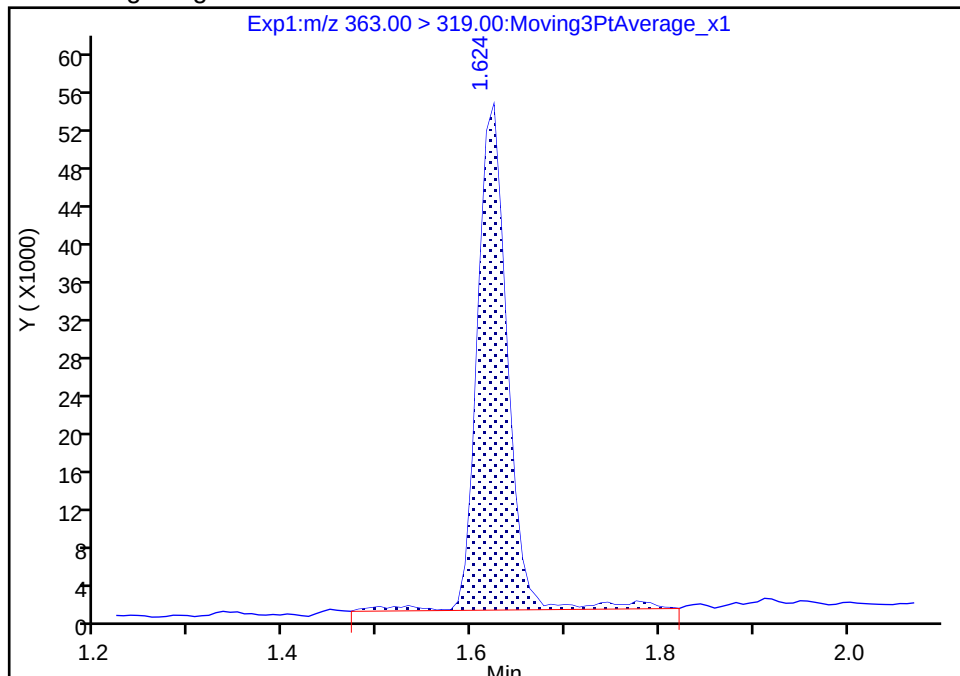
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Injection Date: 21-Jul-2018 12:21:44 Instrument ID: A8_N
Lims ID: IC L1
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

4 Perfluoroheptanoic acid, CAS: 375-85-9

Signal: 1

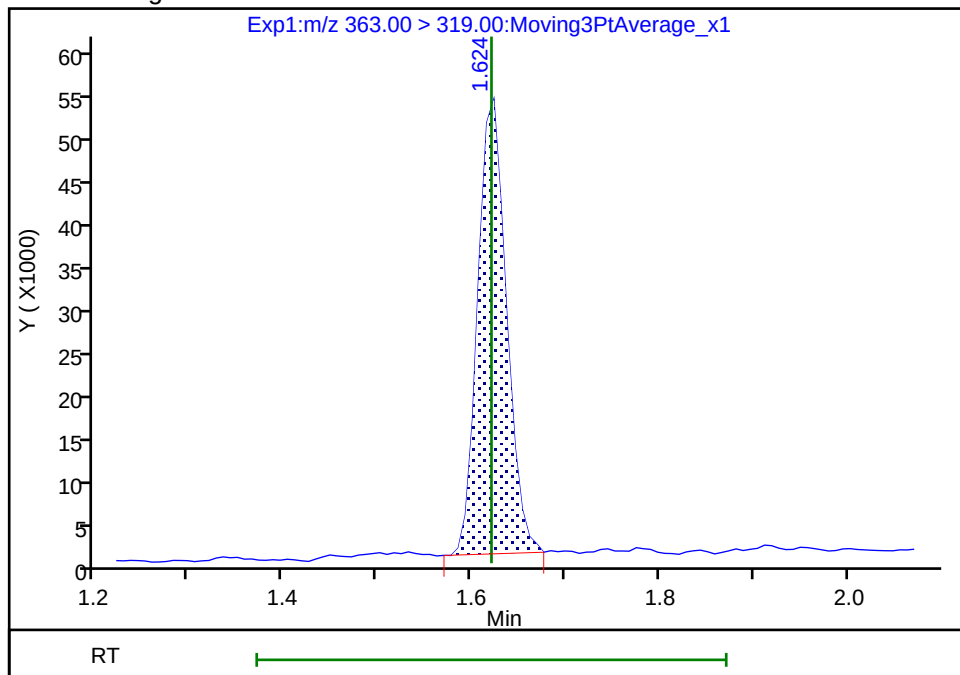
RT: 1.62
Area: 119325
Amount: 1.005261
Amount Units: ng/ml

Processing Integration Results



RT: 1.62
Area: 112443
Amount: 0.965281
Amount Units: ng/ml

Manual Integration Results



Reviewer: roycea, 21-Jul-2018 12:57:31

Audit Action: Manually Integrated

Audit Reason: Baseline

TestAmerica Sacramento

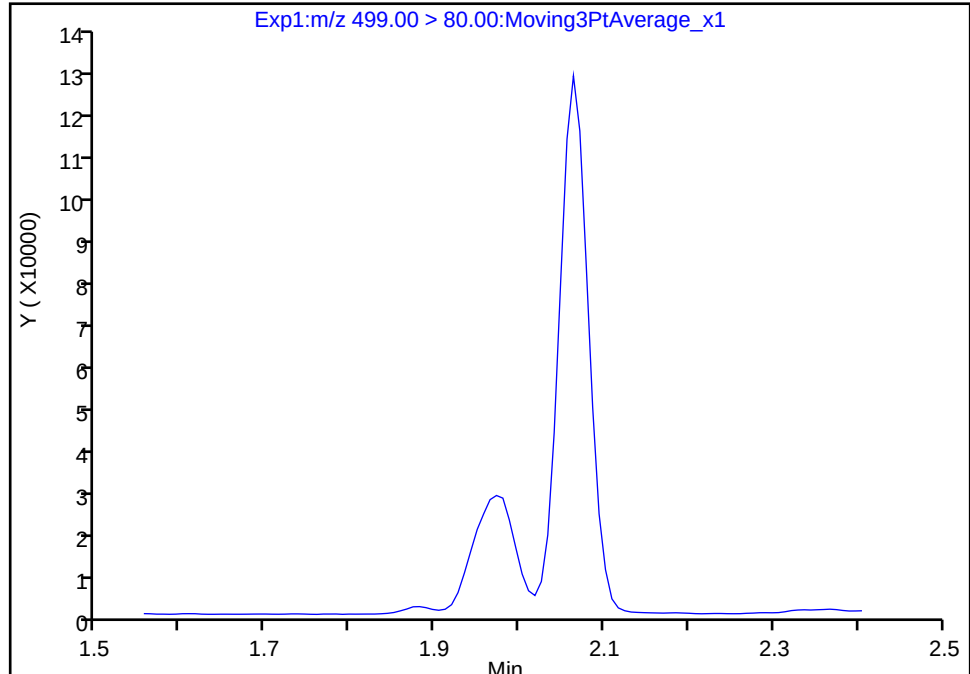
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Injection Date: 21-Jul-2018 12:21:44 Instrument ID: A8_N
Lims ID: IC L1
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

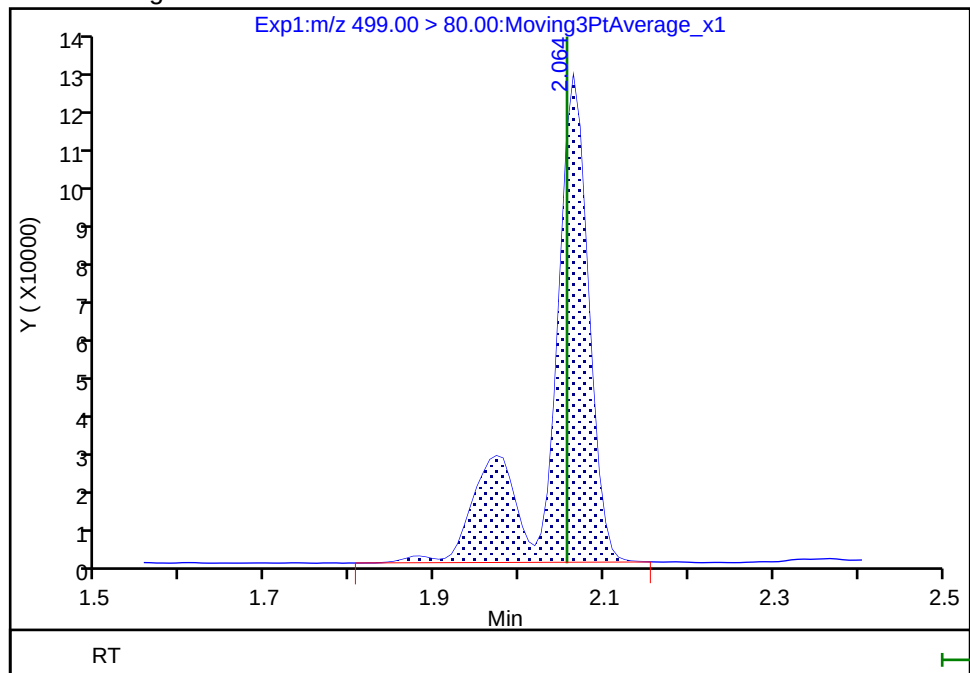
Not Detected
Expected RT: 2.06

Processing Integration Results



RT: 2.06
Area: 409813
Amount: 3.924698
Amount Units: ng/ml

Manual Integration Results



Reviewer: roycea, 21-Jul-2018 12:57:44
Audit Action: Manually Integrated

Audit Reason: Assign Peak
Page 127 of 233

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_004.d
 Lims ID: IC L2
 Client ID:
 Sample Type: IC Calib Level: 2
 Inject. Date: 21-Jul-2018 12:26:23 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\20180721-61414.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 21-Jul-2018 14:51:36 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK022

First Level Reviewer: roycea

Date: 21-Jul-2018 12:59:20

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.358	1.357	0.001	1.000	2723028	21.3		2456	
298.90 > 99.00	1.358	1.357	0.001	1.000	1840340		1.48(0.00-0.00)	2427	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.479	1.477	0.002	1.000	1289770	9.33		15656	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.616	1.620	-0.004	1.000	1212277	6.52		1123	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.624	1.621	0.003	1.000	282953	2.09		31.9	M
* 6 13C2-PFOA									
415.00 > 370.00	1.806	1.803	0.003		1284004	10.0		11587	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.806	1.803	0.003	1.000	569483	4.11		74.7	
413.00 > 169.00	1.806	1.803	0.003	1.000	316179		1.80(0.00-0.00)	741	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.064	2.056	0.008	1.000	963630	8.32		1199	M
499.00 > 99.00	2.056	2.056	0.0	0.996	211829		4.55(0.00-0.00)	415	M
* 7 13C4 PFOS									
503.00 > 80.00	2.056	2.056	0.0		3120086	28.7		5853	
9 Perfluorononanoic acid									
463.00 > 419.00	2.064	2.065	-0.001	1.000	427768	4.21		87.9	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.247	-0.001	1.000	863900	9.67		8355	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LC537-L2_00022

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_004.d

Injection Date: 21-Jul-2018 12:26:23

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

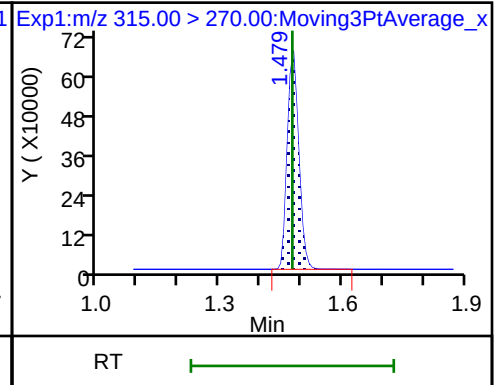
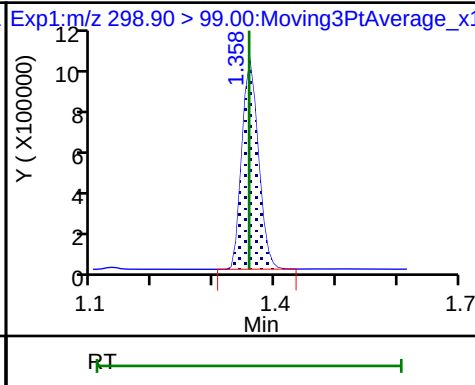
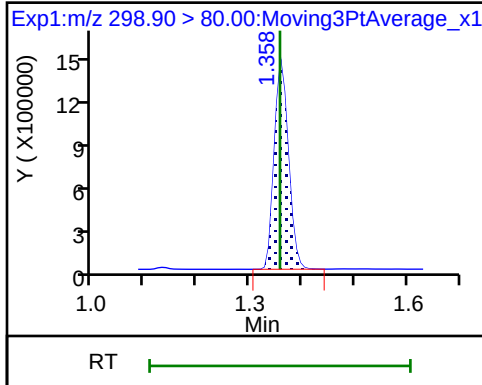
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

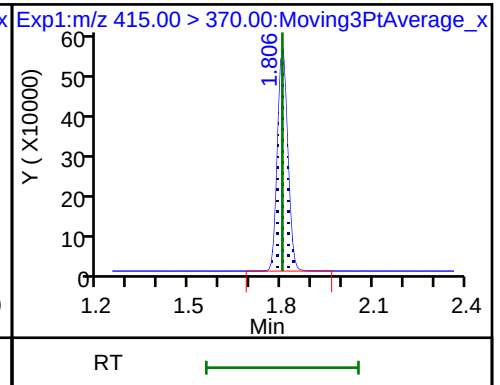
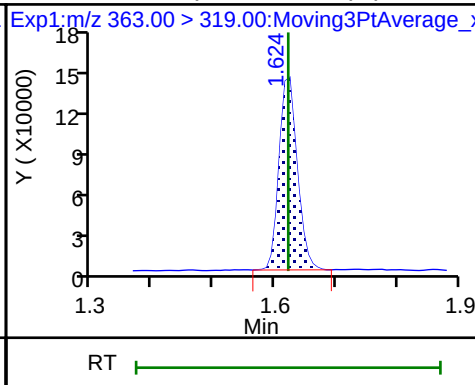
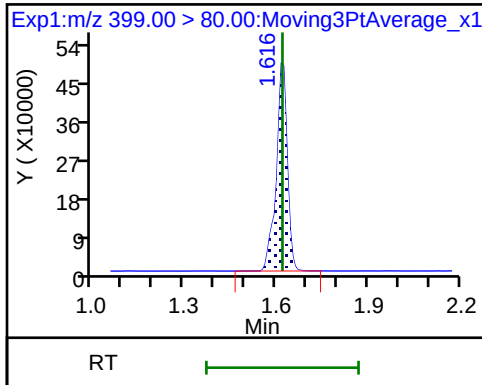
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid (M)

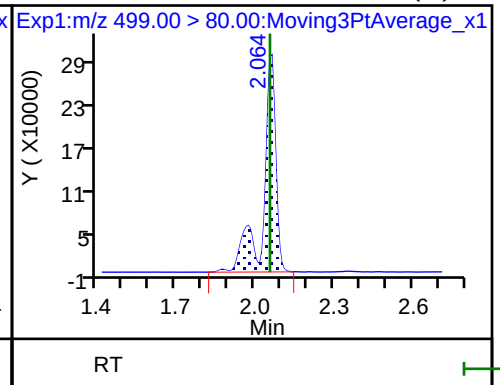
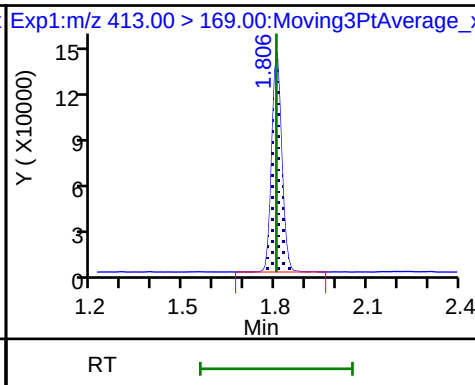
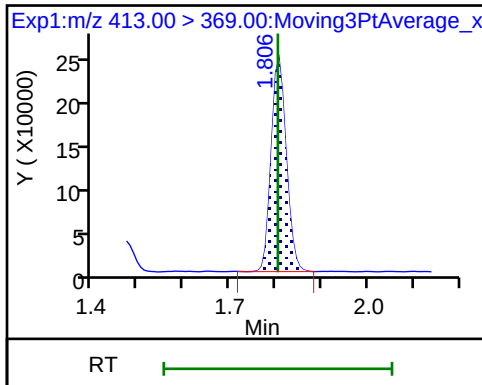
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

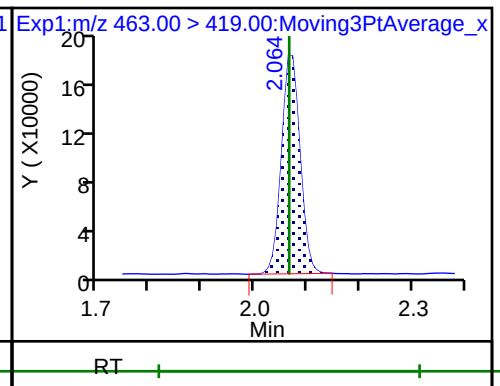
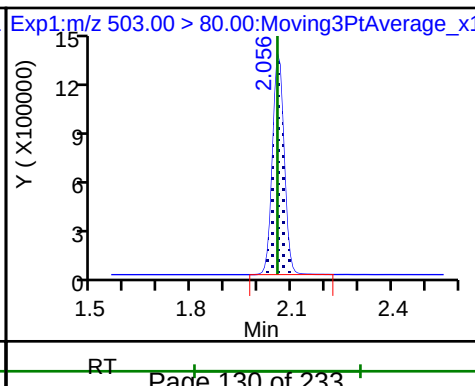
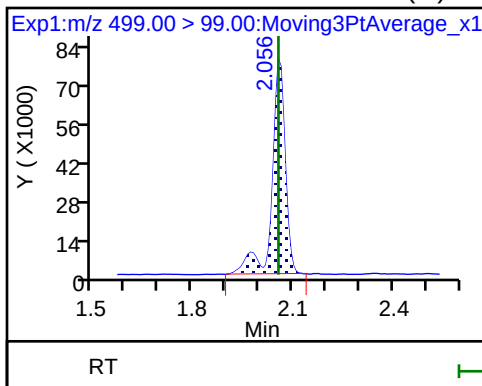
8 Perfluorooctane sulfonic acid (M)



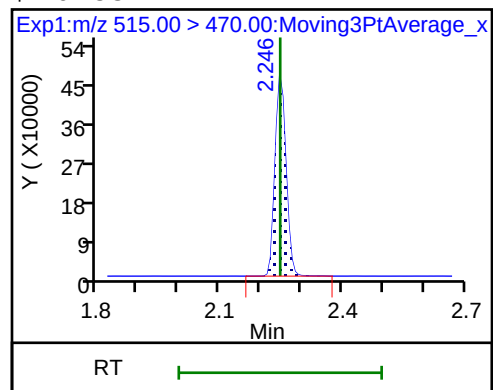
8 Perfluorooctane sulfonic acid (M)

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

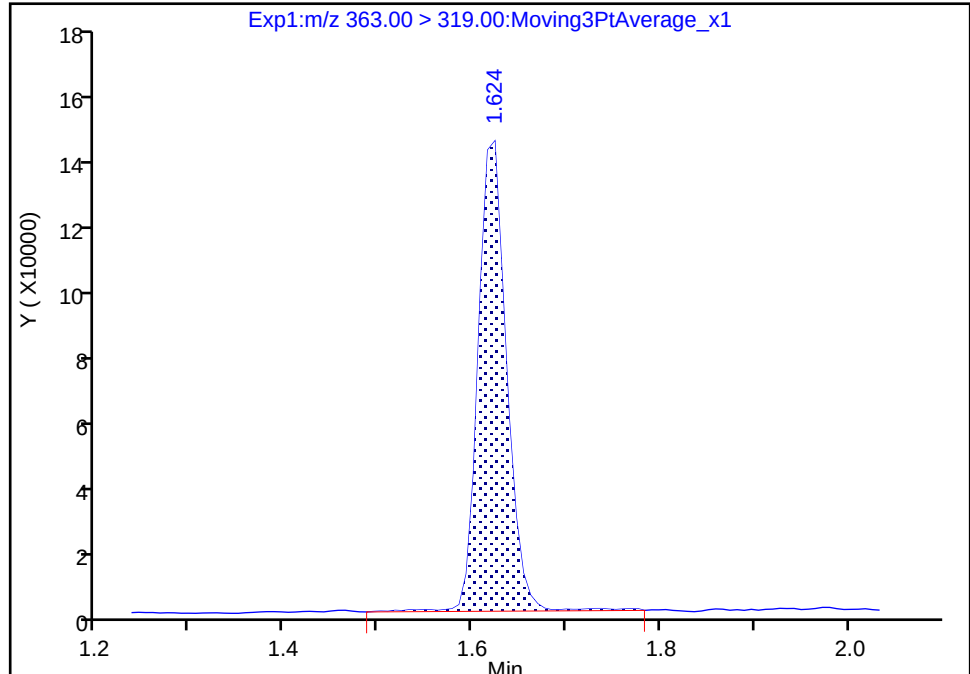
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_004.d
Injection Date: 21-Jul-2018 12:26:23 Instrument ID: A8_N
Lims ID: IC L2
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

4 Perfluoroheptanoic acid, CAS: 375-85-9

Signal: 1

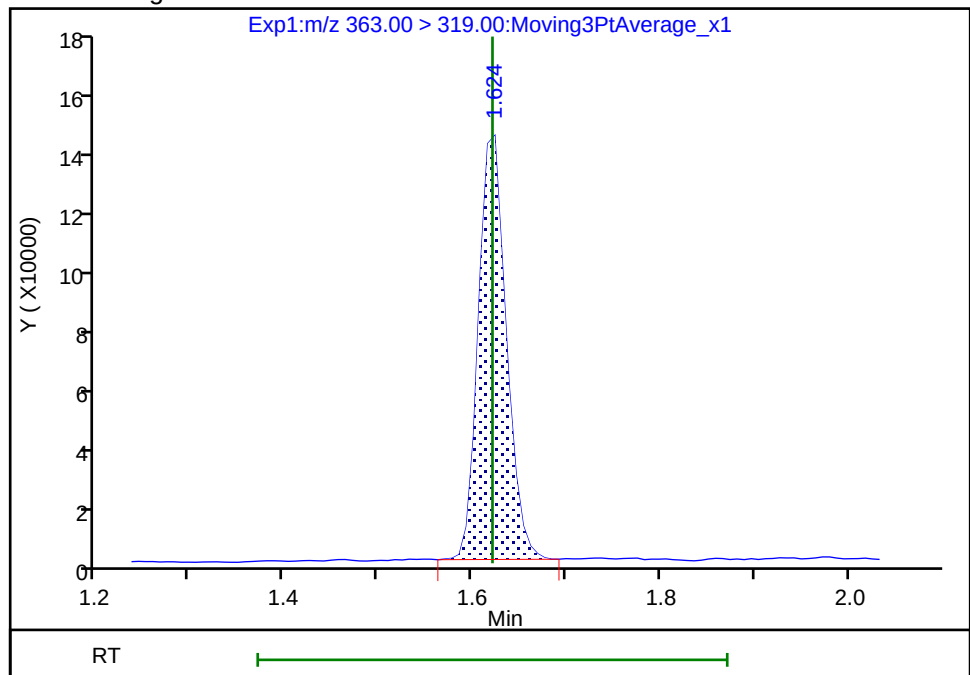
RT: 1.62
Area: 289119
Amount: 2.120814
Amount Units: ng/ml

Processing Integration Results



RT: 1.62
Area: 282953
Amount: 2.089472
Amount Units: ng/ml

Manual Integration Results



Reviewer: roycea, 21-Jul-2018 12:58:16
Audit Action: Manually Integrated

Audit Reason: Baseline
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TestAmerica Sacramento

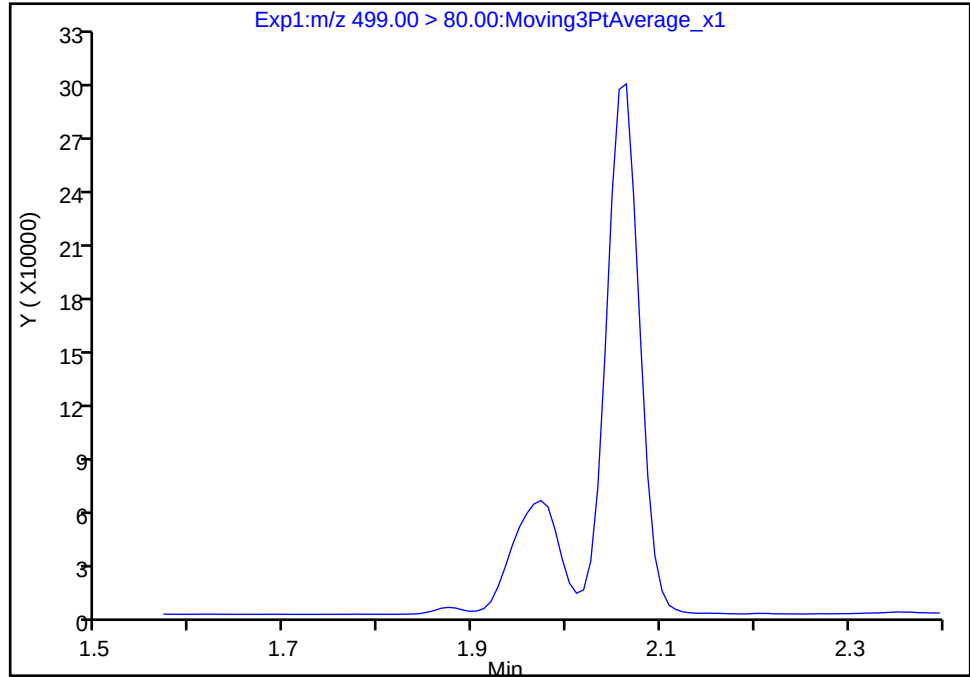
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_004.d
Injection Date: 21-Jul-2018 12:26:23 Instrument ID: A8_N
Lims ID: IC L2
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

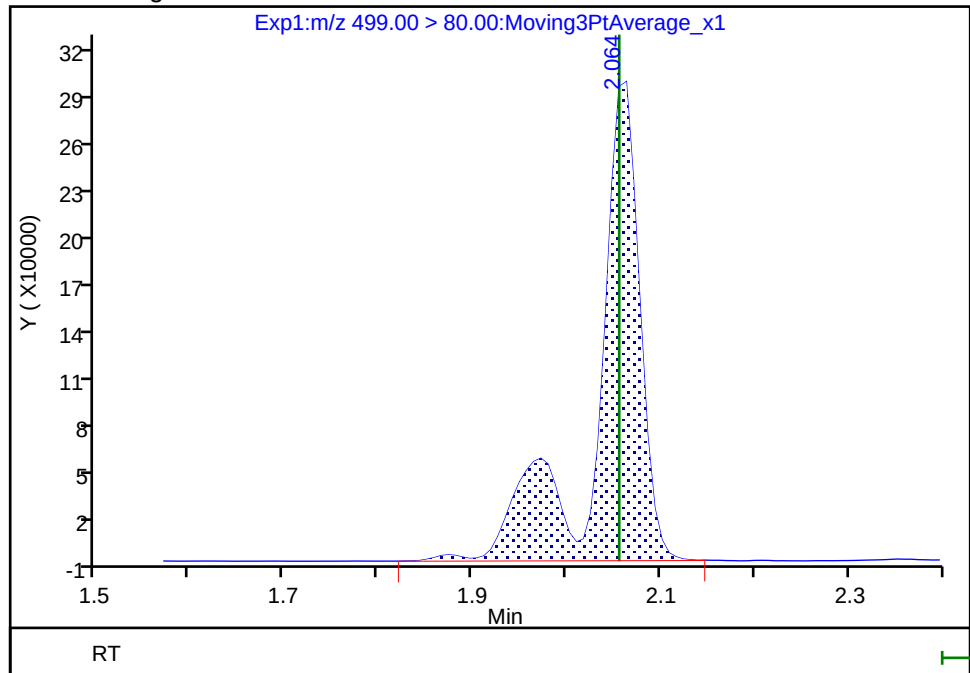
Not Detected
Expected RT: 2.06

Processing Integration Results



RT: 2.06
Area: 963630
Amount: 8.315555
Amount Units: ng/ml

Manual Integration Results



Reviewer: roycea, 21-Jul-2018 12:58:27

Audit Action: Manually Integrated

Audit Reason: Assign Peak

TestAmerica Sacramento

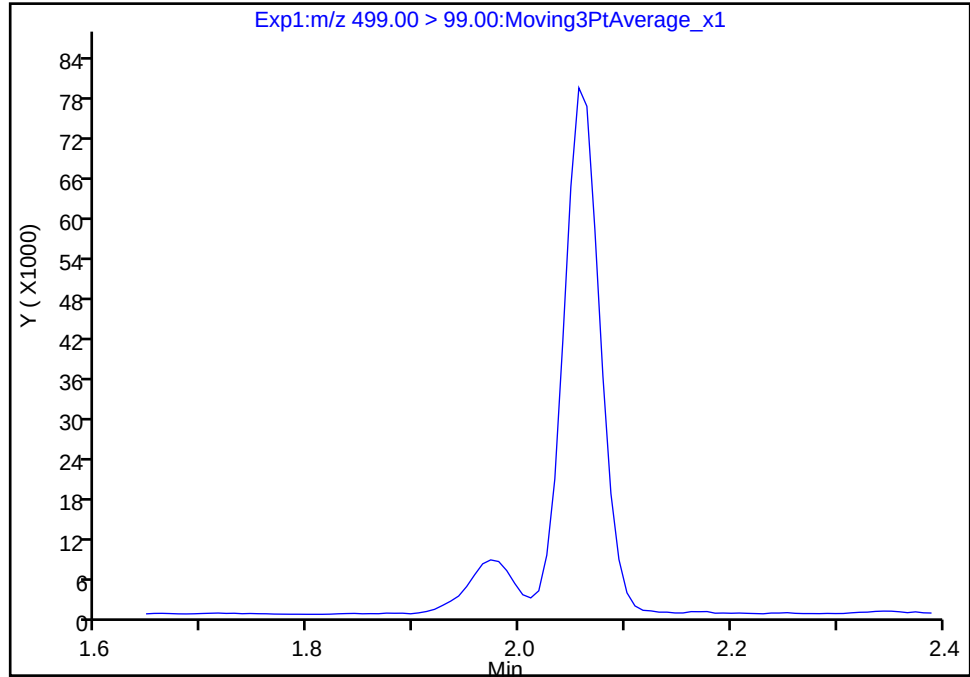
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_004.d
Injection Date: 21-Jul-2018 12:26:23 Instrument ID: A8_N
Lims ID: IC L2
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 2

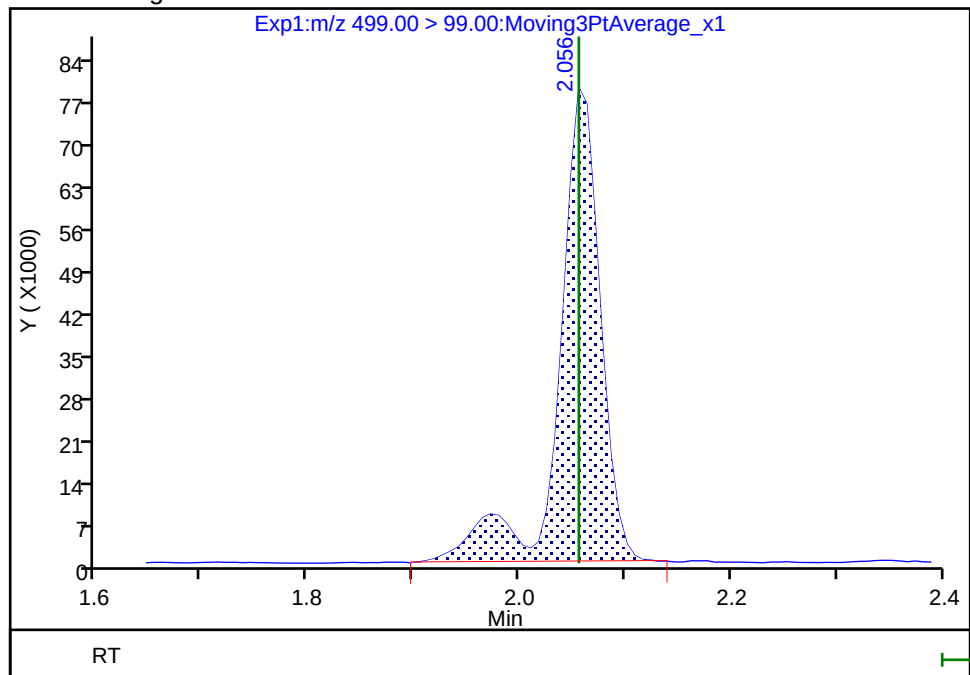
Not Detected
Expected RT: 2.06

Processing Integration Results



Manual Integration Results

RT: 2.06
Area: 211829
Amount: 8.315555
Amount Units: ng/ml



Reviewer: roycea, 21-Jul-2018 12:58:33

Audit Action: Manually Integrated

Audit Reason: Assign Peak

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_005.d
 Lims ID: IC L3
 Client ID:
 Sample Type: IC Calib Level: 3
 Inject. Date: 21-Jul-2018 12:31:04 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\20180721-61414.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 21-Jul-2018 14:51:37 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK022

First Level Reviewer: roycea

Date: 21-Jul-2018 13:00:02

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.358	1.357	0.001	1.000	6349004	49.1		5603	
298.90 > 99.00	1.358	1.357	0.001	1.000	4286827		1.48(0.00-0.00)	5258	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.479	1.477	0.002	1.000	1324630	9.74		14446	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.624	1.620	0.004	1.000	2808334	14.9		2355	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.624	1.621	0.003	1.000	652127	4.89		74.5	M
* 6 13C2-PFOA									
415.00 > 370.00	1.806	1.803	0.003		1263898	10.0		9936	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.806	1.803	0.003	1.000	1333317	9.79		169	
413.00 > 169.00	1.806	1.803	0.003	1.000	731504		1.82(0.00-0.00)	1602	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.056	2.056	0.0	1.000	2307715	19.7		2607	a
499.00 > 99.00	2.056	2.056	0.0	1.000	510708		4.52(0.00-0.00)	925	a
* 7 13C4 PFOS									
503.00 > 80.00	2.056	2.056	0.0		3150414	28.7		5700	
9 Perfluorononanoic acid									
463.00 > 419.00	2.071	2.065	0.006	1.000	984001	9.83		202	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.247	-0.001	1.000	867028	9.86		7559	

QC Flag Legend

Review Flags

M - Manually Integrated

a - User Assigned ID

Reagents:

LC537-L3_00025

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_005.d

Injection Date: 21-Jul-2018 12:31:04

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

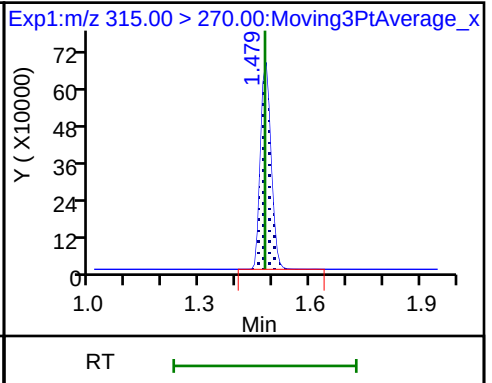
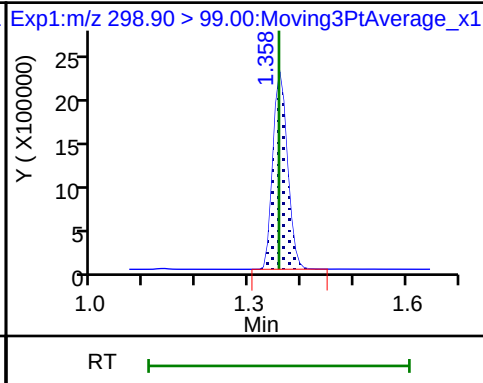
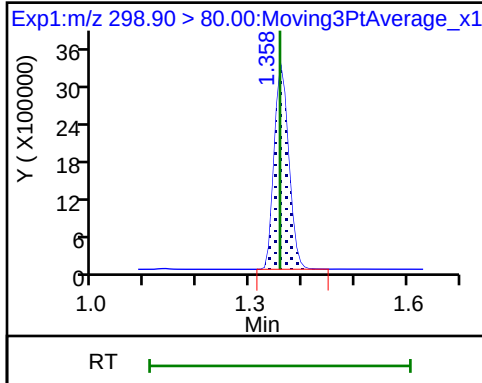
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

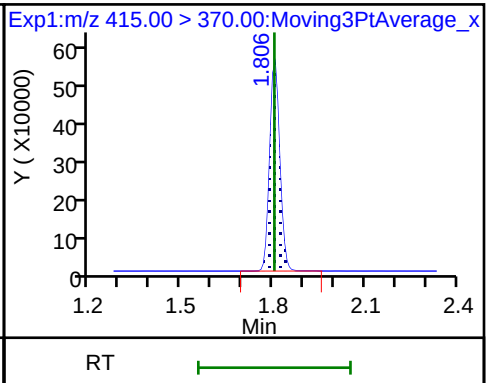
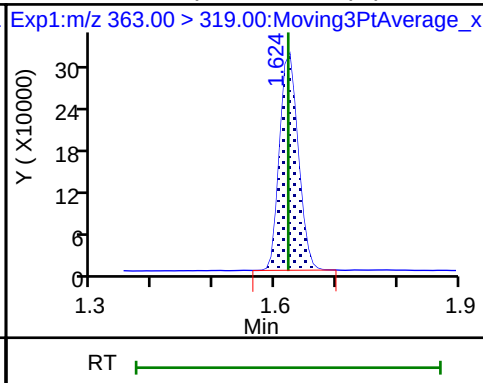
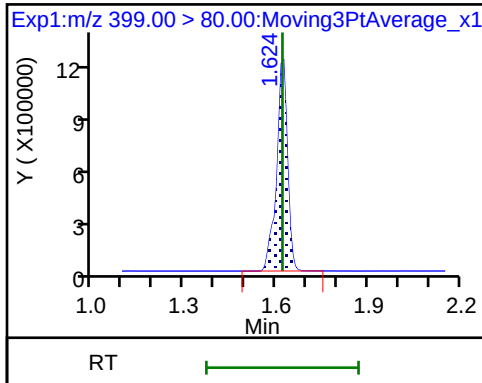
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid (M)

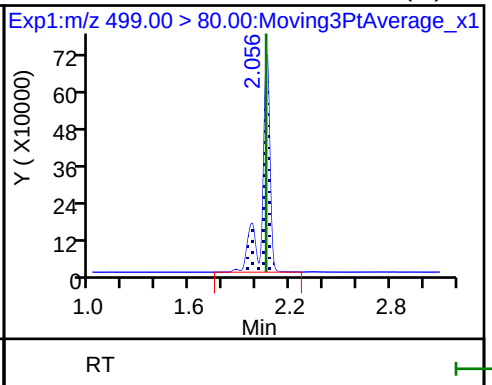
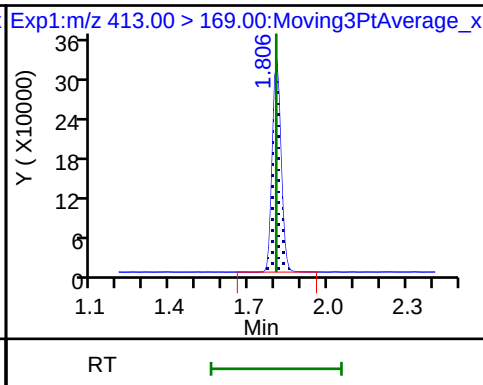
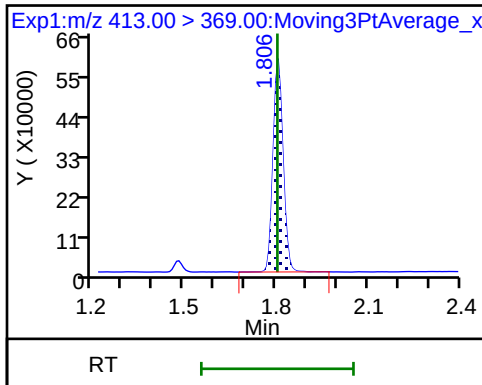
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

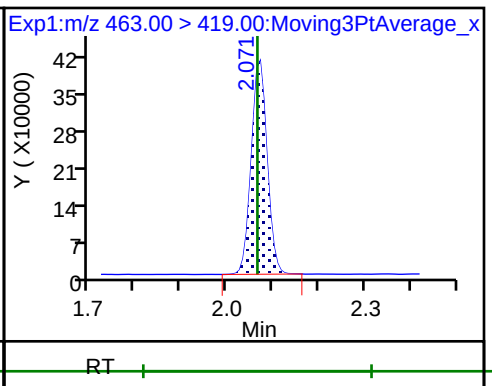
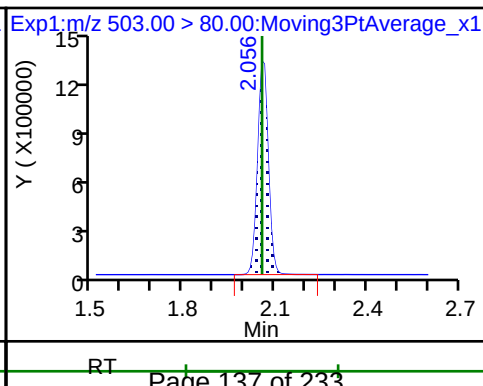
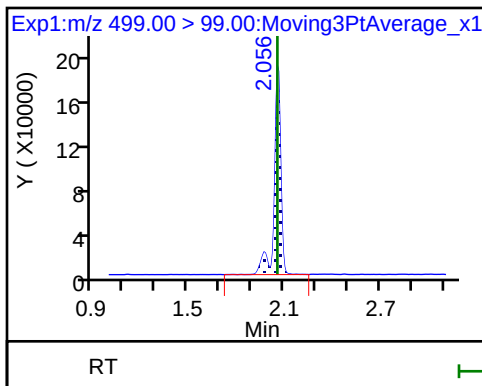
8 Perfluorooctane sulfonic acid (M)



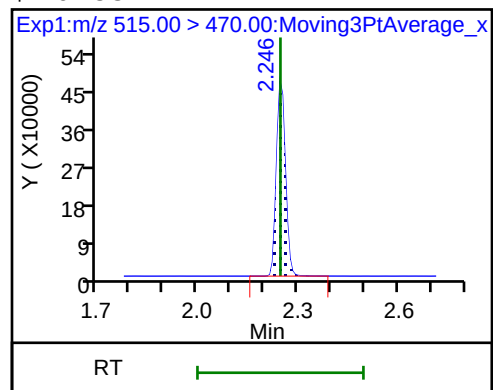
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

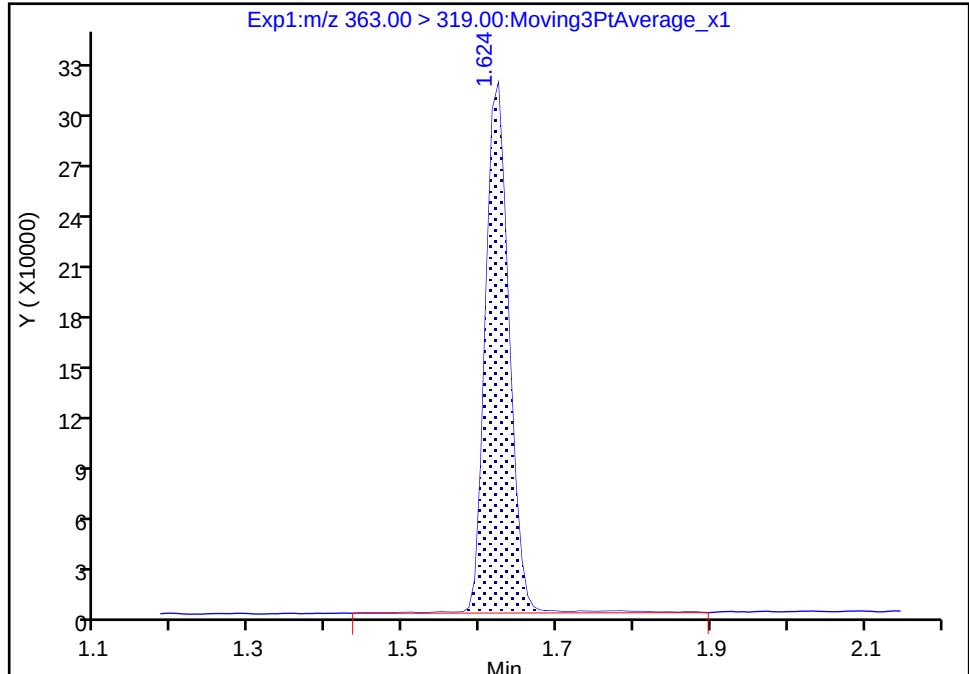
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_005.d
Injection Date: 21-Jul-2018 12:31:04 Instrument ID: A8_N
Lims ID: IC L3
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

4 Perfluoroheptanoic acid, CAS: 375-85-9

Signal: 1

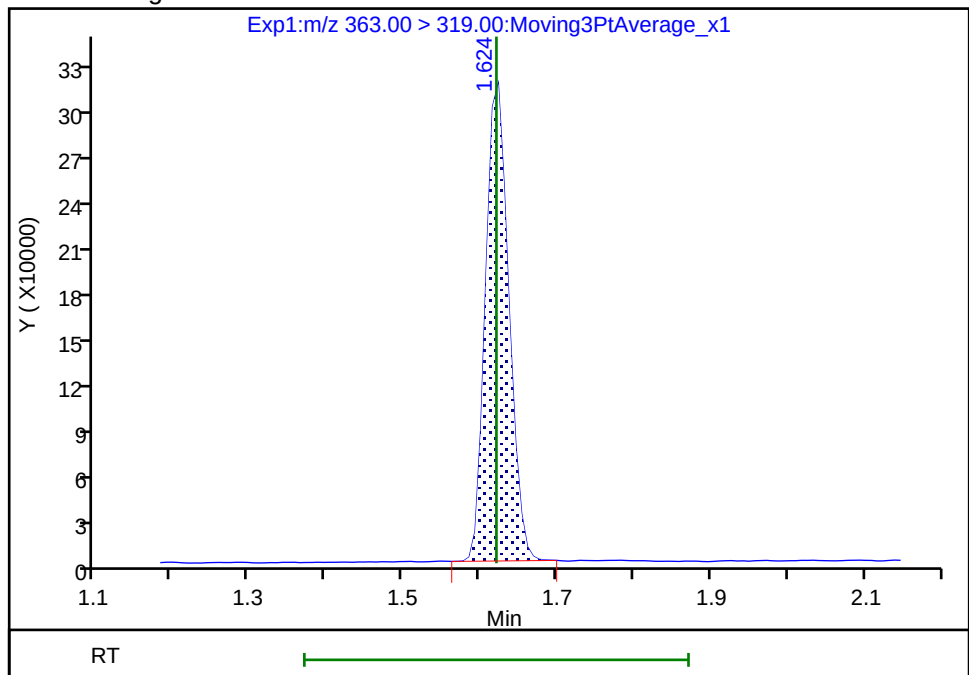
RT: 1.62
Area: 667601
Amount: 4.995971
Amount Units: ng/ml

Processing Integration Results



RT: 1.62
Area: 652127
Amount: 4.892252
Amount Units: ng/ml

Manual Integration Results



Reviewer: roycea, 21-Jul-2018 12:59:38
Audit Action: Manually Integrated

Audit Reason: Baseline
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TestAmerica Sacramento

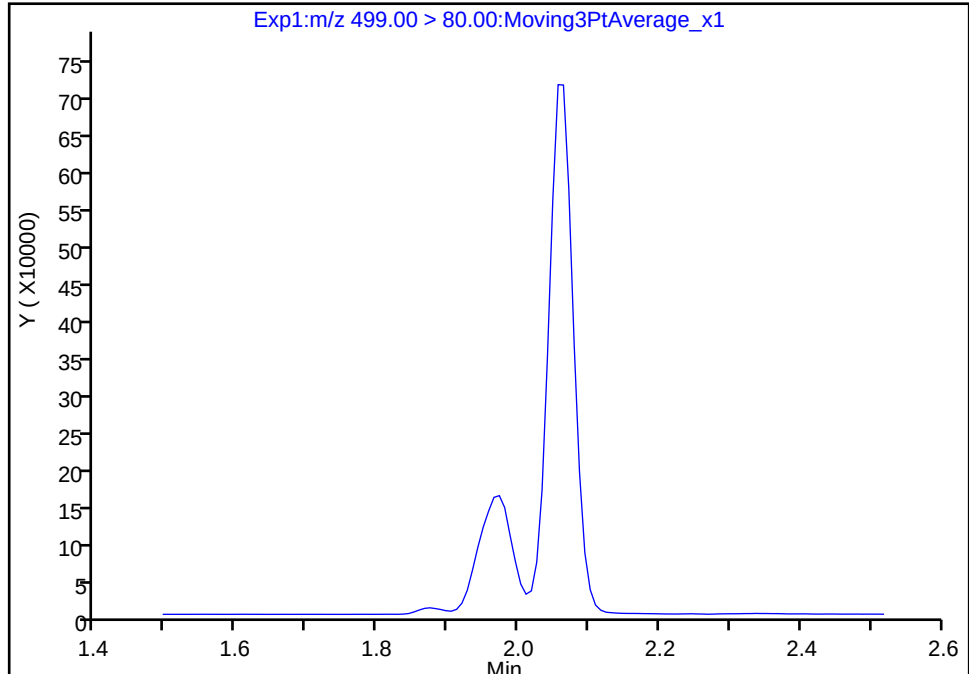
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_005.d
Injection Date: 21-Jul-2018 12:31:04 Instrument ID: A8_N
Lims ID: IC L3
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

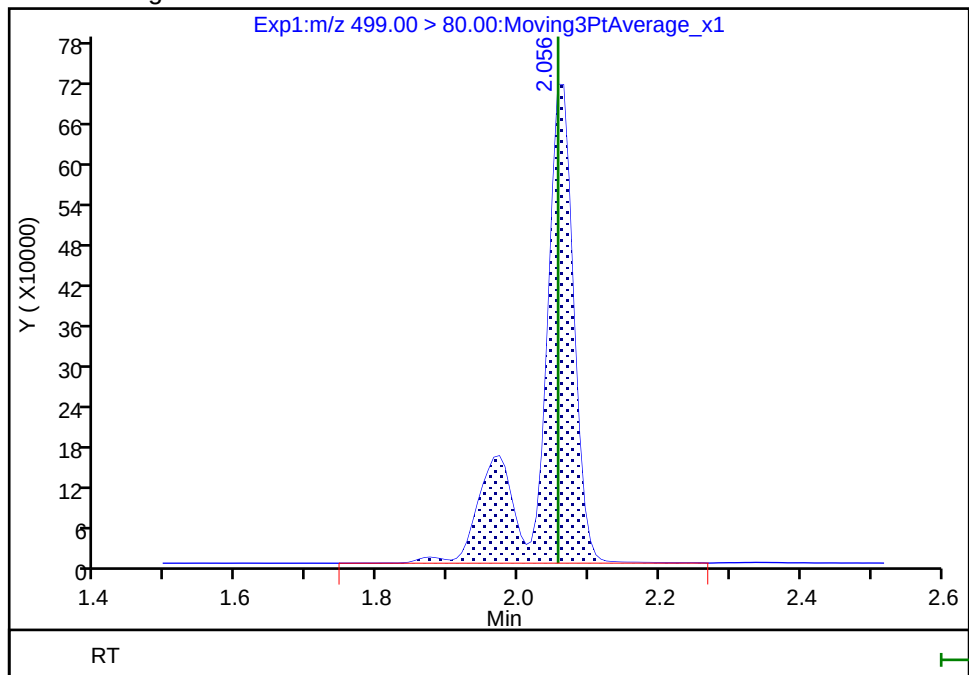
Not Detected
Expected RT: 2.06

Processing Integration Results



RT: 2.06
Area: 2307715
Amount: 19.722503
Amount Units: ng/ml

Manual Integration Results



Reviewer: roycea, 21-Jul-2018 12:59:44
Audit Action: Assigned Compound ID

Audit Reason: Baseline
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TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_006.d
 Lims ID: IC L4
 Client ID:
 Sample Type: ICISAV Calib Level: 4
 Inject. Date: 21-Jul-2018 12:35:44 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\20180721-61414.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 21-Jul-2018 14:51:32 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK022

First Level Reviewer: roycea

Date: 21-Jul-2018 14:51:32

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.350	1.357	-0.007	1.000	10832159	90.5		8106	
298.90 > 99.00	1.350	1.357	-0.007	1.000	7783131		1.39(0.00-0.00)	8986	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.472	1.477	-0.005	1.000	1270784	10.3		14089	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.616	1.620	-0.004	1.000	5428281	31.2		4488	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.616	1.621	-0.005	1.000	1194139	9.83		129	
* 6 13C2-PFOA									
415.00 > 370.00	1.798	1.803	-0.005		1151615	10.0		8605	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.798	1.803	-0.005	1.000	2496915	20.1		324	
413.00 > 169.00	1.798	1.803	-0.005	1.000	1316711		1.90(0.00-0.00)	2664	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.048	2.056	-0.008	1.000	4414336	40.7		5777	a
499.00 > 99.00	2.048	2.056	-0.008	1.000	942658		4.68(0.00-0.00)	1771	a
* 7 13C4 PFOS									
503.00 > 80.00	2.048	2.056	-0.008		2917514	28.7		5274	
9 Perfluorononanoic acid									
463.00 > 419.00	2.056	2.065	-0.009	1.000	1842282	20.2		375	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.247	-0.001	1.000	807504	10.1		6189	

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\20180721-61414.b\2018.07.21_537CURVE_006.d

Injection Date: 21-Jul-2018 12:35:44

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

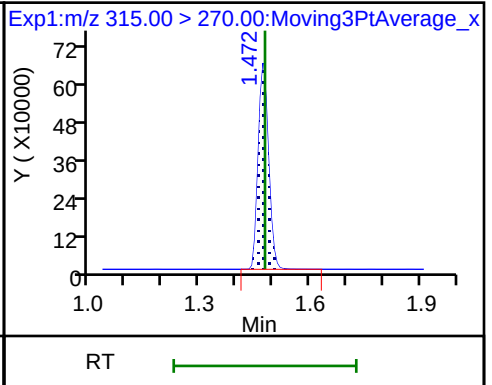
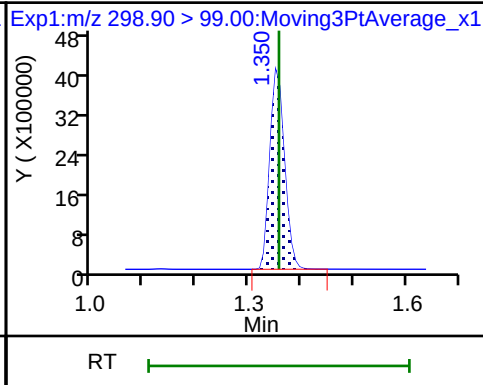
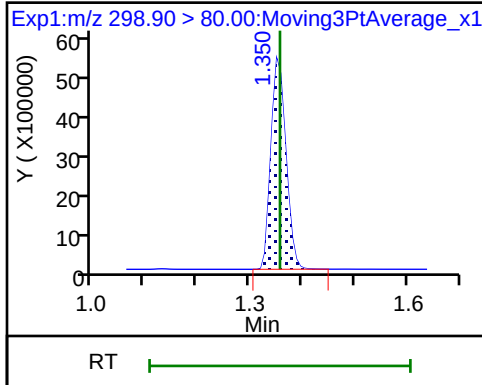
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

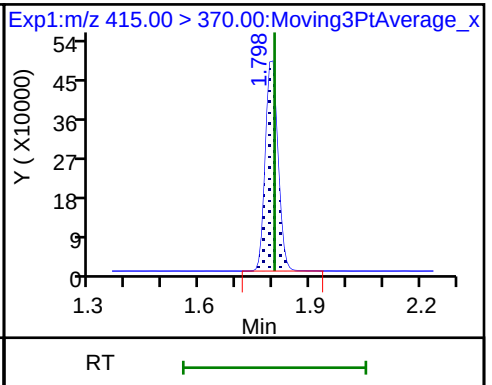
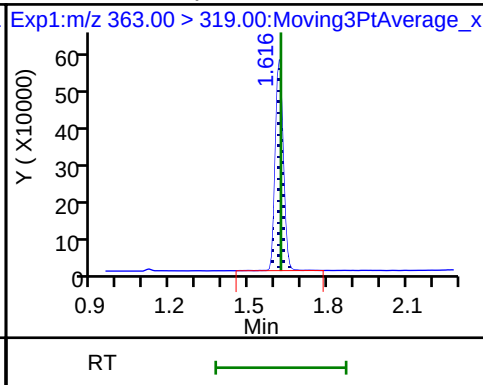
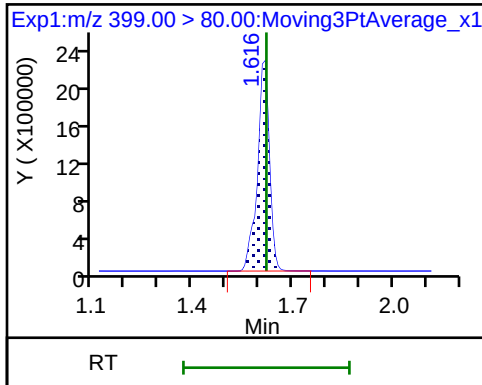
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

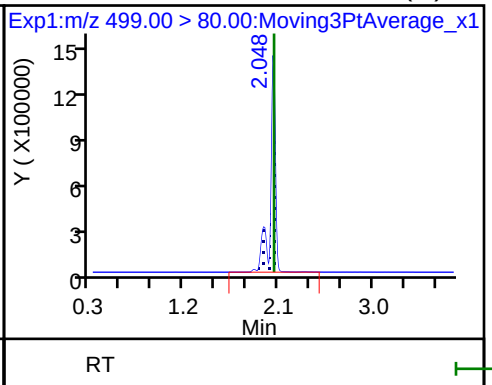
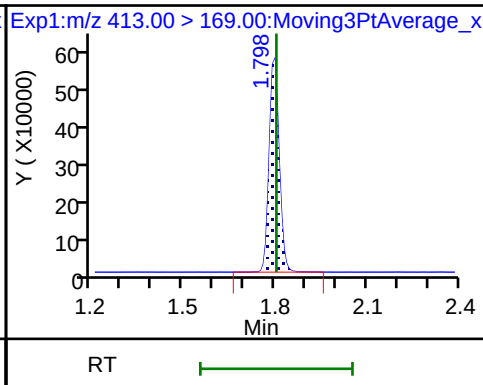
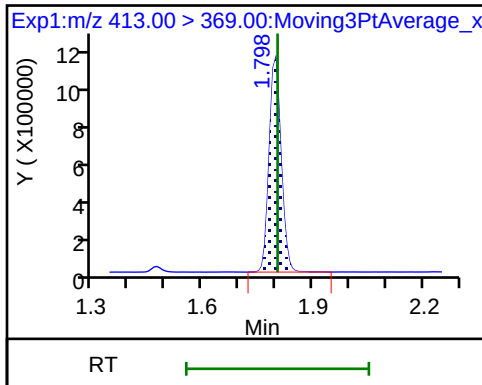
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

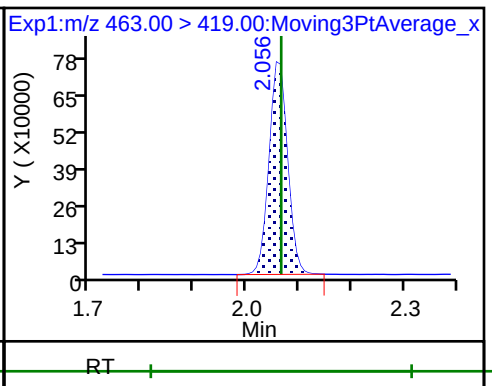
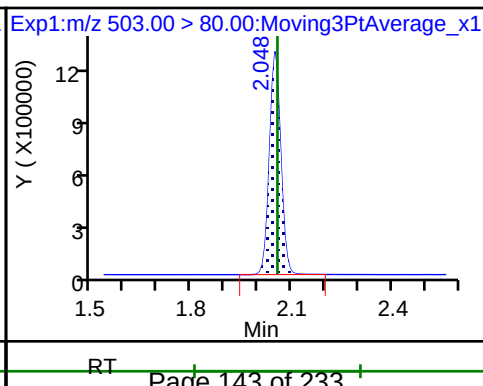
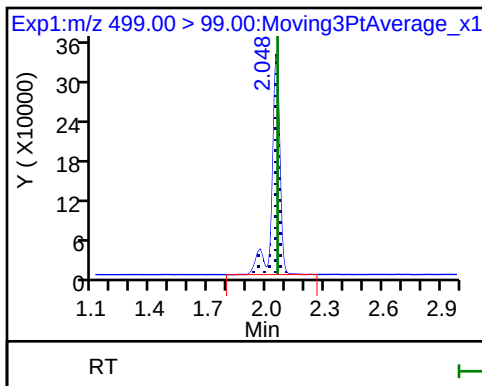
8 Perfluorooctane sulfonic acid (M)



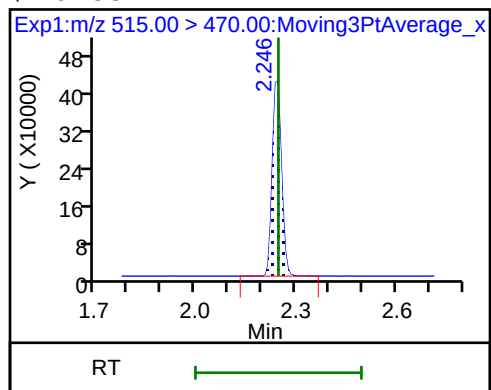
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

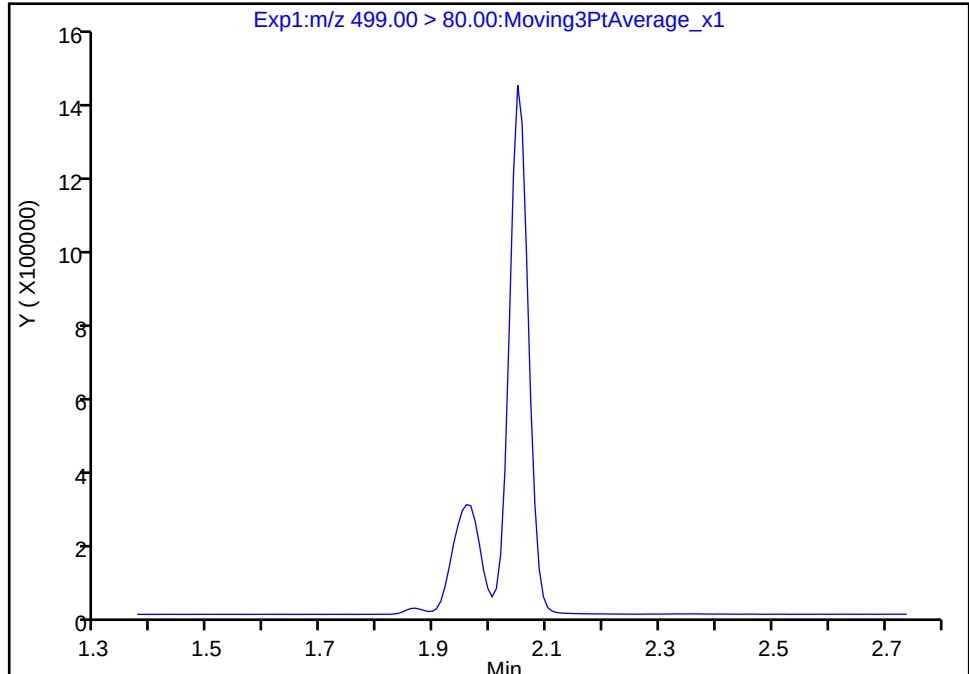
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_006.d
Injection Date: 21-Jul-2018 12:35:44 Instrument ID: A8_N
Lims ID: IC L4
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 4 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

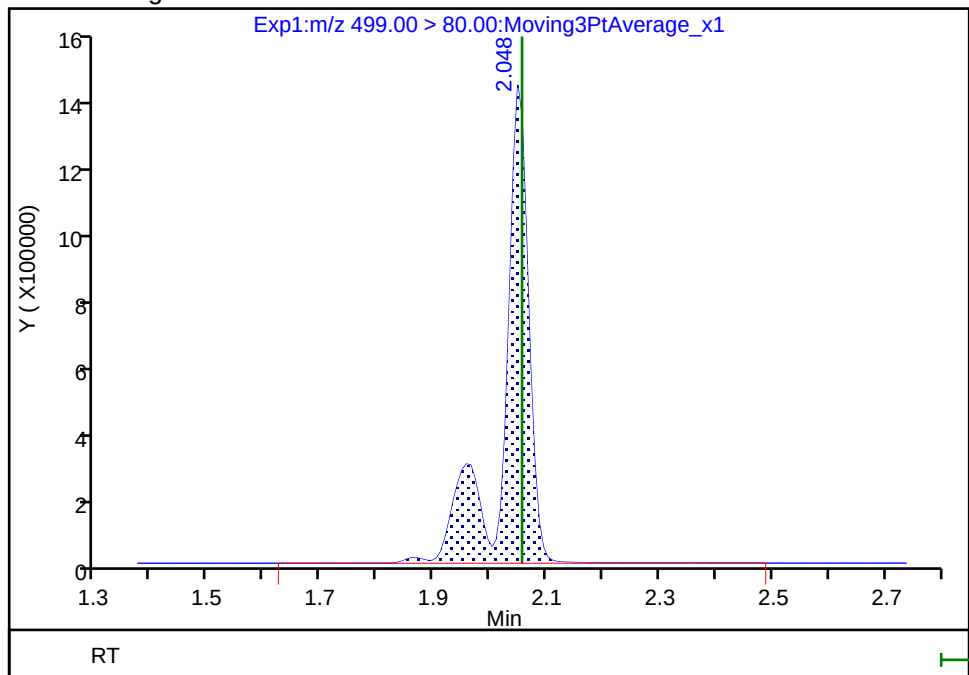
Not Detected
Expected RT: 2.06

Processing Integration Results



Manual Integration Results

RT: 2.05
Area: 4414336
Amount: 40.738022
Amount Units: ng/ml



Reviewer: roycea, 21-Jul-2018 13:00:12

Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_007.d
 Lims ID: IC L5
 Client ID:
 Sample Type: IC Calib Level: 5
 Inject. Date: 21-Jul-2018 12:40:26 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\20180721-61414.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 21-Jul-2018 14:51:38 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK022

First Level Reviewer: roycea

Date: 21-Jul-2018 13:00:59

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.358	1.357	0.001	1.000	14336242	123.8		9919	
298.90 > 99.00	1.358	1.357	0.001	1.000	10389441		1.38(0.00-0.00)	10715	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.479	1.477	0.002	1.000	1212894	9.69		14230	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.624	1.620	0.004	1.000	7728080	45.9		6177	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.624	1.621	0.003	1.000	1759394	14.3		199	
* 6 13C2-PFOA									
415.00 > 370.00	1.806	1.803	0.003		1163367	10.0		10890	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.806	1.803	0.003	1.000	3725583	29.7		503	
413.00 > 169.00	1.806	1.803	0.003	1.000	1957436		1.90(0.00-0.00)	3998	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.056	2.056	0.0	1.000	6367762	60.8		7602	a
499.00 > 99.00	2.056	2.056	0.0	1.000	1358795		4.69(0.00-0.00)	2425	a
* 7 13C4 PFOS									
503.00 > 80.00	2.056	2.056	0.0		2821978	28.7		6075	
9 Perfluorononanoic acid									
463.00 > 419.00	2.064	2.065	-0.001	1.000	2668663	29.0		514	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.247	-0.001	1.000	796607	9.84		8285	

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\20180721-61414.b\2018.07.21_537CURVE_007.d

Injection Date: 21-Jul-2018 12:40:26

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

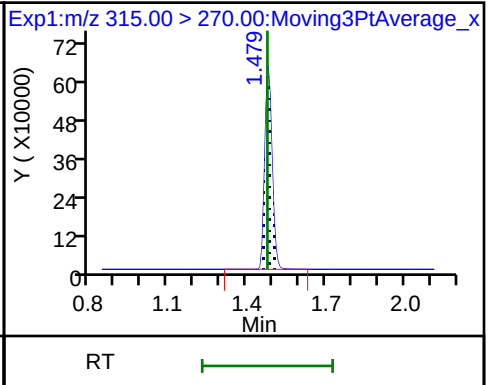
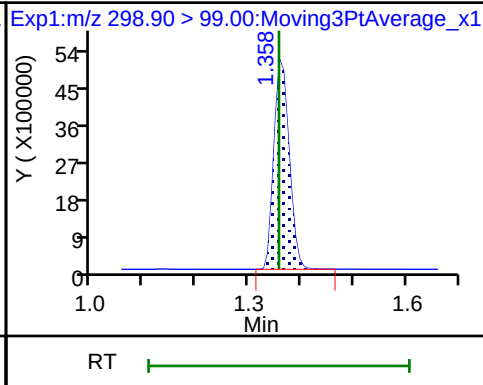
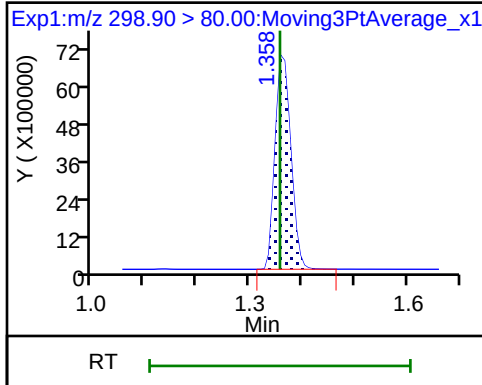
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

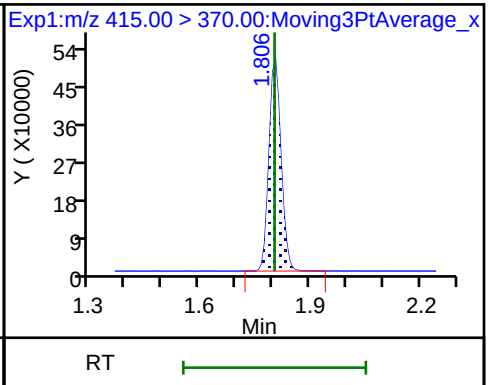
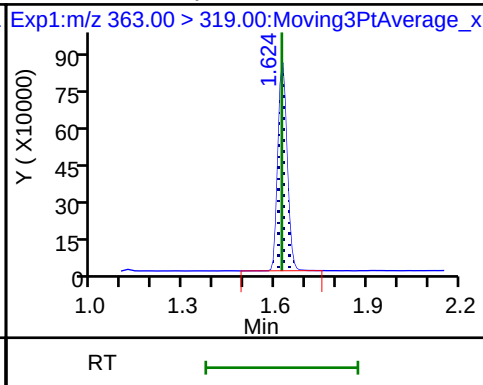
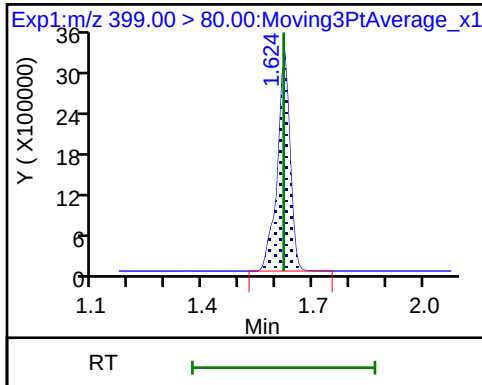
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

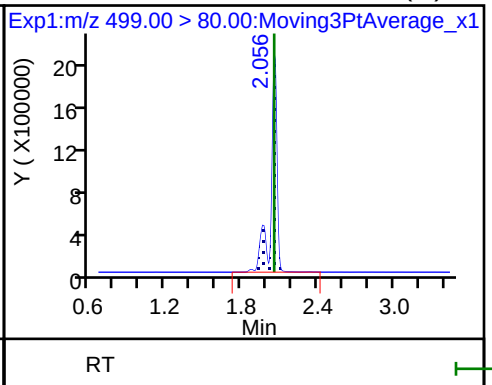
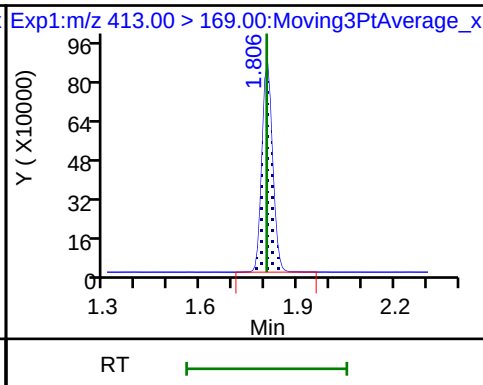
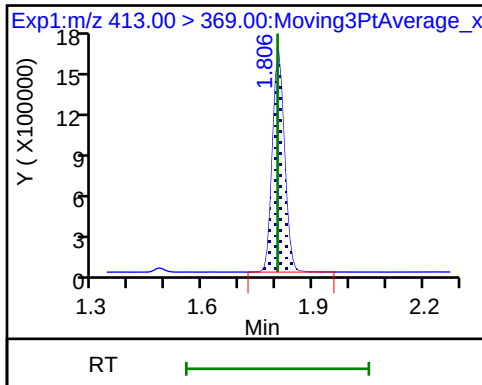
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

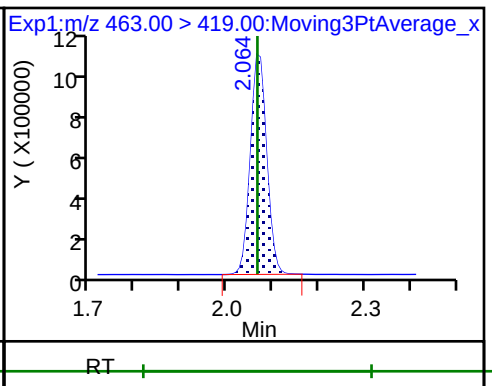
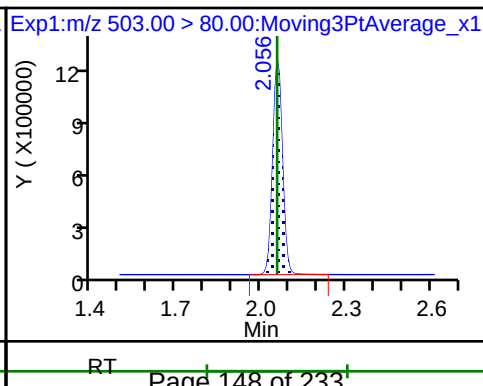
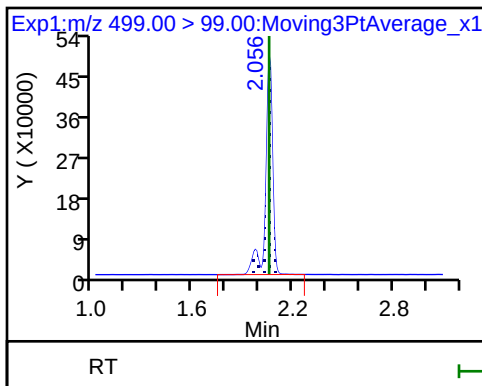
8 Perfluorooctane sulfonic acid (M)



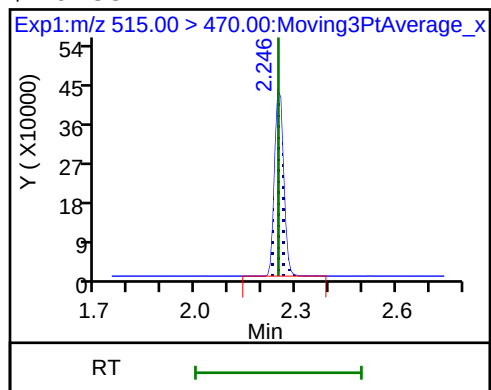
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

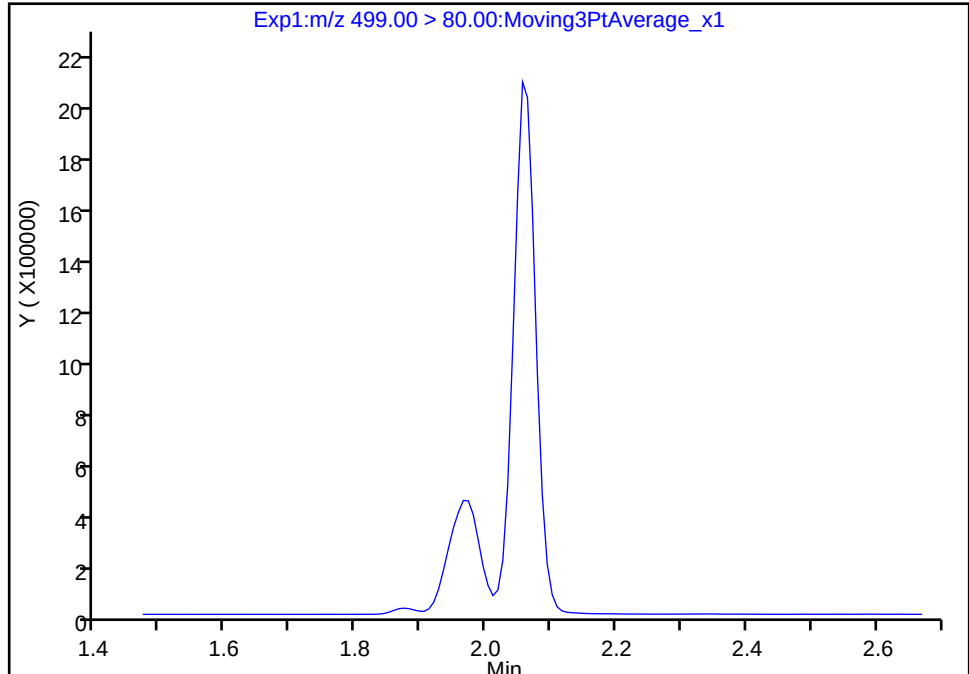
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_007.d
Injection Date: 21-Jul-2018 12:40:26 Instrument ID: A8_N
Lims ID: IC L5
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

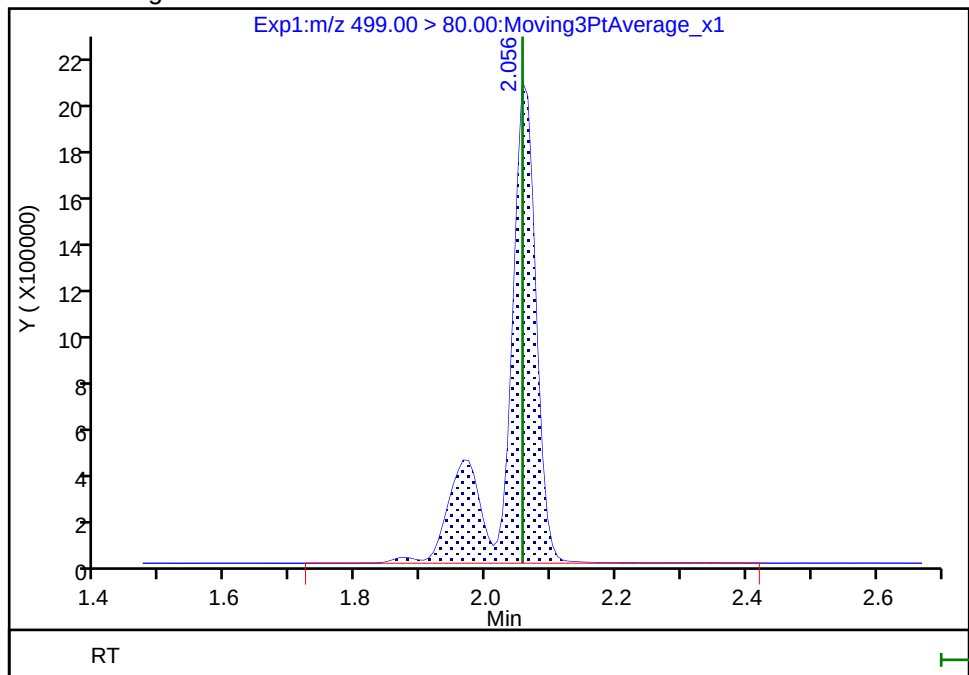
Not Detected
Expected RT: 2.06

Processing Integration Results



RT: 2.06
Area: 6367762
Amount: 60.754814
Amount Units: ng/ml

Manual Integration Results



Reviewer: roycea, 21-Jul-2018 13:00:42
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected
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TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d
 Lims ID: IC L6
 Client ID:
 Sample Type: IC Calib Level: 6
 Inject. Date: 21-Jul-2018 12:45:07 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\20180721-61414.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 21-Jul-2018 14:51:39 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK022

First Level Reviewer: roycea

Date: 21-Jul-2018 13:01:19

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.358	1.357	0.001	1.000	17778336	150.1		11741	
298.90 > 99.00	1.358	1.357	0.001	1.000	13154200		1.35(0.00-0.00)	12178	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.472	1.477	-0.005	1.000	1298612	10.7		14563	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.616	1.620	-0.004	1.000	10233792	59.4		7601	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.616	1.621	-0.005	1.000	2367732	19.9		259	
* 6 13C2-PFOA									
415.00 > 370.00	1.798	1.803	-0.005		1126134	10.0		9806	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.798	1.803	-0.005	1.000	4835518	39.8		675	
413.00 > 169.00	1.798	1.803	-0.005	1.000	2630066		1.84(0.00-0.00)	5843	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.056	2.056	0.0	1.000	8546272	79.7		9451	a
499.00 > 99.00	2.056	2.056	0.0	1.000	1842612		4.64(0.00-0.00)	3404	a
* 7 13C4 PFOS									
503.00 > 80.00	2.056	2.056	0.0		2887592	28.7		5453	
9 Perfluorononanoic acid									
463.00 > 419.00	2.064	2.065	-0.001	1.000	3541730	39.7		698	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.247	-0.001	1.000	800909	10.2		8580	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L6_00022

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Injection Date: 21-Jul-2018 12:45:07

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

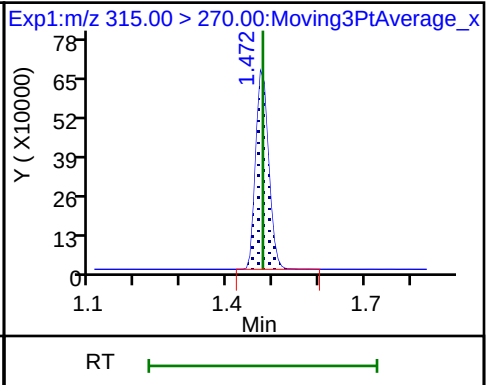
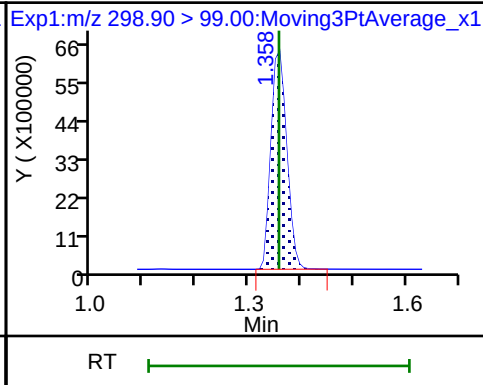
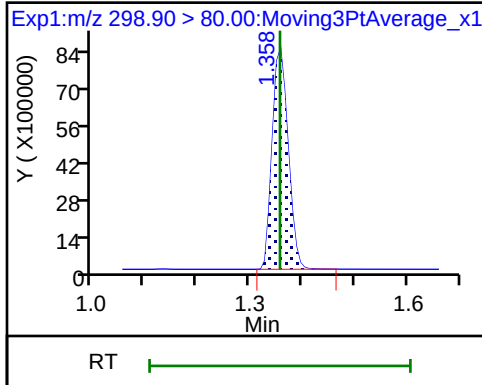
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

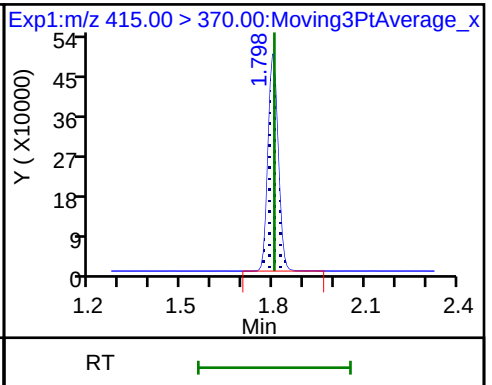
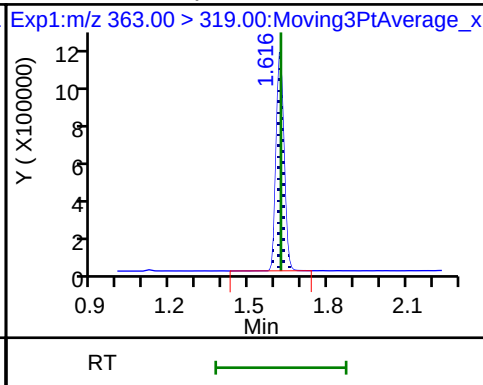
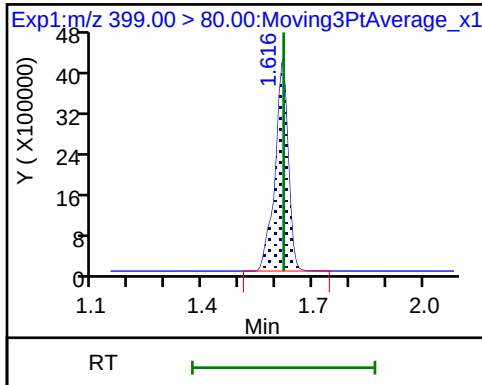
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

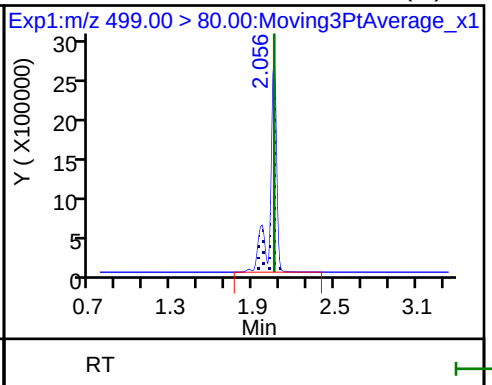
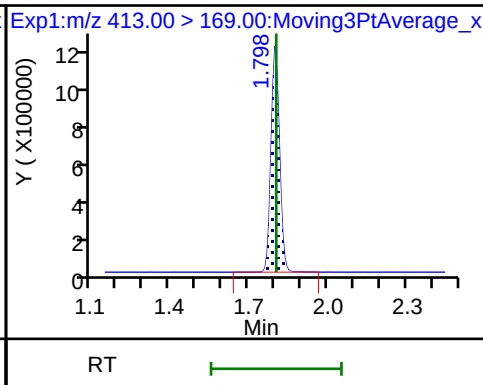
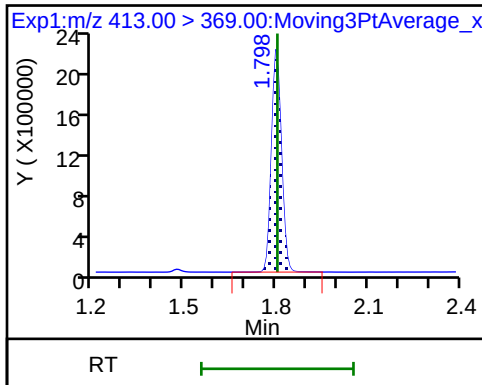
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

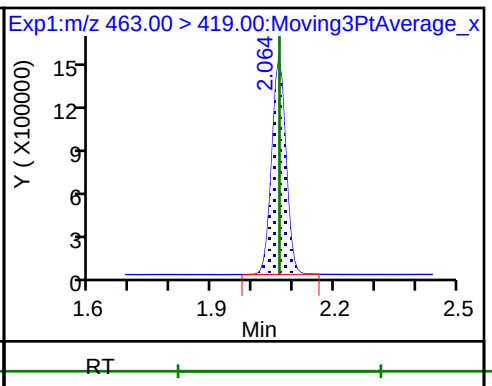
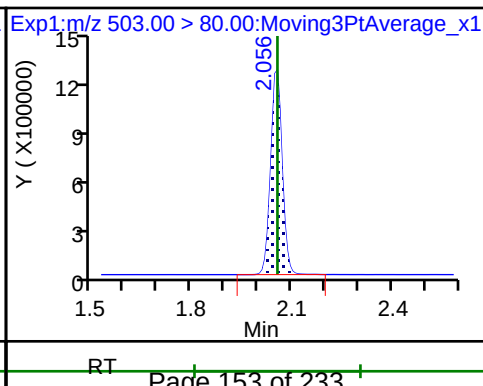
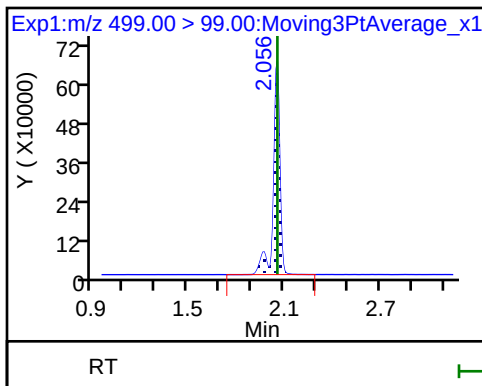
8 Perfluorooctane sulfonic acid (M)



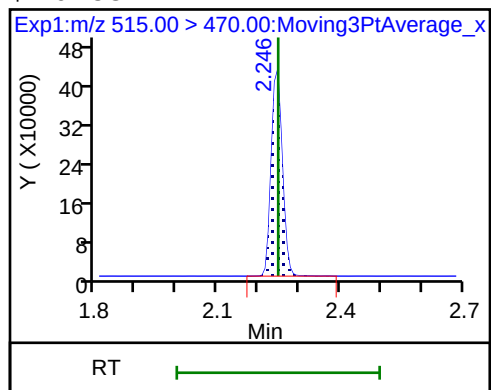
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

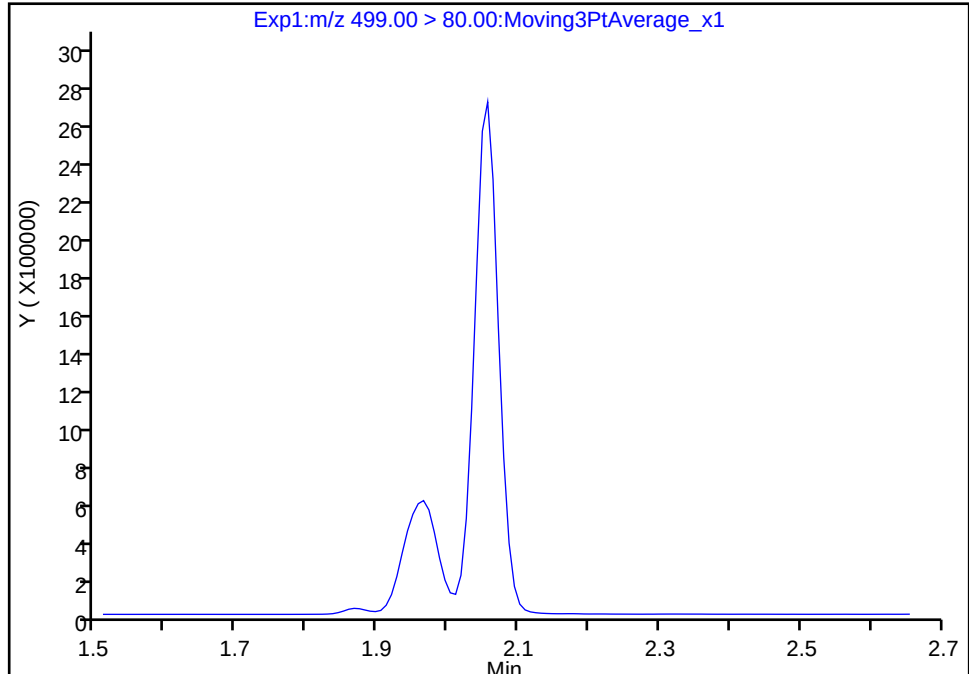
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d
Injection Date: 21-Jul-2018 12:45:07 Instrument ID: A8_N
Lims ID: IC L6
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 6 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

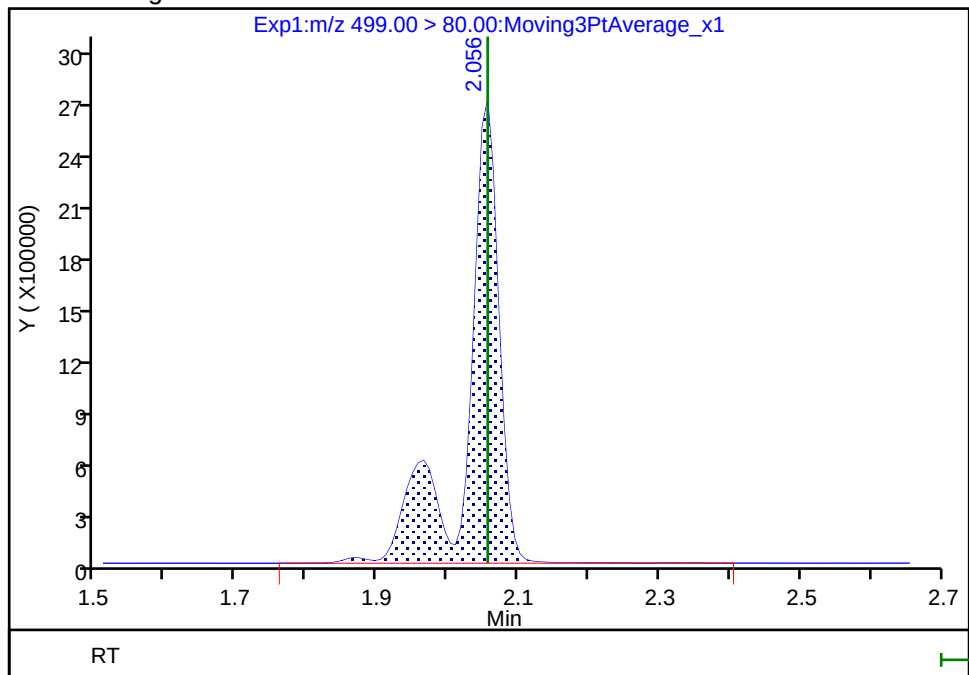
Not Detected
Expected RT: 2.06

Processing Integration Results



Manual Integration Results

RT: 2.06
Area: 8546272
Amount: 79.687165
Amount Units: ng/ml



Reviewer: roycea, 21-Jul-2018 13:01:08
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected
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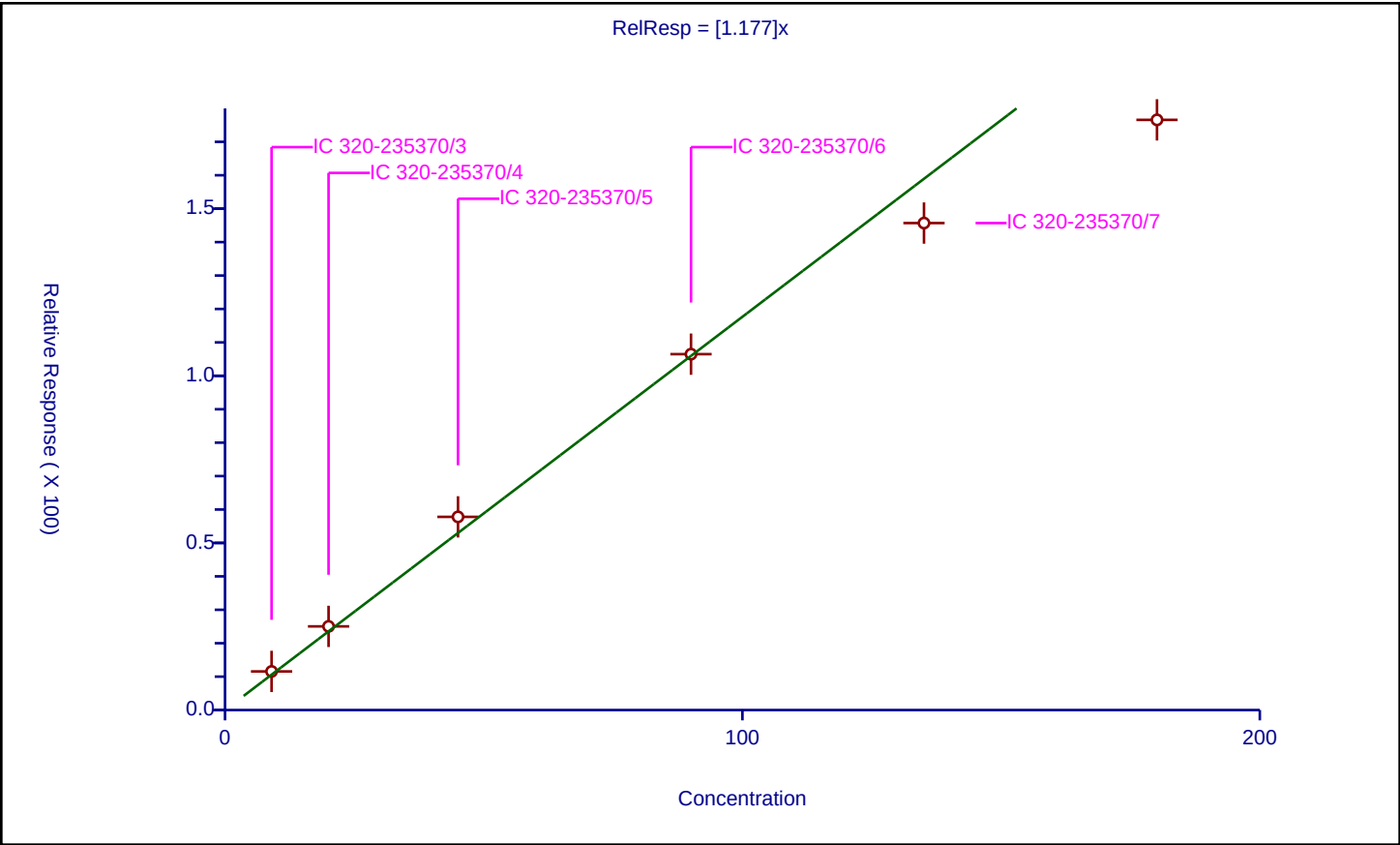
Calibration

/ Perfluorobutanesulfonic acid

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

Curve Coefficients	
Intercept:	0
Slope:	1.177
Error Coefficients	
Standard Error:	11700000
Relative Standard Error:	10.5
Correlation Coefficient:	0.985
Coefficient of Determination (Adjusted):	0.981

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-235370/3	8.99912	11.555668	28.68	2811428.0	1.284089	Y
2	IC 320-235370/4	20.01376	25.030221	28.68	3120086.0	1.250651	Y
3	IC 320-235370/5	45.03096	57.798573	28.68	3150414.0	1.28353	Y
4	IC 320-235370/6	90.06192	106.483232	28.68	2917514.0	1.182334	Y
5	IC 320-235370/7	135.09288	145.700434	28.68	2821978.0	1.07852	Y
6	IC 320-235370/8	180.12384	176.577119	28.68	2887592.0	0.98031	Y



Calibration

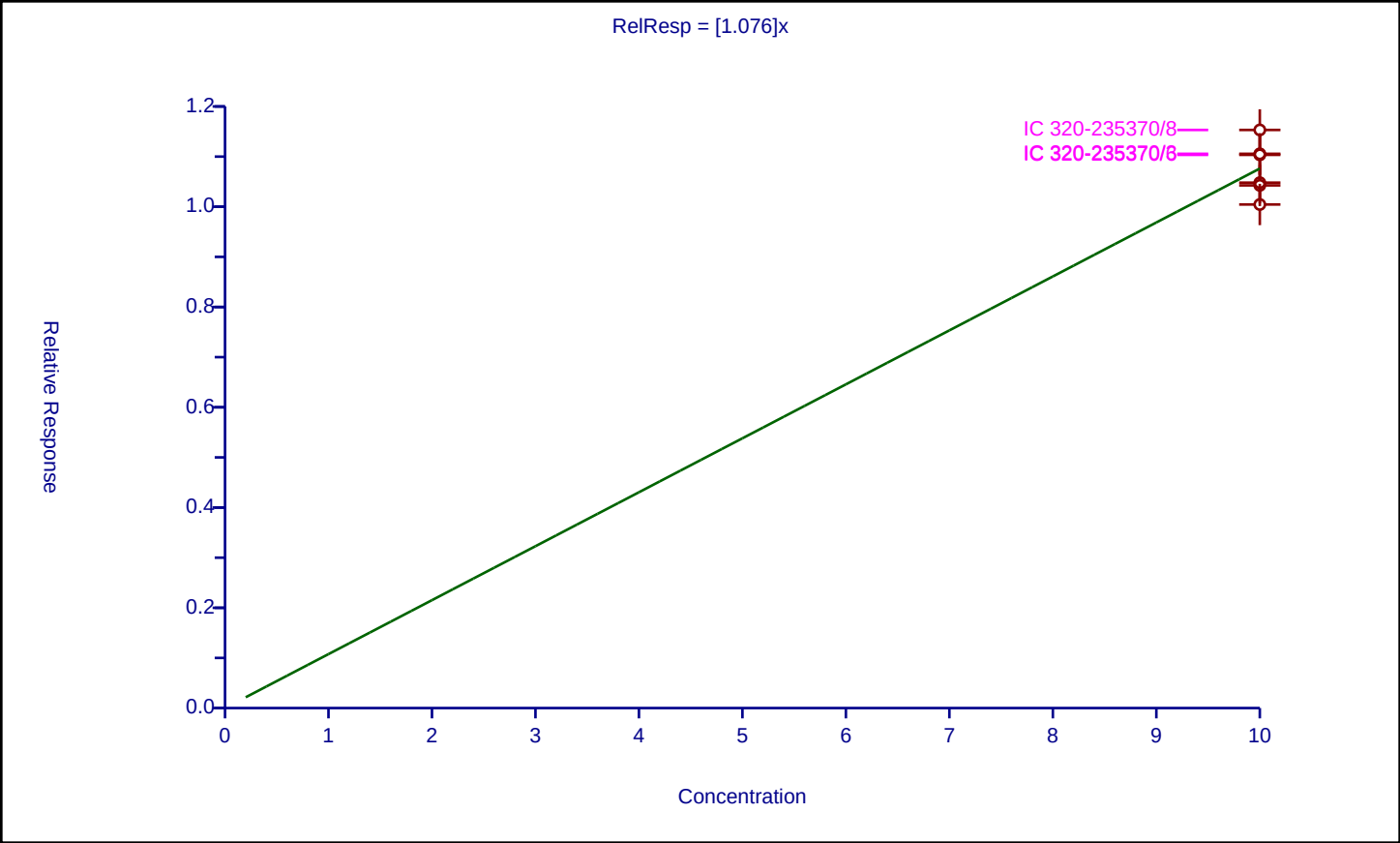
/ 13C2 PFHxA

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

Curve Coefficients	
Intercept:	0
Slope:	1.076

Error Coefficients	
Standard Error:	1390000
Relative Standard Error:	5.0
Correlation Coefficient:	0.00000000000000000000
Coefficient of Determination (Adjusted):	0

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-235370/3	10.0	11.055994	10.0	1104504.0	1.105599	Y
2	IC 320-235370/4	10.0	10.044906	10.0	1284004.0	1.004491	Y
3	IC 320-235370/5	10.0	10.480513	10.0	1263898.0	1.048051	Y
4	IC 320-235370/6	10.0	11.034799	10.0	1151615.0	1.10348	Y
5	IC 320-235370/7	10.0	10.425721	10.0	1163367.0	1.042572	Y
6	IC 320-235370/8	10.0	11.531594	10.0	1126134.0	1.153159	Y



Calibration

/ Perfluoroheptanoic acid

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

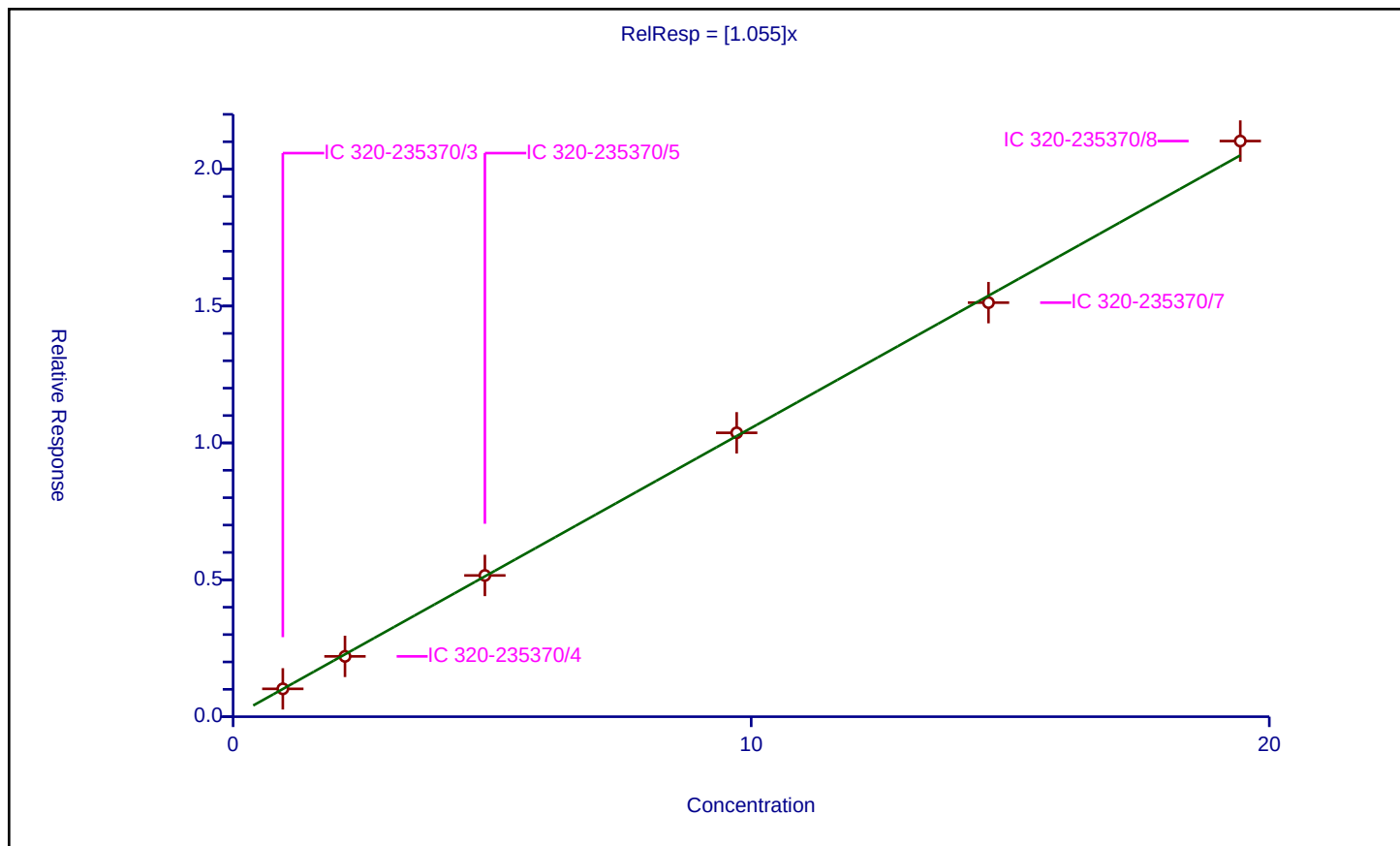
Curve Coefficients

Intercept: 0
Slope: 1.055

Error Coefficients

Standard Error: 1460000
Relative Standard Error: 2.1
Correlation Coefficient: 0.999
Coefficient of Determination (Adjusted): 0.999

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-235370/3	0.96	1.018041	10.0	1104504.0	1.060459	Y
2	IC 320-235370/4	2.16	2.203677	10.0	1284004.0	1.020221	Y
3	IC 320-235370/5	4.86	5.159649	10.0	1263898.0	1.061656	Y
4	IC 320-235370/6	9.72	10.369255	10.0	1151615.0	1.066796	Y
5	IC 320-235370/7	14.58	15.123293	10.0	1163367.0	1.037263	Y
6	IC 320-235370/8	19.44	21.025313	10.0	1126134.0	1.081549	Y



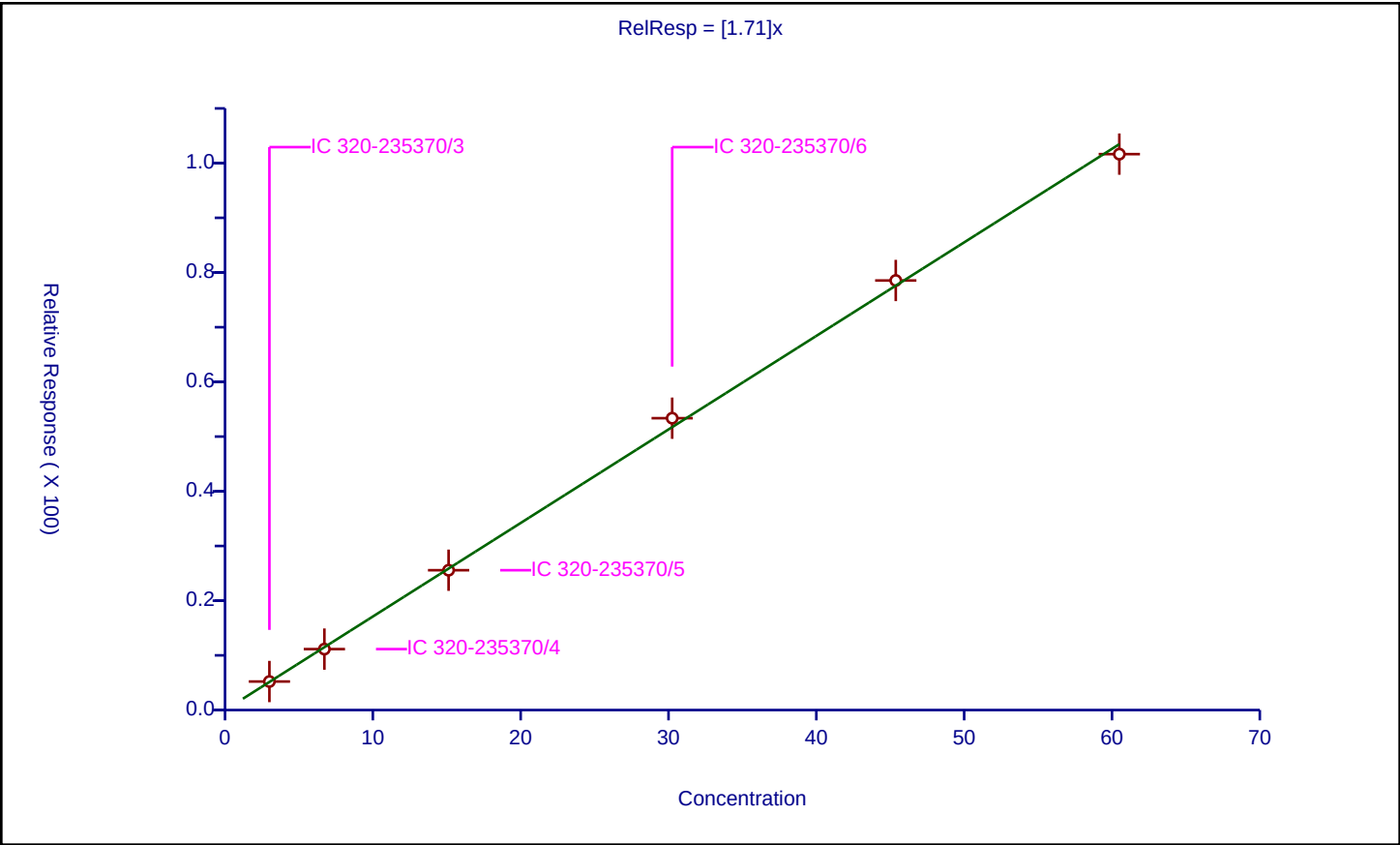
Calibration

/ Perfluorohexanesulfonic acid

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

Curve Coefficients	
Intercept:	0
Slope:	1.71
Error Coefficients	
Standard Error:	6380000
Relative Standard Error:	2.4
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.999

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-235370/3	3.003	5.217945	28.68	2811428.0	1.737578	Y
2	IC 320-235370/4	6.721867	11.143316	28.68	3120086.0	1.657771	Y
3	IC 320-235370/5	15.1242	25.565852	28.68	3150414.0	1.690394	Y
4	IC 320-235370/6	30.2484	53.36156	28.68	2917514.0	1.764112	Y
5	IC 320-235370/7	45.3726	78.541128	28.68	2821978.0	1.731026	Y
6	IC 320-235370/8	60.4968	101.643568	28.68	2887592.0	1.680148	Y



Calibration

/ Perfluorooctanoic acid

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

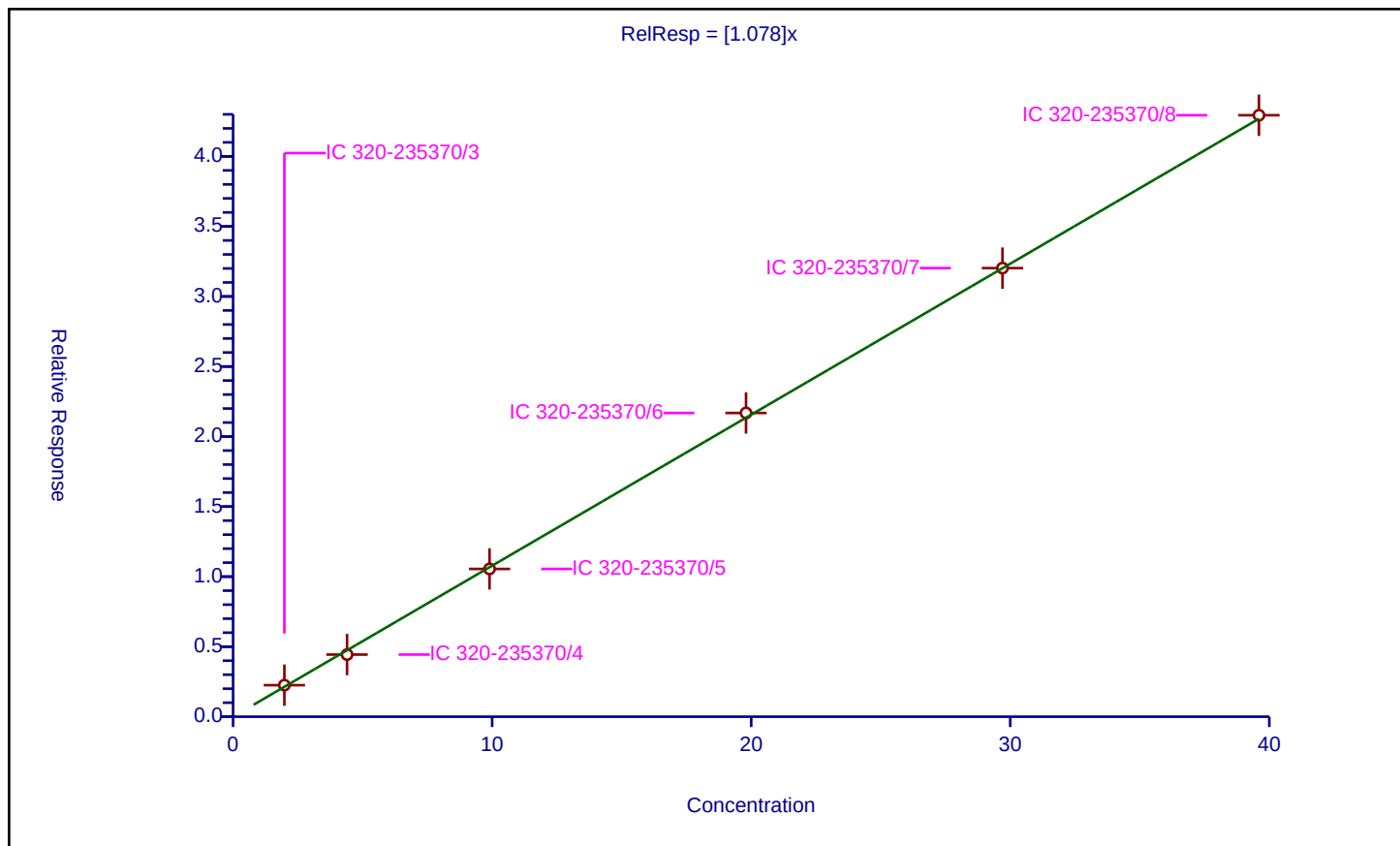
Curve Coefficients

Intercept: 0
 Slope: 1.078

Error Coefficients

Standard Error: 3020000
 Relative Standard Error: 3.9
 Correlation Coefficient: 0.999
 Coefficient of Determination (Adjusted): 0.998

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-235370/3	1.98	2.250838	10.0	1104504.0	1.136787	Y
2	IC 320-235370/4	4.4	4.435212	10.0	1284004.0	1.008003	Y
3	IC 320-235370/5	9.9	10.549245	10.0	1263898.0	1.06558	Y
4	IC 320-235370/6	19.8	21.681855	10.0	1151615.0	1.095043	Y
5	IC 320-235370/7	29.7	32.024142	10.0	1163367.0	1.078254	Y
6	IC 320-235370/8	39.6	42.9391	10.0	1126134.0	1.084321	Y



Calibration

/ Perfluorooctane sulfonic acid

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

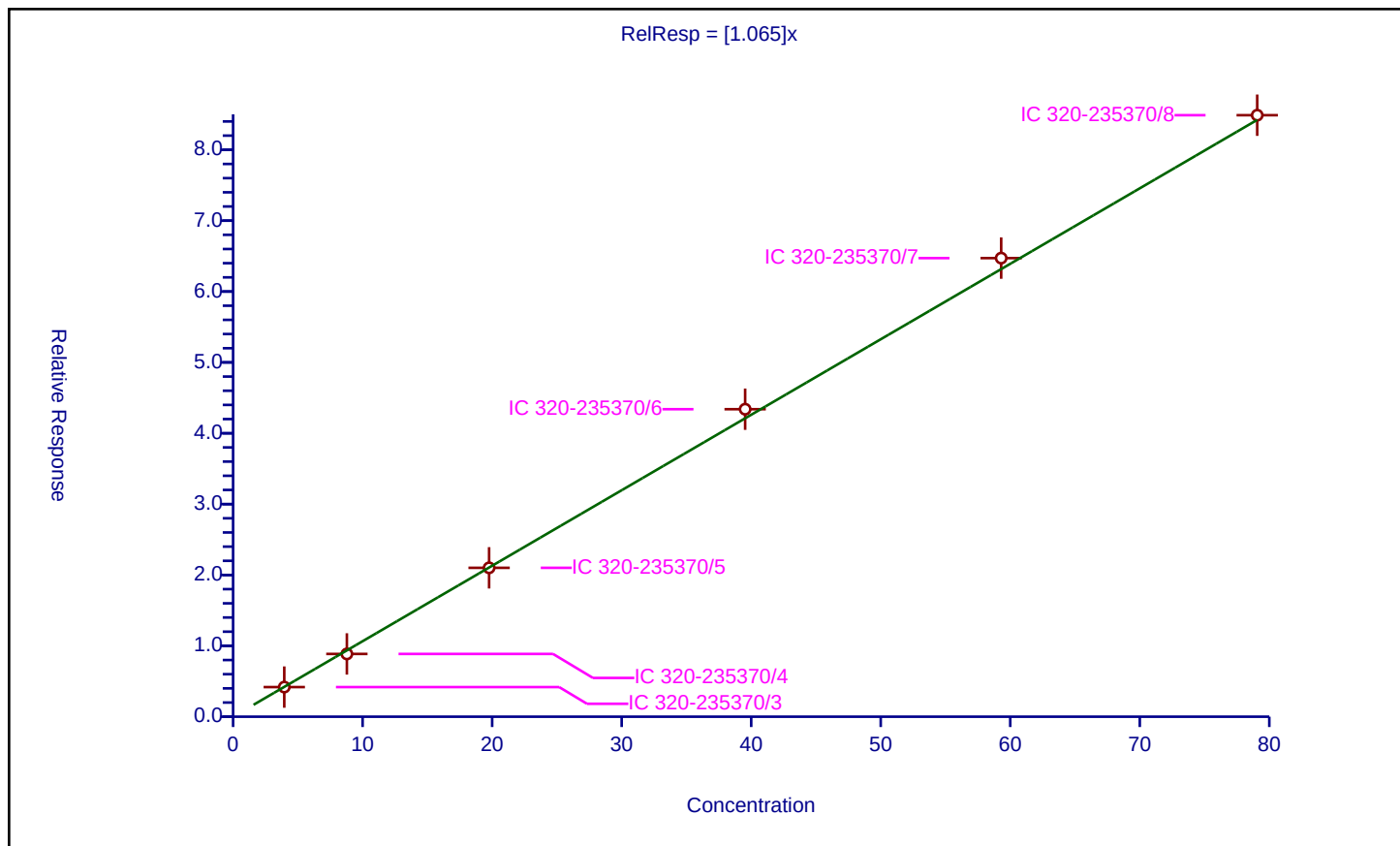
Curve Coefficients

Intercept: 0
 Slope: 1.065

Error Coefficients

Standard Error: 5280000
 Relative Standard Error: 3.0
 Correlation Coefficient: 0.999
 Coefficient of Determination (Adjusted): 0.999

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-235370/3	3.95328	4.180593	28.68	2811428.0	1.0575	Y
2	IC 320-235370/4	8.785067	8.857739	28.68	3120086.0	1.008272	Y
3	IC 320-235370/5	19.7664	21.008435	28.68	3150414.0	1.062836	Y
4	IC 320-235370/6	39.5328	43.39419	28.68	2917514.0	1.097676	Y
5	IC 320-235370/7	59.2992	64.716101	28.68	2821978.0	1.091349	Y
6	IC 320-235370/8	79.0656	84.882865	28.68	2887592.0	1.073575	Y



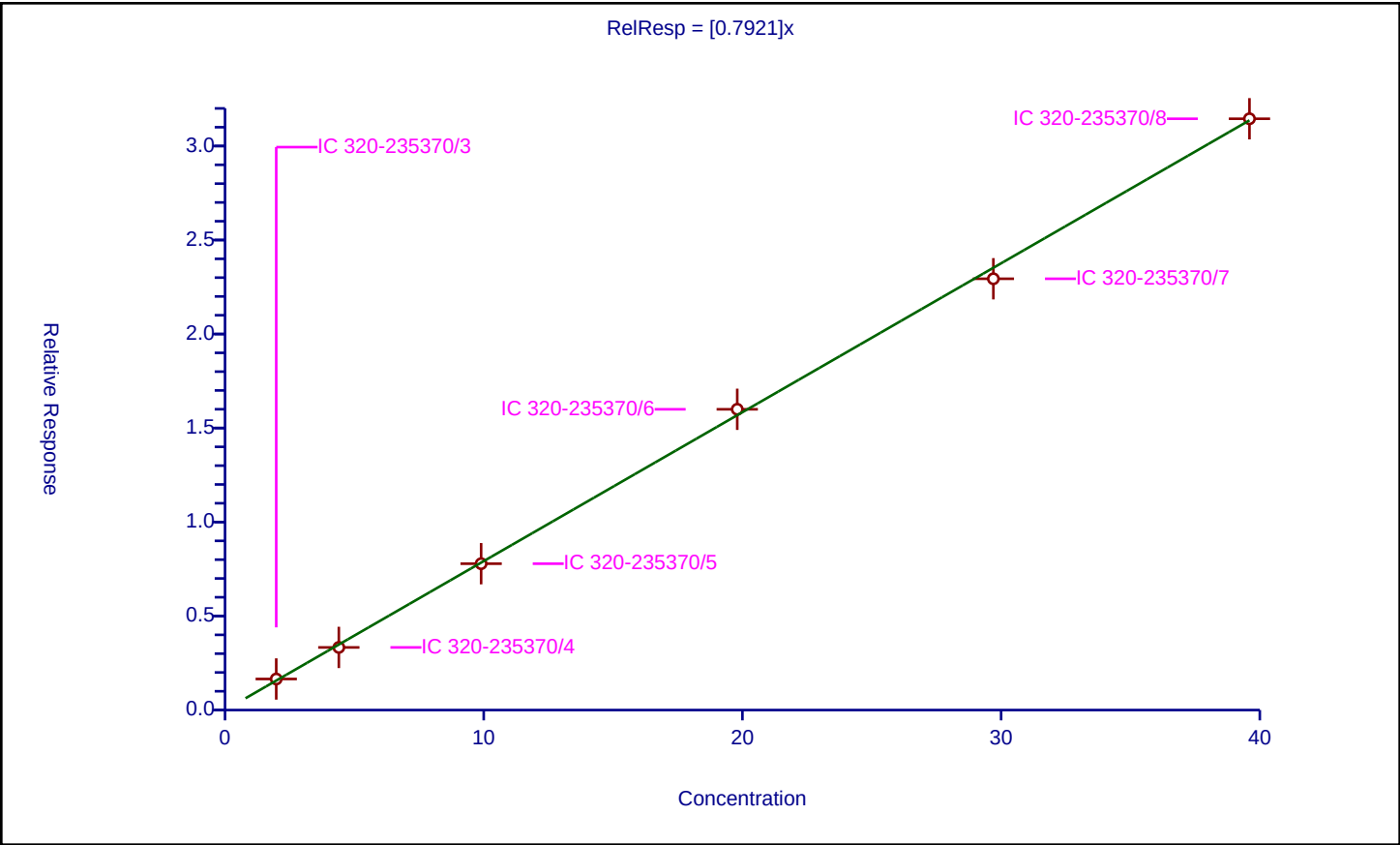
Calibration

/ Perfluorononanoic acid

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

Curve Coefficients	
Intercept:	0
Slope:	0.7921
Error Coefficients	
Standard Error:	2200000
Relative Standard Error:	3.4
Correlation Coefficient:	0.999
Coefficient of Determination (Adjusted):	0.998

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-235370/3	1.98	1.65199	10.0	1104504.0	0.834339	Y
2	IC 320-235370/4	4.4	3.331516	10.0	1284004.0	0.757163	Y
3	IC 320-235370/5	9.9	7.785446	10.0	1263898.0	0.786409	Y
4	IC 320-235370/6	19.8	15.997378	10.0	1151615.0	0.807948	Y
5	IC 320-235370/7	29.7	22.939133	10.0	1163367.0	0.772361	Y
6	IC 320-235370/8	39.6	31.450342	10.0	1126134.0	0.794201	Y



Calibration

/ 13C2 PFDA

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

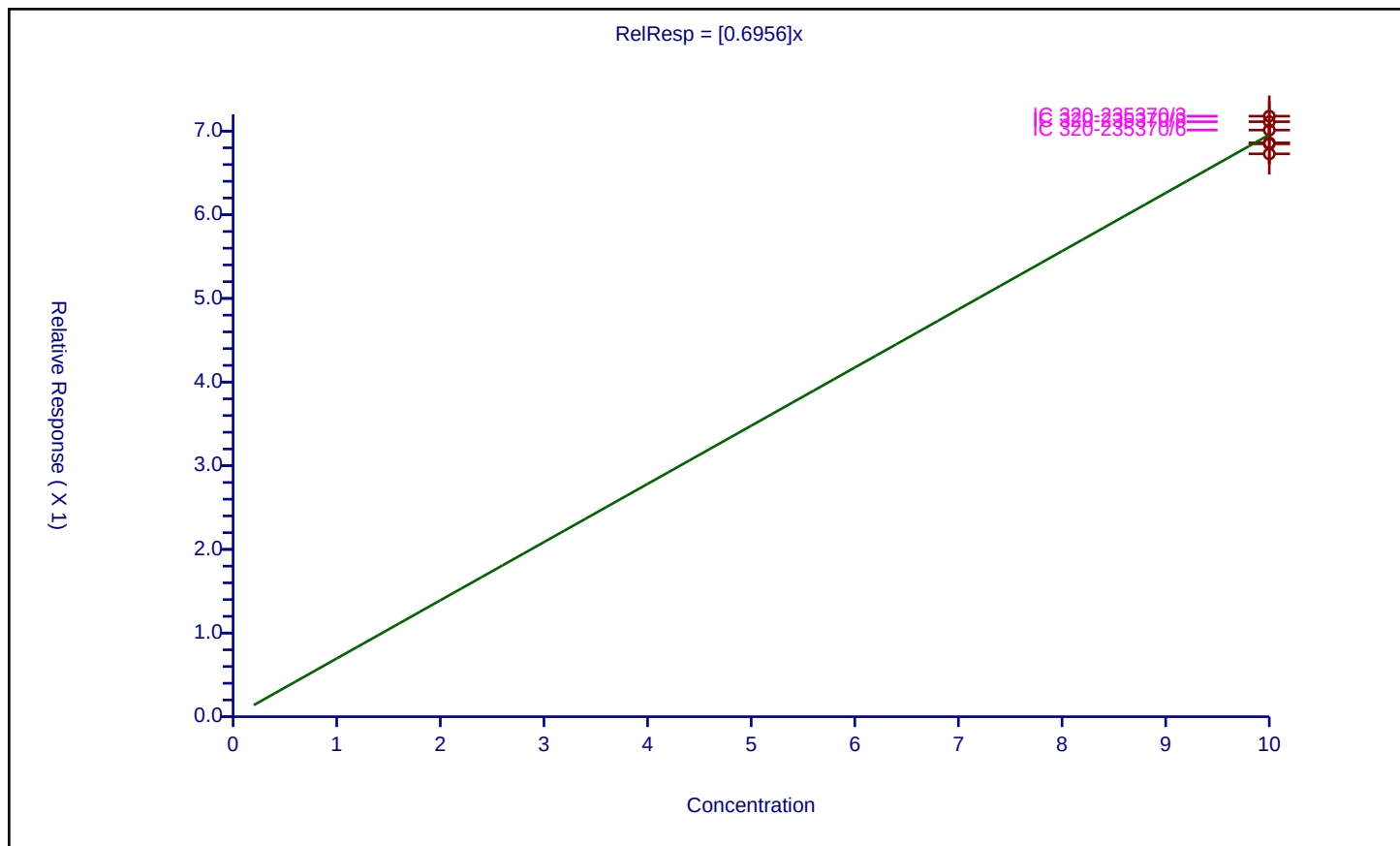
Curve Coefficients

Intercept: 0
Slope: 0.6956

Error Coefficients

Standard Error: 901000
Relative Standard Error: 2.5
Correlation Coefficient: 0
Coefficient of Determination (Adjusted): 0

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-235370/3	10.0	7.178426	10.0	1104504.0	0.717843	Y
2	IC 320-235370/4	10.0	6.728172	10.0	1284004.0	0.672817	Y
3	IC 320-235370/5	10.0	6.859952	10.0	1263898.0	0.685995	Y
4	IC 320-235370/6	10.0	7.011927	10.0	1151615.0	0.701193	Y
5	IC 320-235370/7	10.0	6.847426	10.0	1163367.0	0.684743	Y
6	IC 320-235370/8	10.0	7.112022	10.0	1126134.0	0.711202	Y



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: CCVL 320-235370/11 Calibration Date: 07/21/2018 12:54
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.21_537CURVE_010.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.177	1.256		21.4	20.0	6.8	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	1.048		2.15	2.16	-0.6	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.662		6.53	6.72	-2.8	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	1.024		4.18	4.40	-5.0	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	1.041		8.59	8.79	-2.2	50.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.7981		4.43	4.40	0.8	50.0
13C2 PFHxA	Ave	1.076	1.070		9.95	10.0	-0.5	30.0
13C2 PFDA	Ave	0.6956	0.6772		9.73	10.0	-2.7	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_010.d
 Lims ID: CCVL
 Client ID:
 Sample Type: CCVL
 Inject. Date: 21-Jul-2018 12:54:25 ALS Bottle#: 2 Worklist Smp#: 11
 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\20180721-61414.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 21-Jul-2018 14:50:42 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK022

First Level Reviewer: roycea

Date: 21-Jul-2018 13:03:45

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.358	1.357	0.001	1.000	2628791	21.4		2269	
298.90 > 99.00	1.358	1.357	0.001	1.000	1773254		1.48(0.00-0.00)	2231	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.472	1.478	-0.006	1.000	1306766	9.95		13318	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.616	1.621	-0.005	1.000	1167854	6.53		1057	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.616	1.622	-0.006	1.000	276355	2.15		33.7	M
* 6 13C2-PFOA									
415.00 > 370.00	1.798	1.804	-0.006		1220813	10.0		10976	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.798	1.804	-0.006	1.000	549969	4.18		78.5	
413.00 > 169.00	1.798	1.804	-0.006	1.000	300739		1.83(0.00-0.00)	658	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.056	2.056	0.0	1.000	956527	8.59		1209	a
499.00 > 99.00	2.048	2.056	-0.008	0.996	209061		4.58(0.00-0.00)	405	a
* 7 13C4 PFOS									
503.00 > 80.00	2.048	2.056	-0.008		2998753	28.7		5853	
9 Perfluorononanoic acid									
463.00 > 419.00	2.064	2.065	-0.001	1.000	428712	4.43		87.7	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.247	-0.001	1.000	826714	9.73		8131	

QC Flag Legend

Review Flags

M - Manually Integrated

a - User Assigned ID

Reagents:

LC537-L2_00022

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_010.d

Injection Date: 21-Jul-2018 12:54:25

Instrument ID: A8_N

Lims ID: CCVL

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 11

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

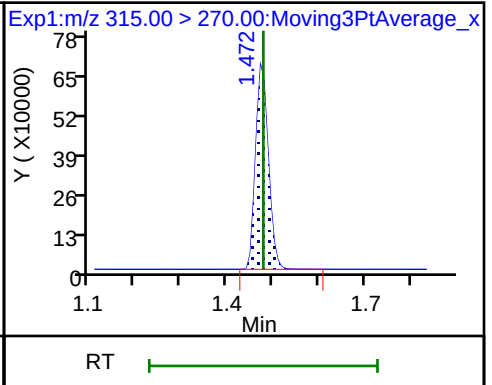
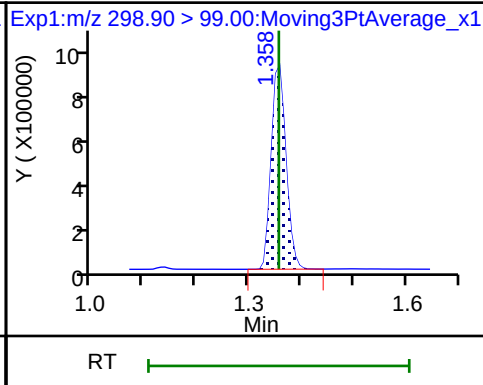
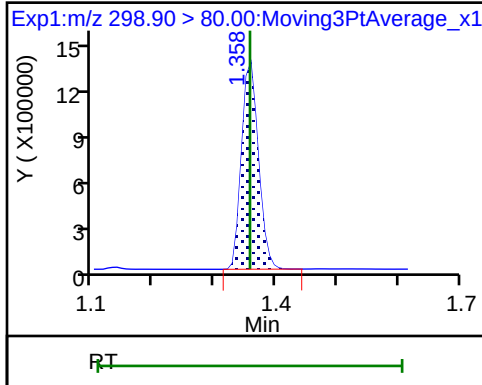
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

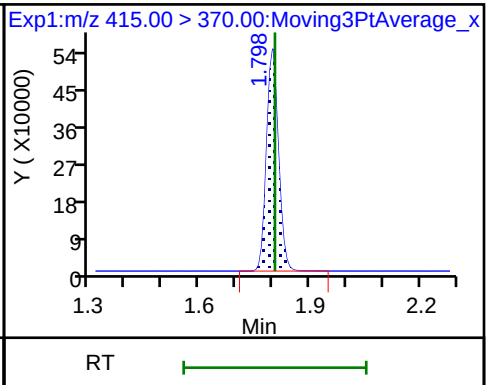
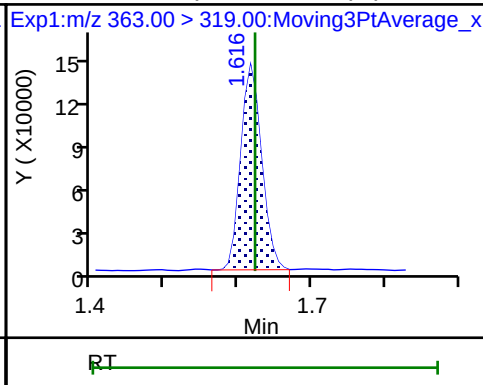
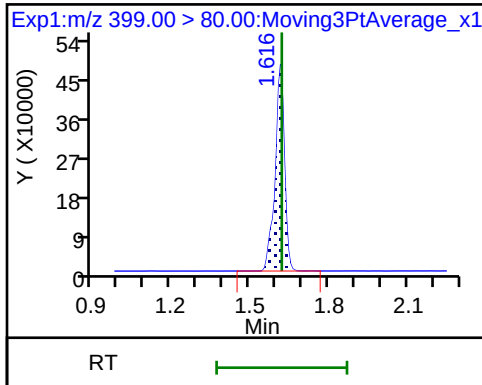
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid (M)

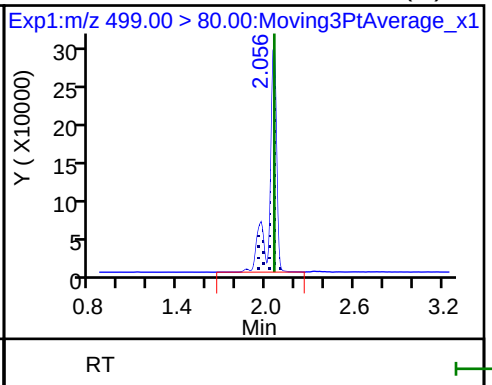
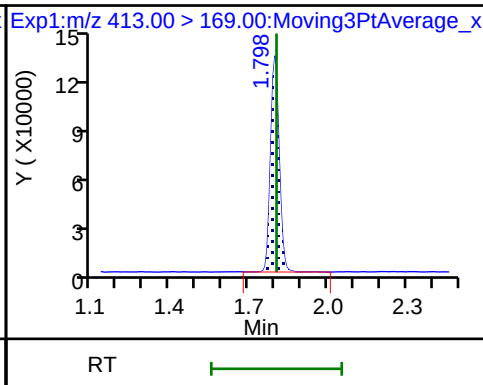
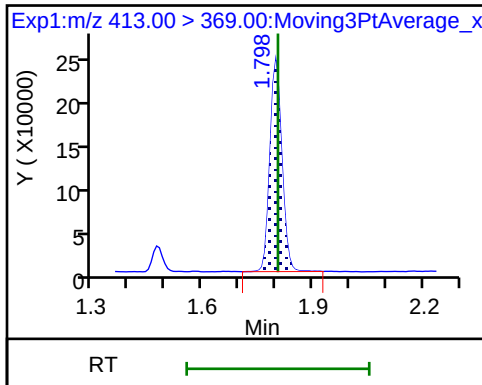
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

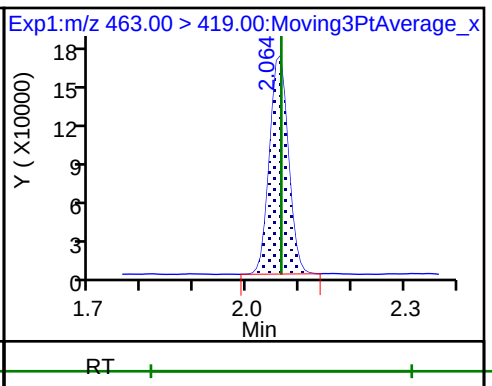
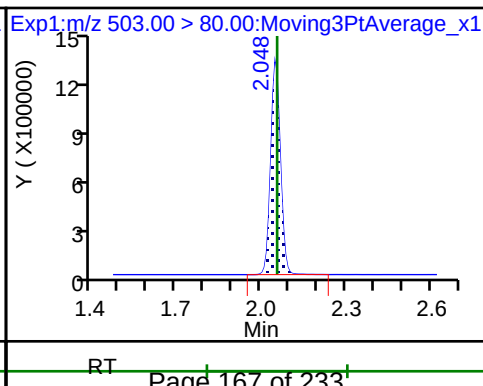
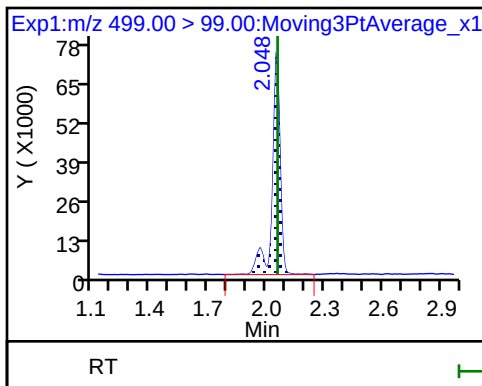
8 Perfluorooctane sulfonic acid (M)



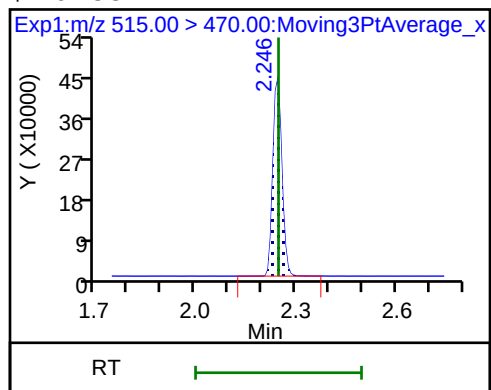
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

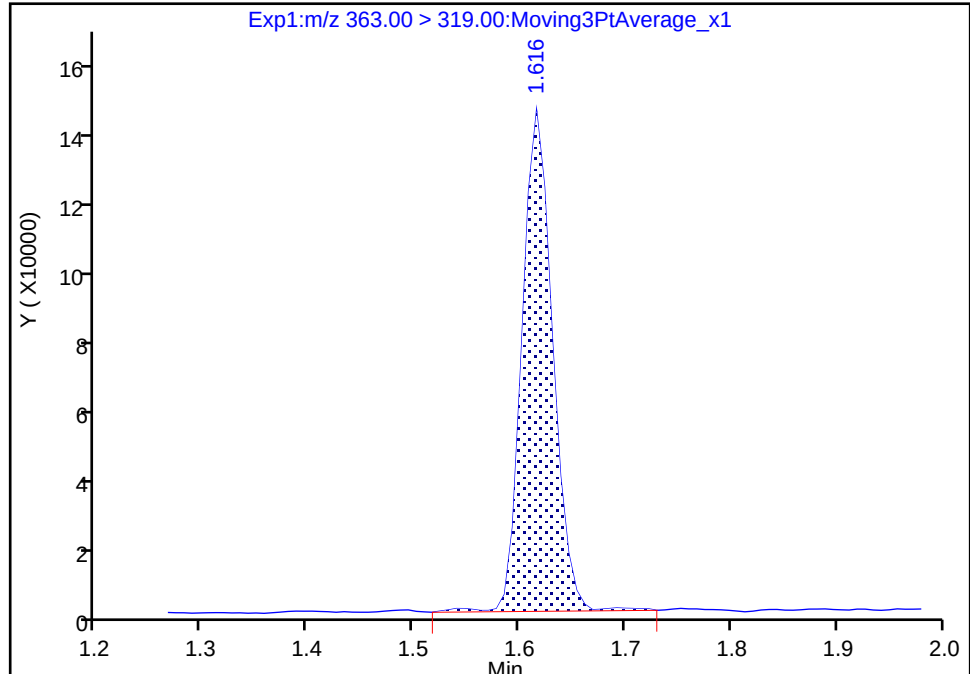
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Injection Date: 21-Jul-2018 12:54:25 Instrument ID: A8_N
Lims ID: CCVL
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 11
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

4 Perfluoroheptanoic acid, CAS: 375-85-9

Signal: 1

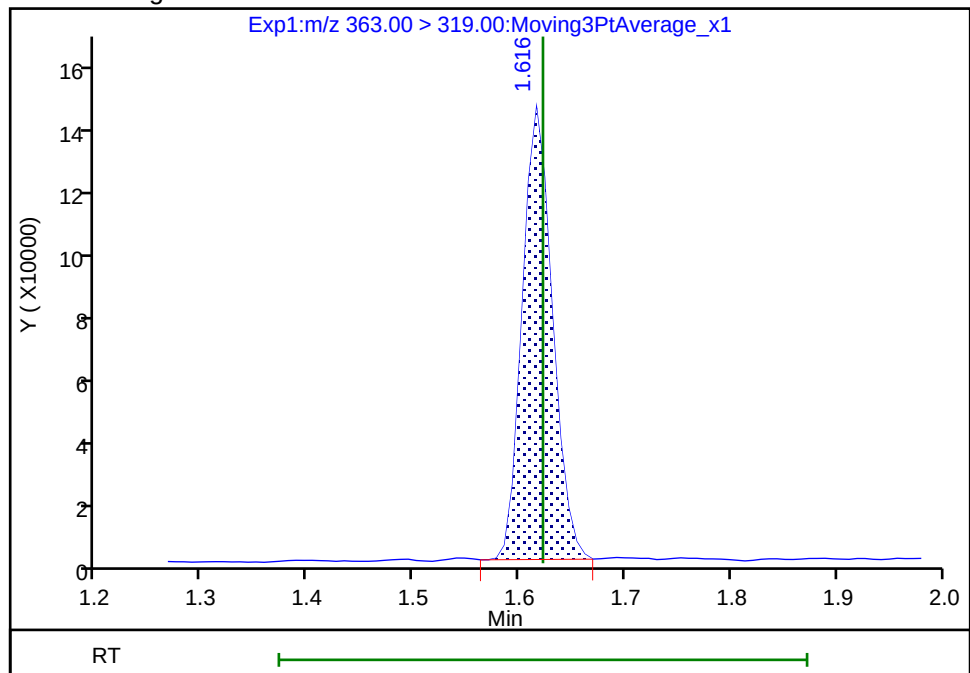
RT: 1.62
Area: 281841
Amount: 2.188989
Amount Units: ng/ml

Processing Integration Results



RT: 1.62
Area: 276355
Amount: 2.146381
Amount Units: ng/ml

Manual Integration Results



Reviewer: roycea, 21-Jul-2018 13:03:24
Audit Action: Manually Integrated

Audit Reason: Baseline
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TestAmerica Sacramento

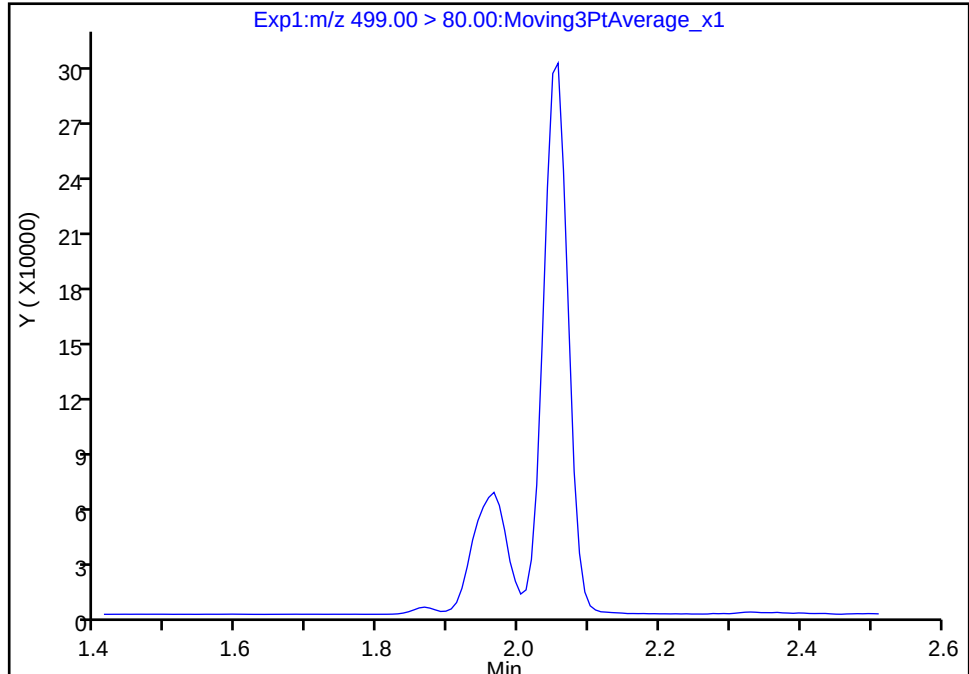
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Injection Date: 21-Jul-2018 12:54:25 Instrument ID: A8_N
Lims ID: CCVL
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 11
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

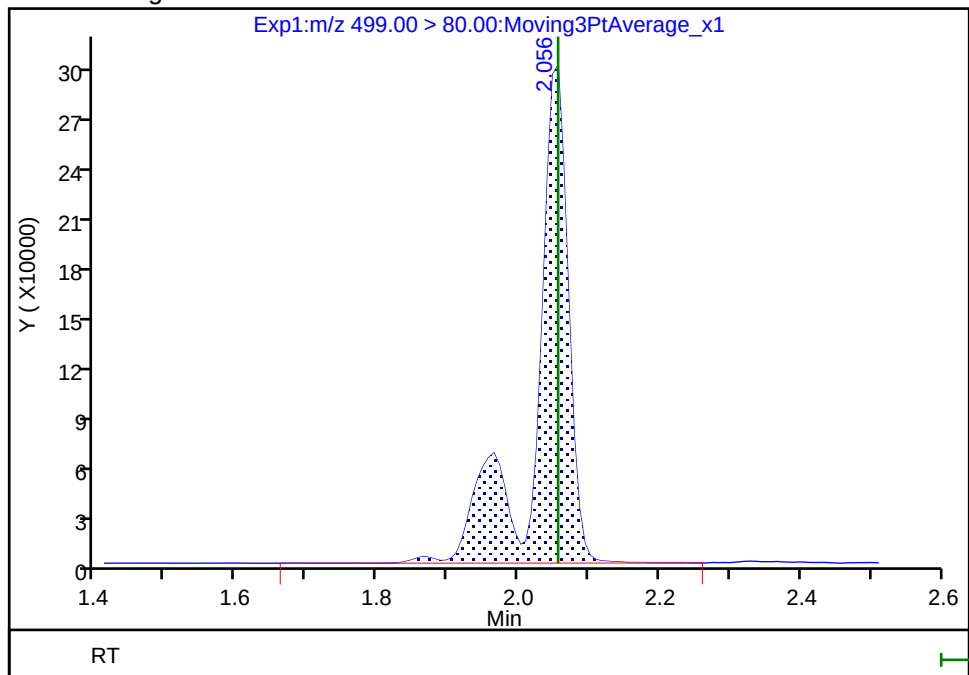
Signal: 1

Not Detected
Expected RT: 2.06

Processing Integration Results



Manual Integration Results



RT: 2.06
Area: 956527
Amount: 8.588237
Amount Units: ng/ml

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: ICV 320-235370/13 Calibration Date: 07/21/2018 13:03
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.21_537CURVE_012.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.177	1.013		86.2	100	-13.9	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	0.9445		8.96	10.0	-10.4	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.586		18.7	20.2	-7.3	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	0.8738		16.3	20.2	-18.9	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	0.9567		18.1	20.2	-10.2	30.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.7091		18.1	20.2	-10.5	30.0
13C2 PFHxA	Ave	1.076	1.028		9.55	10.0	-4.5	30.0
13C2 PFDA	Ave	0.6956	0.6576		9.45	10.0	-5.5	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_012.d
 Lims ID: ICV
 Client ID:
 Sample Type: ICV
 Inject. Date: 21-Jul-2018 13:03:44 ALS Bottle#: 7 Worklist Smp#: 13
 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\20180721-61414.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 21-Jul-2018 14:50:46 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK022

First Level Reviewer: roycea

Date: 21-Jul-2018 14:24:02

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.358	1.357	0.001	1.000	10122872	86.2		7855	
298.90 > 99.00	1.358	1.357	0.001	1.000	7344722		1.38(0.00-0.00)	7963	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.479	1.478	0.001	1.000	1193225	9.55		12137	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.624	1.621	0.003	1.000	3191227	18.7		3066	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.624	1.622	0.002	1.000	1096487	8.96		123	
* 6 13C2-PFOA									
415.00 > 370.00	1.806	1.804	0.002		1160905	10.0		9542	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.806	1.804	0.002	1.000	2045768	16.3		281	
413.00 > 169.00	1.806	1.804	0.002	1.000	1105368		1.85(0.00-0.00)	2191	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.056	2.056	0.0	1.000	1926283	18.1		2387	a
499.00 > 99.00	2.056	2.056	0.0	1.000	378894		5.08(0.00-0.00)	684	a
* 7 13C4 PFOS									
503.00 > 80.00	2.056	2.056	0.0		2863082	28.7		5307	
9 Perfluorononanoic acid									
463.00 > 419.00	2.064	2.065	-0.001	1.000	1659943	18.1		373	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.246	2.247	-0.001	1.000	763446	9.45		7318	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-ICV_00032

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_012.d

Injection Date: 21-Jul-2018 13:03:44

Instrument ID: A8_N

Lims ID: ICV

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 7

Worklist Smp#: 13

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

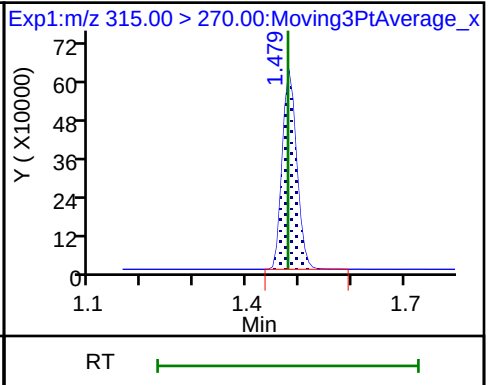
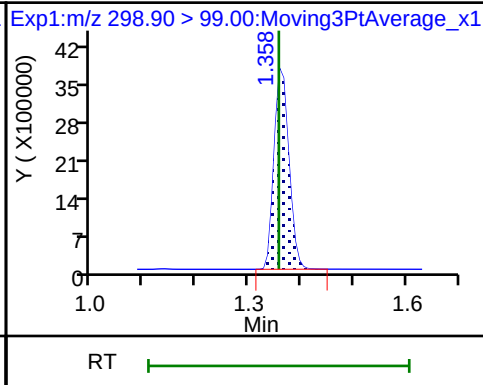
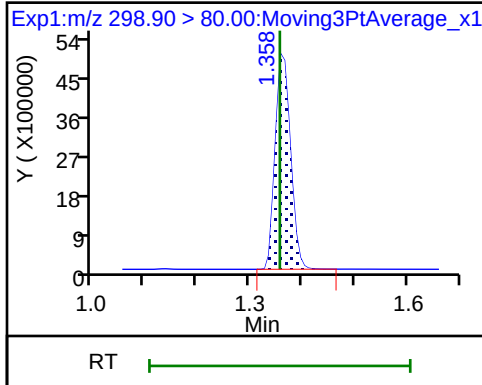
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

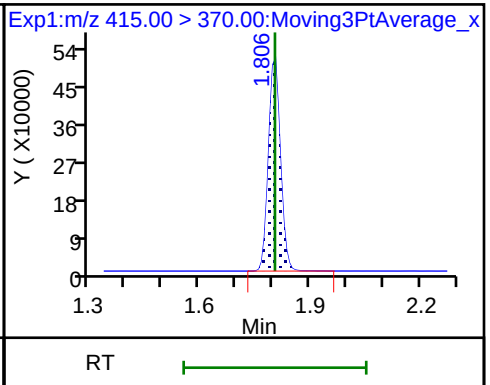
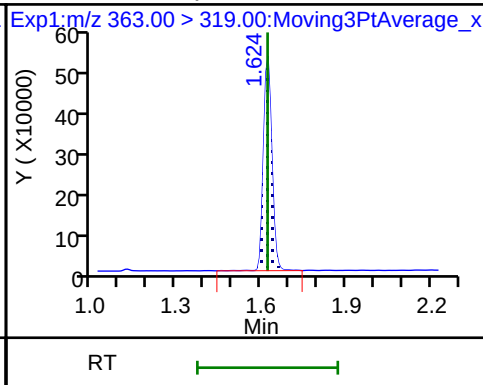
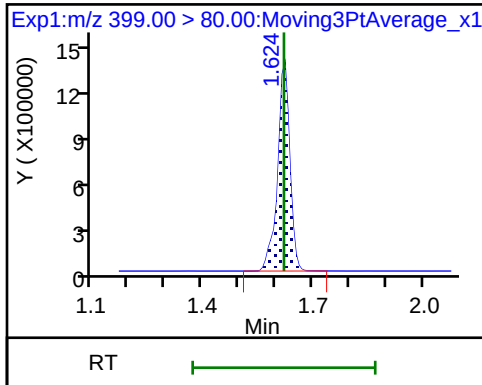
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

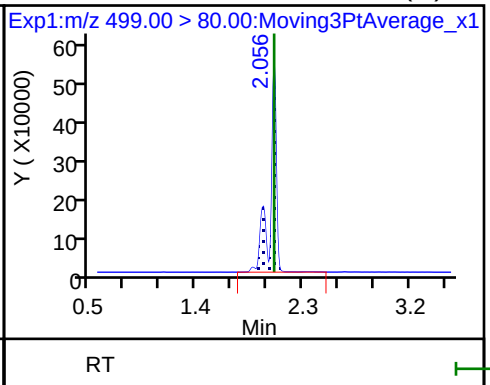
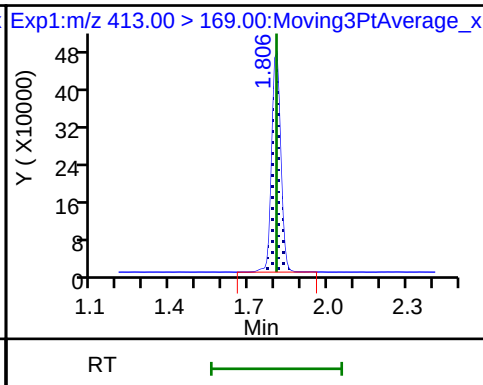
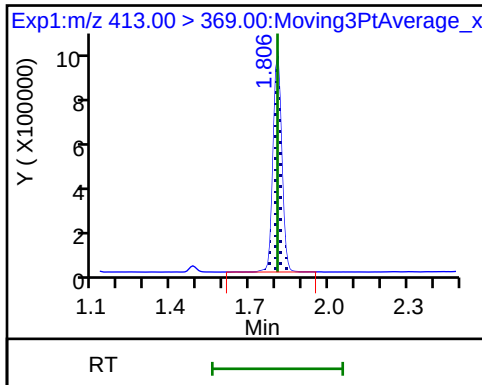
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

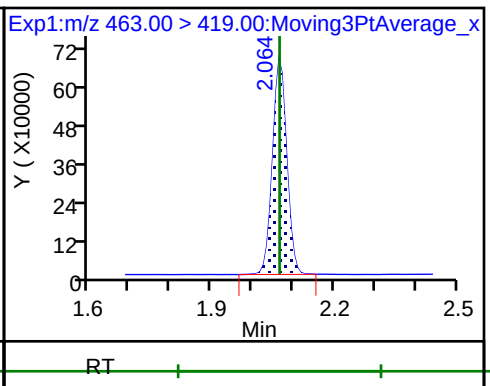
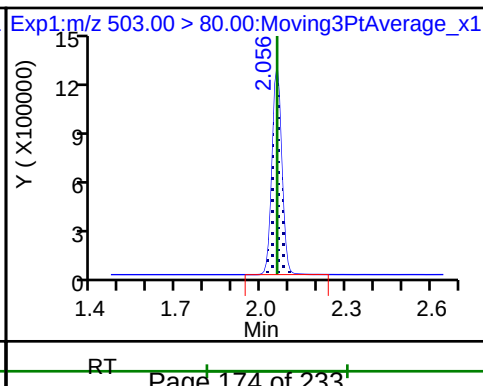
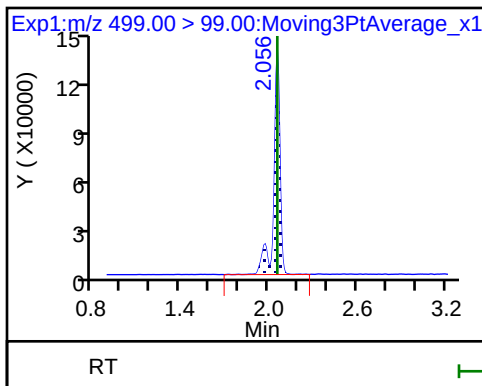
8 Perfluorooctane sulfonic acid (M)



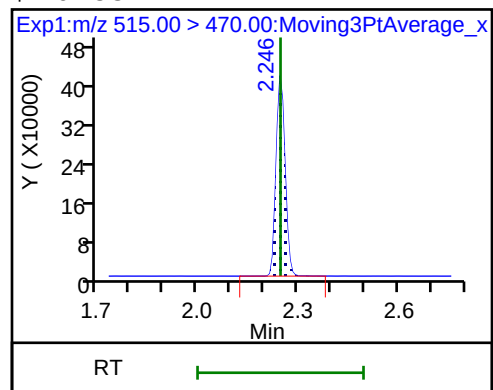
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

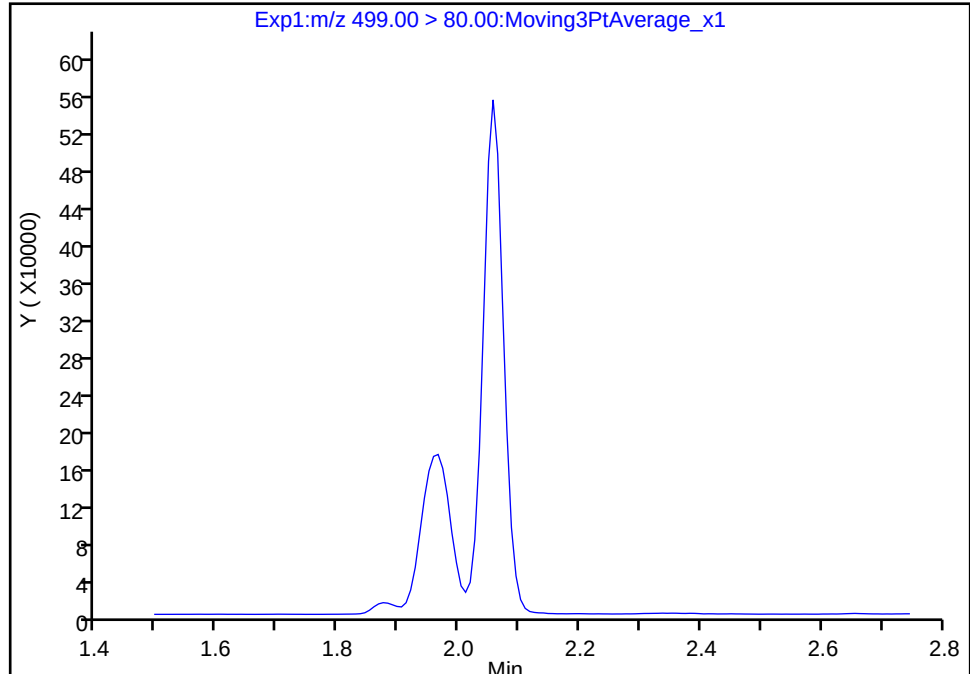
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_012.d
Injection Date: 21-Jul-2018 13:03:44 Instrument ID: A8_N
Lims ID: ICV
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 7 Worklist Smp#: 13
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

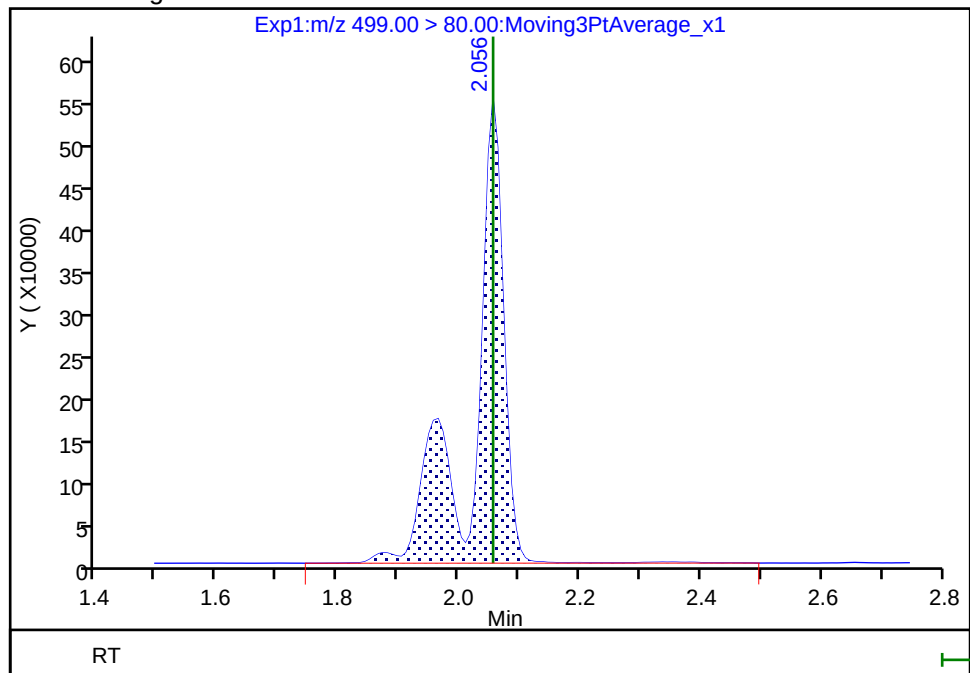
Signal: 1

Not Detected
Expected RT: 2.06

Processing Integration Results



Manual Integration Results



RT: 2.06
Area: 1926283
Amount: 18.114811
Amount Units: ng/ml

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: CCVL 320-235918/2 Calibration Date: 07/24/2018 08:18
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.24_537A_003.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.177	1.331		22.6	20.0	13.1	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	1.114		2.28	2.16	5.6	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.726		6.78	6.72	0.9	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	1.064		4.34	4.40	-1.3	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	1.058		8.72	8.79	-0.7	50.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.8481		4.71	4.40	7.1	50.0
13C2 PFHxA	Ave	1.076	1.061		9.86	10.0	-1.4	30.0
13C2 PFDA	Ave	0.6956	0.7059		10.1	10.0	1.5	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180724-61574.b\2018.07.24_537A_003.d
 Lims ID: CCVL
 Client ID:
 Sample Type: CCVL
 Inject. Date: 24-Jul-2018 08:18:29 ALS Bottle#: 2 Worklist Smp#: 2
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: CCVL
 Misc. Info.: Plate: 1 Rack: 1
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Sublist: chrom-537_A8_N*sub9
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180724-61574.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 25-Jul-2018 13:49:53 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK017

First Level Reviewer: barnettj

Date: 25-Jul-2018 13:30:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.350	1.350	0.0	1.000	2823579	22.6		593	
298.90 > 99.00	1.350	1.350	0.0	1.000	1866328		1.51(0.00-0.00)	625	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.464	1.464	0.0	1.000	1372615	9.86		15686	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.601	1.593	0.008	1.000	1230031	6.78		682	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.601	1.593	0.008	1.000	311045	2.28		28.3	
* 6 13C2-PFOA									
415.00 > 370.00	1.768	1.760	0.008		1293103	10.0		12866	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.768	1.768	0.0	1.000	605449	4.34		73.0	
413.00 > 169.00	1.768	1.768	0.0	1.000	310679		1.95(0.00-0.00)	1060	
* 7 13C4 PFOS									
503.00 > 80.00	2.011	2.003	0.008		3041132	28.7		5046	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.011	2.003	0.008	1.000	985356	8.72		946	a
499.00 > 99.00	2.011	2.003	0.008	1.000	217838		4.52(0.00-0.00)	353	a
9 Perfluorononanoic acid									
463.00 > 419.00	2.018	2.011	0.007	1.000	482559	4.71		33.8	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.223	2.215	0.008	1.000	912744	10.1		7313	

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\20180724-61574.b\2018.07.24_537A_003.d

Injection Date: 24-Jul-2018 08:18:29

Instrument ID: A8_N

Lims ID: CCVL

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 2

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

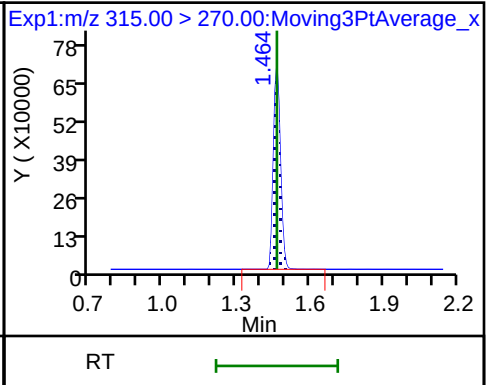
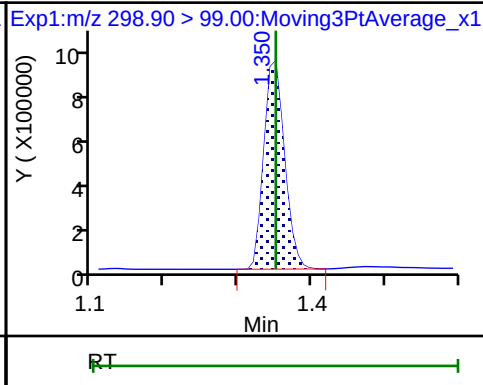
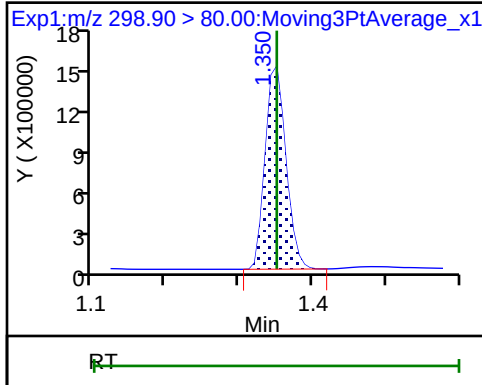
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

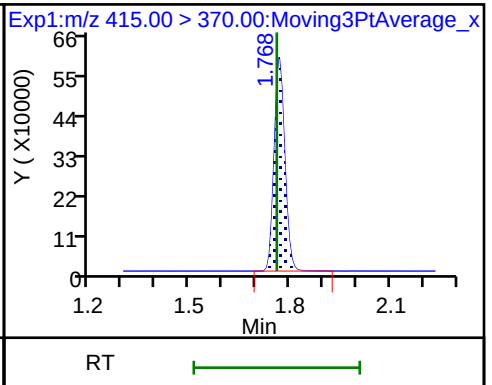
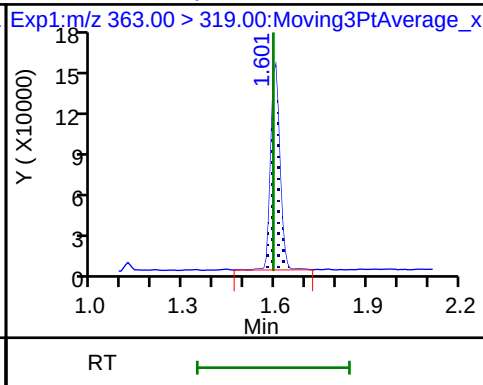
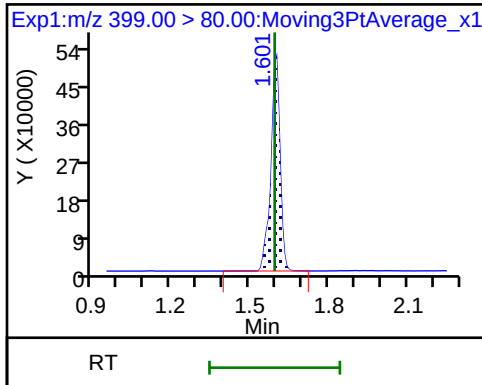
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

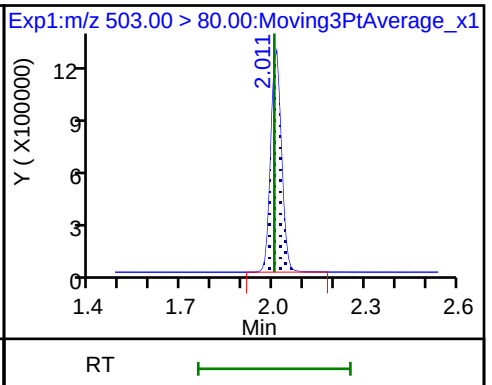
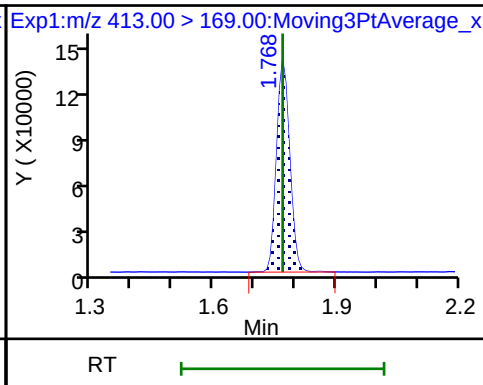
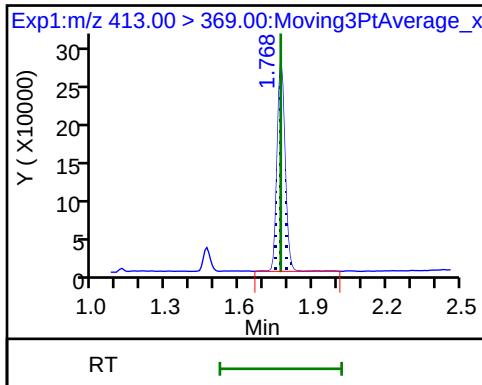
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

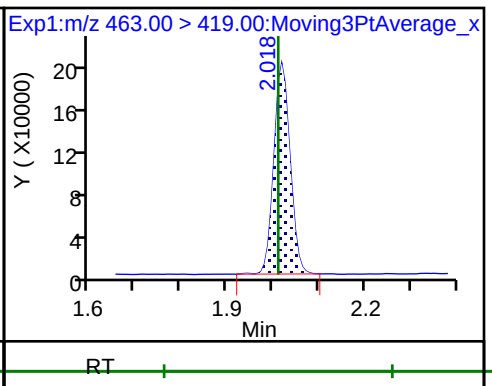
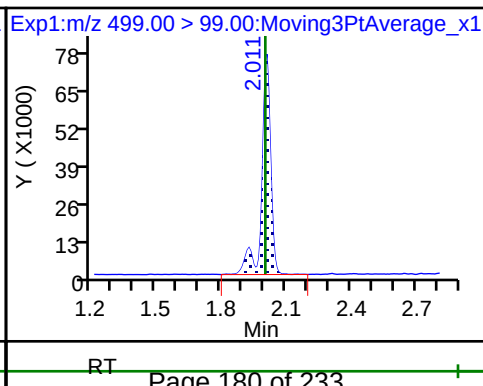
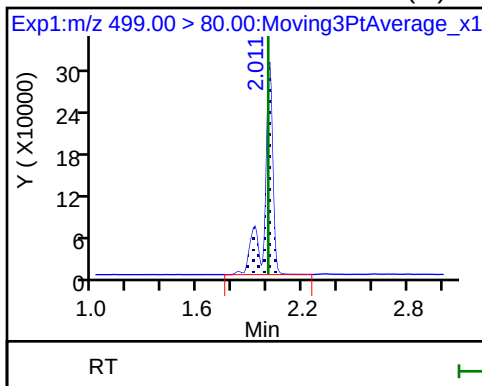
* 7 13C4 PFOS



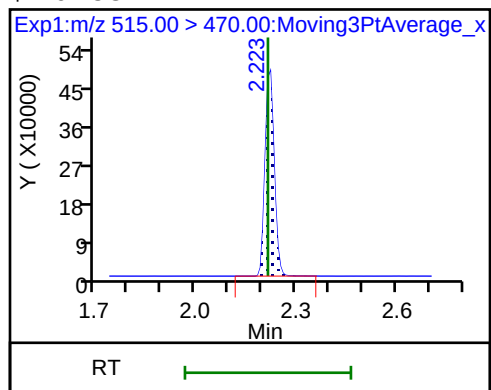
8 Perfluorooctane sulfonic acid (M)

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180724-61574.b\2018.07.24_537A_003.d

Injection Date: 24-Jul-2018 08:18:29

Instrument ID: A8_N

Lims ID: CCVL

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#:

2

Worklist Smp#: 2

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

Method: 537_A8_N

Limit Group: LC 537 ICAL

Column:

Detector EXP1

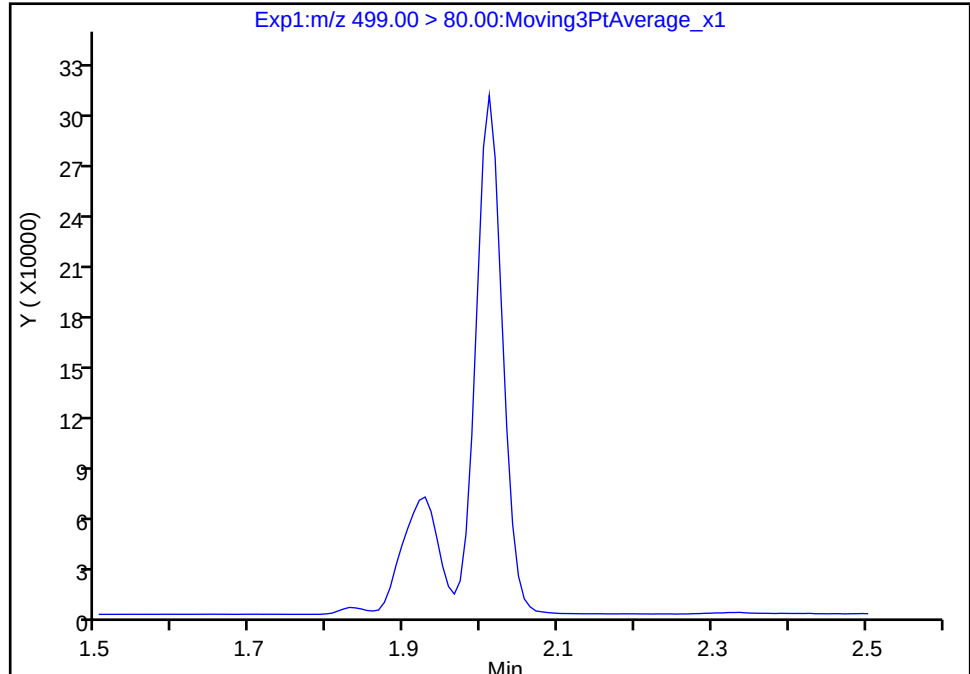
8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

Not Detected

Expected RT: 2.00

Processing Integration Results



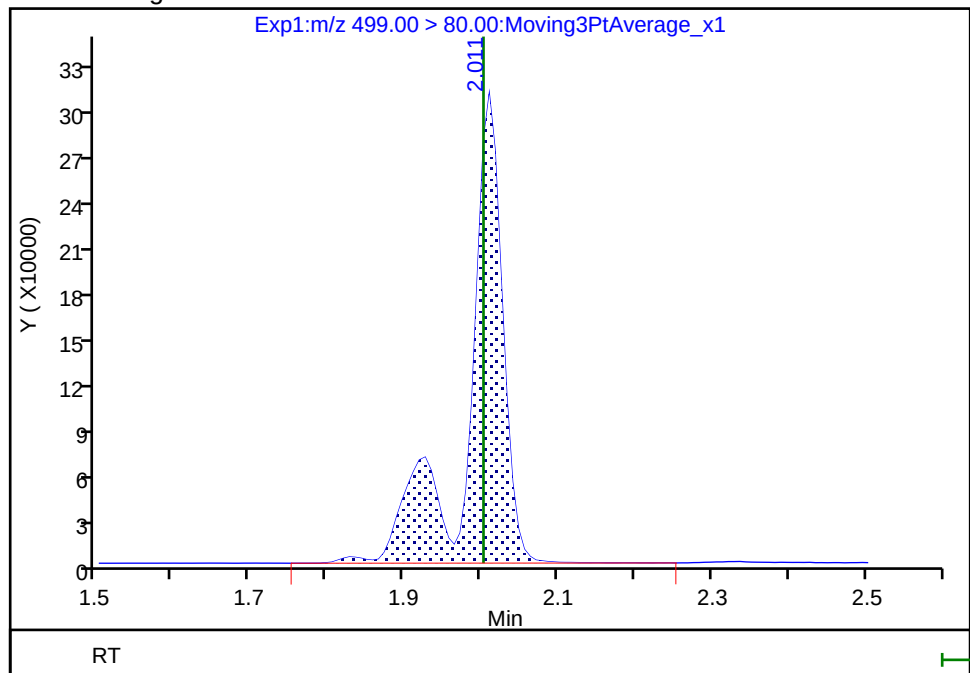
RT: 2.01

Area: 985356

Amount: 8.723794

Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 25-Jul-2018 13:30:46

Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: CCV 320-235922/22 Calibration Date: 07/24/2018 09:56
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.24_537A_024.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.177	1.253		48.0	45.0	6.5	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	1.109		5.11	4.86	5.2	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.703		15.1	15.1	-0.4	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	1.086		9.97	9.90	0.7	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	1.040		19.3	19.8	-2.3	30.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.8350		10.4	9.90	5.4	30.0
13C2 PFHxA	Ave	1.076	1.079		10.0	10.0	0.2	30.0
13C2 PFDA	Ave	0.6956	0.7313		10.5	10.0	5.1	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180724-61574.b\2018.07.24_537A_024.d
 Lims ID: CCV L3
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 24-Jul-2018 09:56:46 ALS Bottle#: 3 Worklist Smp#: 22
 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\20180724-61574.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 25-Jul-2018 13:50:27 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK017

First Level Reviewer: barnettj

Date: 25-Jul-2018 13:31:51

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.350	1.350	0.0	1.000	5421677	48.0		1191	
298.90 > 99.00	1.350	1.350	0.0	1.000	3742456		1.45(0.00-0.00)	1302	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.464	1.464	0.0	1.000	1186332	10.0		14228	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.601	1.601	0.0	1.000	2473950	15.1		1389	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.601	1.601	0.0	1.000	592912	5.11		55.3	
* 6 13C2-PFOA									
415.00 > 370.00	1.768	1.768	0.0		1099648	10.0		11140	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.768	1.768	0.0	1.000	1182114	9.97		155	
413.00 > 169.00	1.768	1.768	0.0	1.000	632600		1.87(0.00-0.00)	2092	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.011	2.003	0.008	1.000	1975118	19.3		1699	a
499.00 > 99.00	2.011	2.003	0.008	1.000	436729		4.52(0.00-0.00)	642	a
* 7 13C4 PFOS									
503.00 > 80.00	2.011	2.011	0.0		2754805	28.7		4196	
9 Perfluorononanoic acid									
463.00 > 419.00	2.018	2.018	0.0	1.000	909019	10.4		66.4	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.215	2.215	0.0	1.000	804150	10.5		6452	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L3_00025

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180724-61574.b\2018.07.24_537A_024.d

Injection Date: 24-Jul-2018 09:56:46

Instrument ID: A8_N

Lims ID: CCV L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 22

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

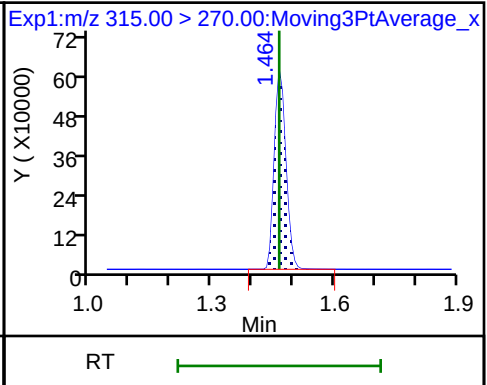
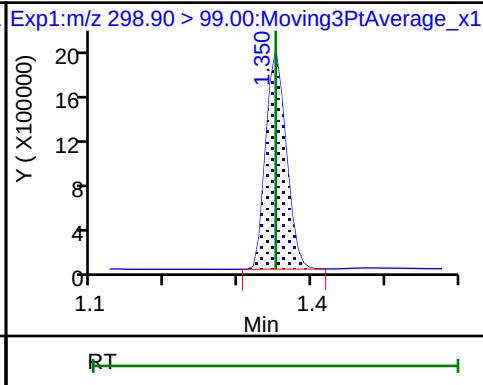
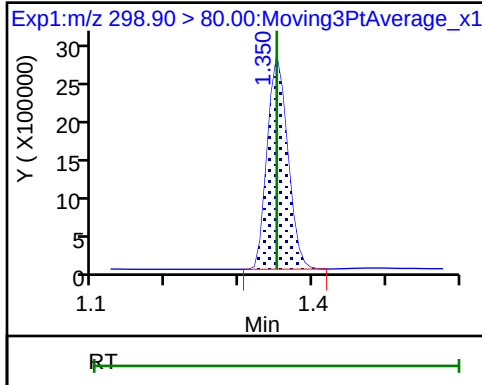
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

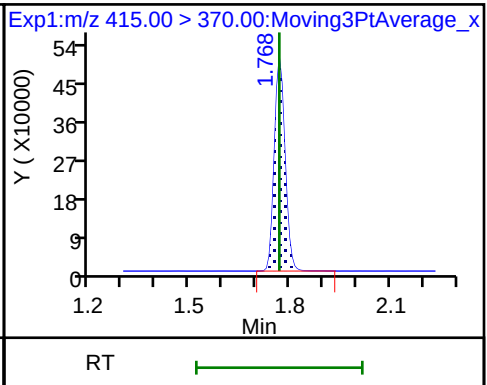
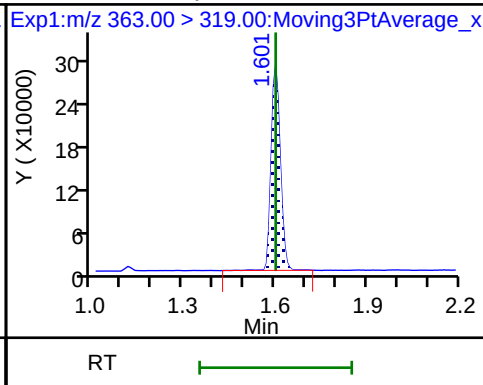
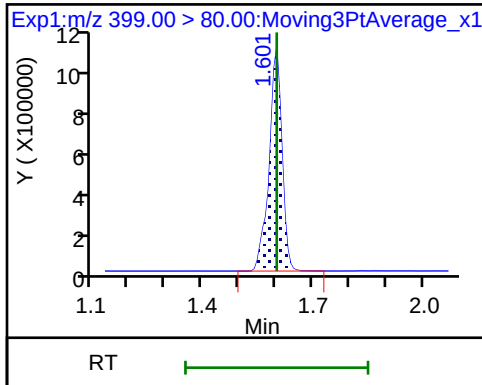
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

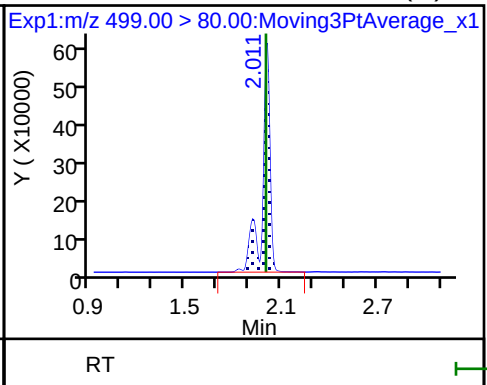
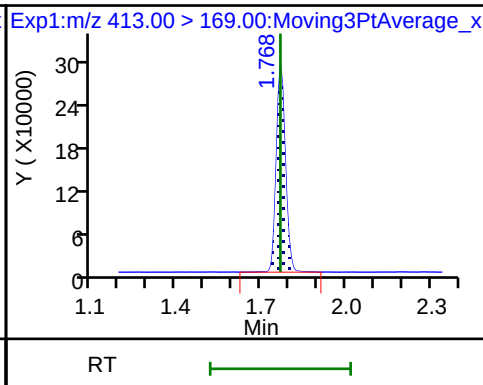
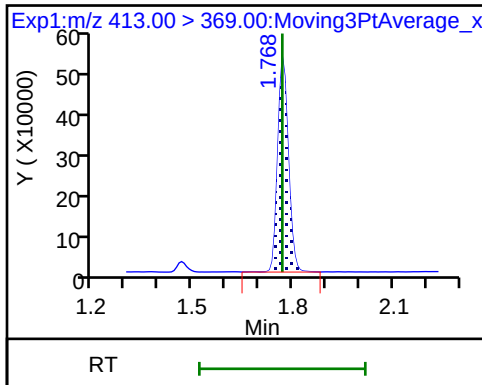
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

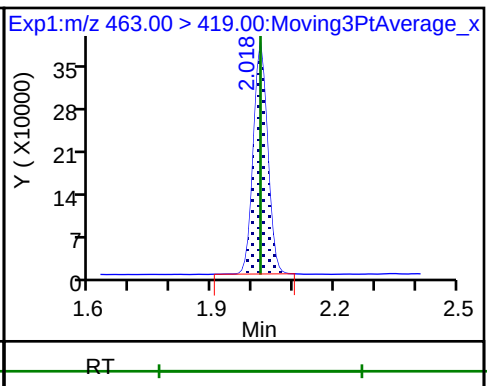
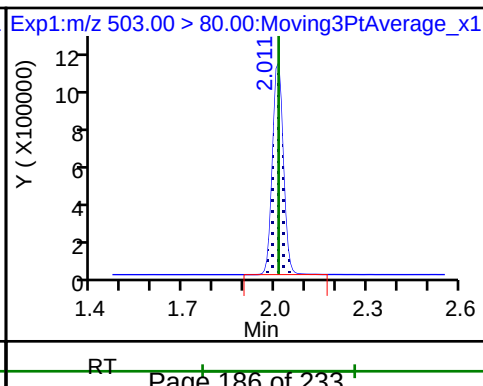
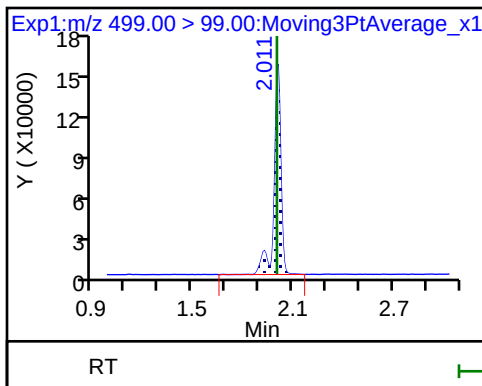
8 Perfluorooctane sulfonic acid (M)



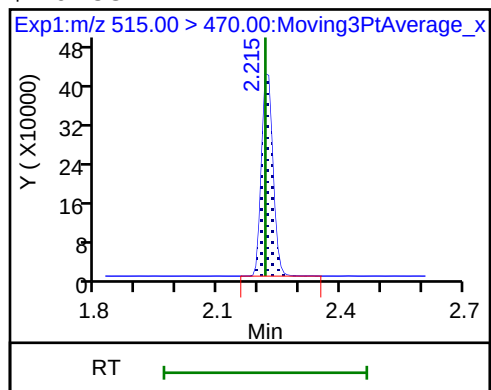
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

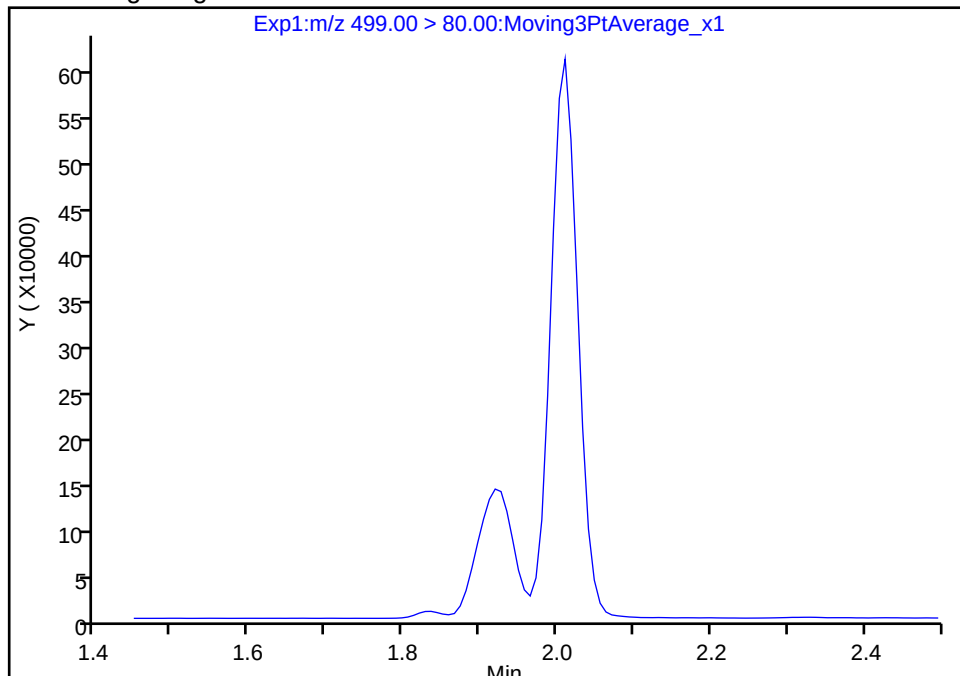
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180724-61574.b\2018.07.24_537A_024.d
Injection Date: 24-Jul-2018 09:56:46 Instrument ID: A8_N
Lims ID: CCV L3
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 22
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

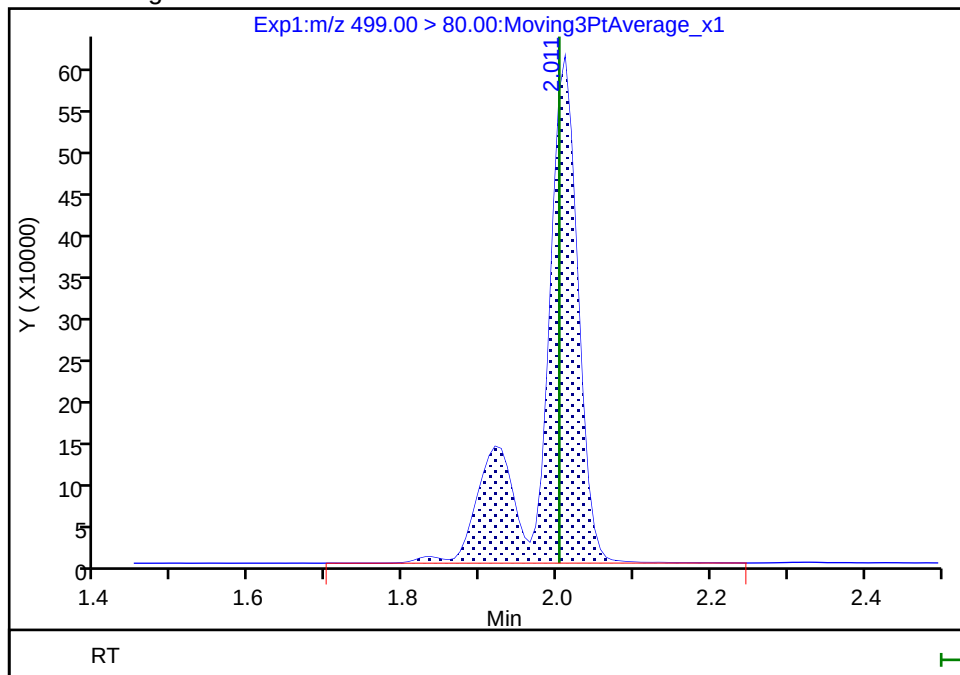
Not Detected
Expected RT: 2.00

Processing Integration Results



RT: 2.01
Area: 1975118
Amount: 19.304105
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 25-Jul-2018 13:31:37

Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: CCV 320-235922/34 Calibration Date: 07/24/2018 10:52
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.24_537A_036.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.177	1.098		126	135	-6.7	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	1.045		14.5	14.6	-0.9	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.790		47.5	45.4	4.7	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	1.106		30.5	29.7	2.6	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	1.096		61.0	59.3	2.9	30.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.8031		30.1	29.7	1.4	30.0
13C2 PFHxA	Ave	1.076	1.089		10.1	10.0	1.2	30.0
13C2 PFDA	Ave	0.6956	0.7008		10.1	10.0	0.7	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180724-61574.b\2018.07.24_537A_036.d
 Lims ID: CCV L5
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 24-Jul-2018 10:52:57 ALS Bottle#: 5 Worklist Smp#: 34
 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\20180724-61574.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 25-Jul-2018 13:50:42 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK017

First Level Reviewer: barnettj

Date: 25-Jul-2018 13:33:51

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.350	1.350	0.0	1.000	14083998	126.0		2803	
298.90 > 99.00	1.350	1.350	0.0	1.000	10188835		1.38(0.00-0.00)	3036	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.464	1.464	0.0	1.000	1230380	10.1		15802	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.593	1.593	0.0	1.000	7713257	47.5		4153	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.593	1.593	0.0	1.000	1721672	14.5		165	
* 6 13C2-PFOA									
415.00 > 370.00	1.760	1.760	0.0		1129599	10.0		12012	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.768	1.768	0.0	1.000	3710806	30.5		464	
413.00 > 169.00	1.760	1.768	-0.008	0.996	1922246		1.93(0.00-0.00)	5290	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.003	2.003	0.0	1.000	6172127	61.0		5398	a
499.00 > 99.00	2.003	2.003	0.0	1.000	1359957		4.54(0.00-0.00)	2033	a
* 7 13C4 PFOS									
503.00 > 80.00	2.003	2.003	0.0		2724199	28.7		4435	
9 Perfluorononanoic acid									
463.00 > 419.00	2.011	2.011	0.0	1.000	2694473	30.1		182	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.215	2.215	0.0	1.000	791618	10.1		7348	

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\20180724-61574.b\2018.07.24_537A_036.d

Injection Date: 24-Jul-2018 10:52:57

Instrument ID: A8_N

Lims ID: CCV L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 34

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

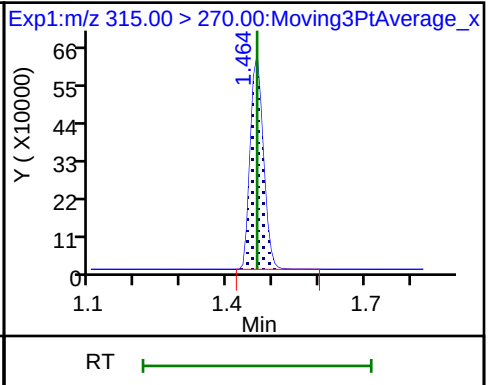
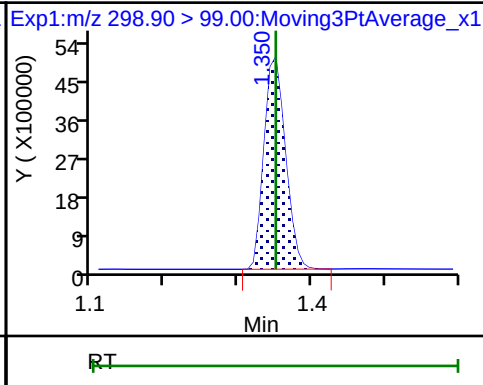
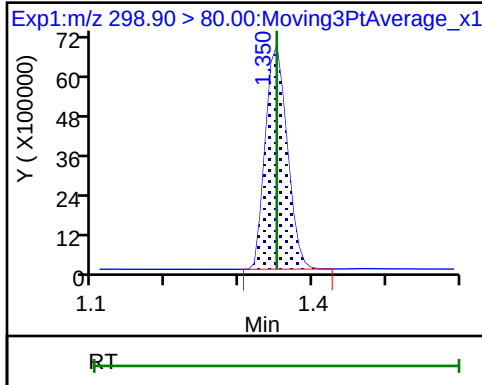
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

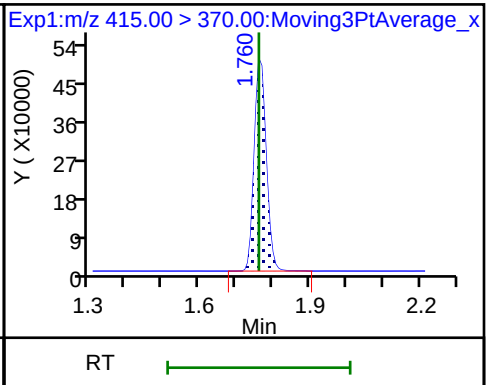
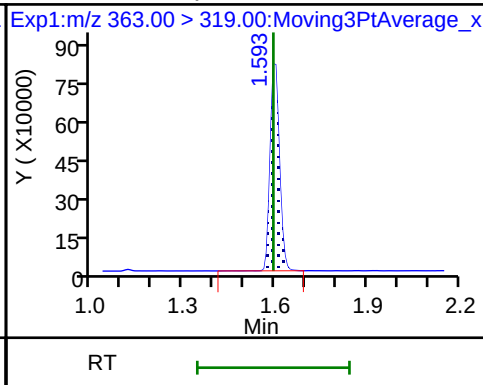
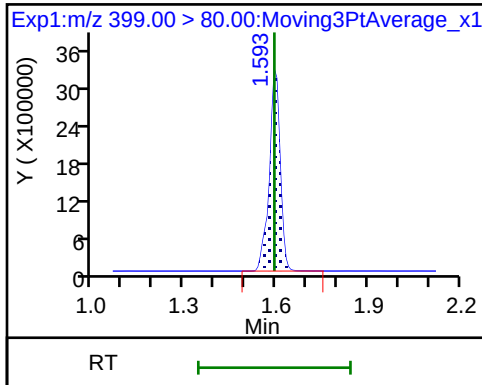
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

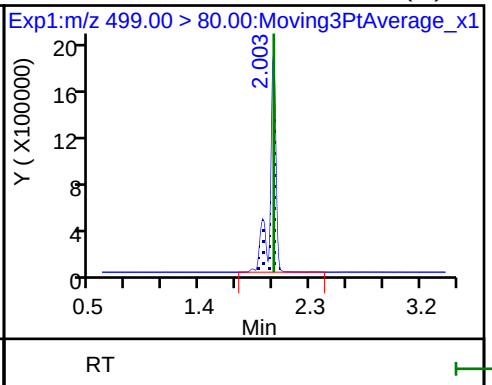
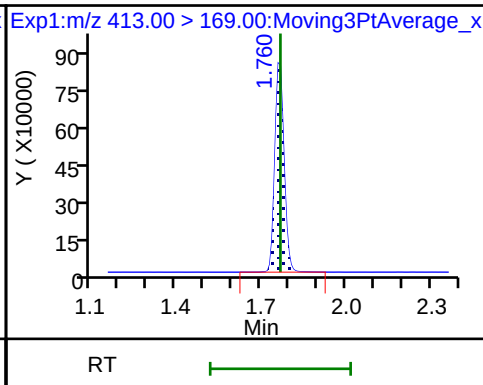
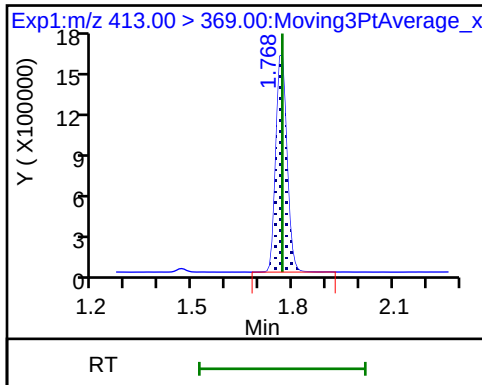
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

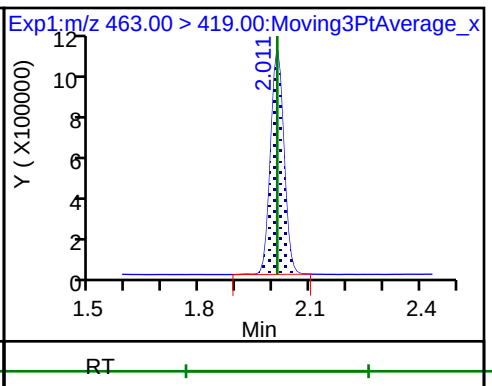
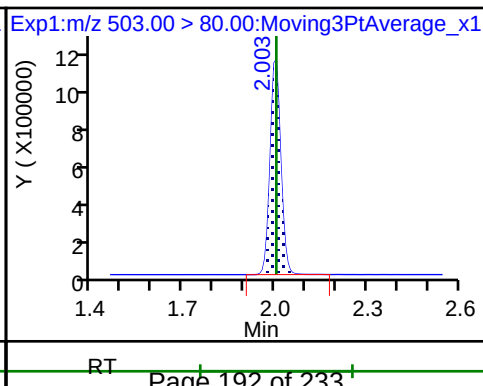
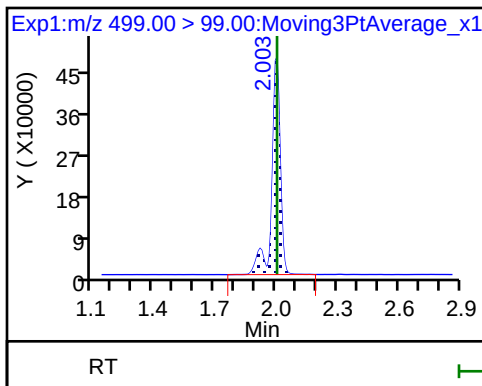
8 Perfluorooctane sulfonic acid (M)



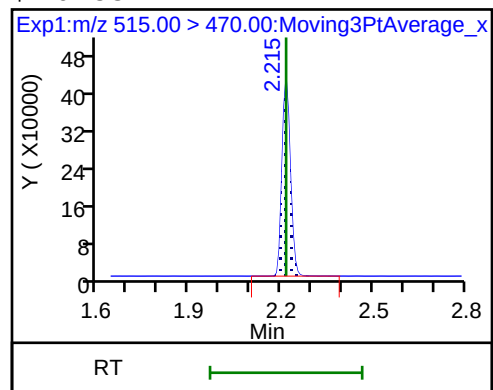
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

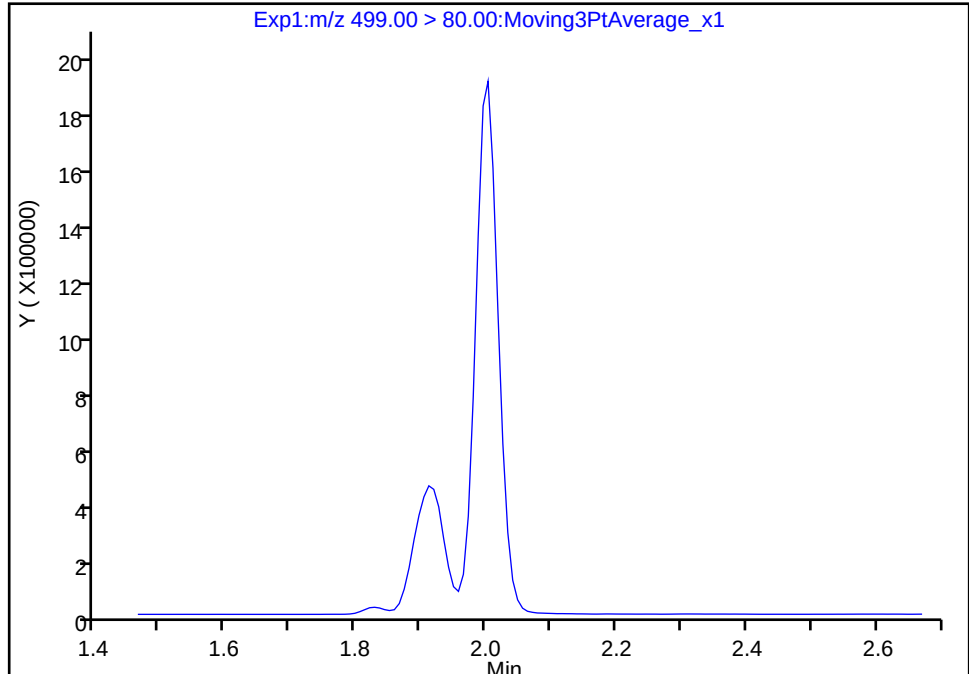
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180724-61574.b\2018.07.24_537A_036.d
Injection Date: 24-Jul-2018 10:52:57 Instrument ID: A8_N
Lims ID: CCV L5
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 34
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

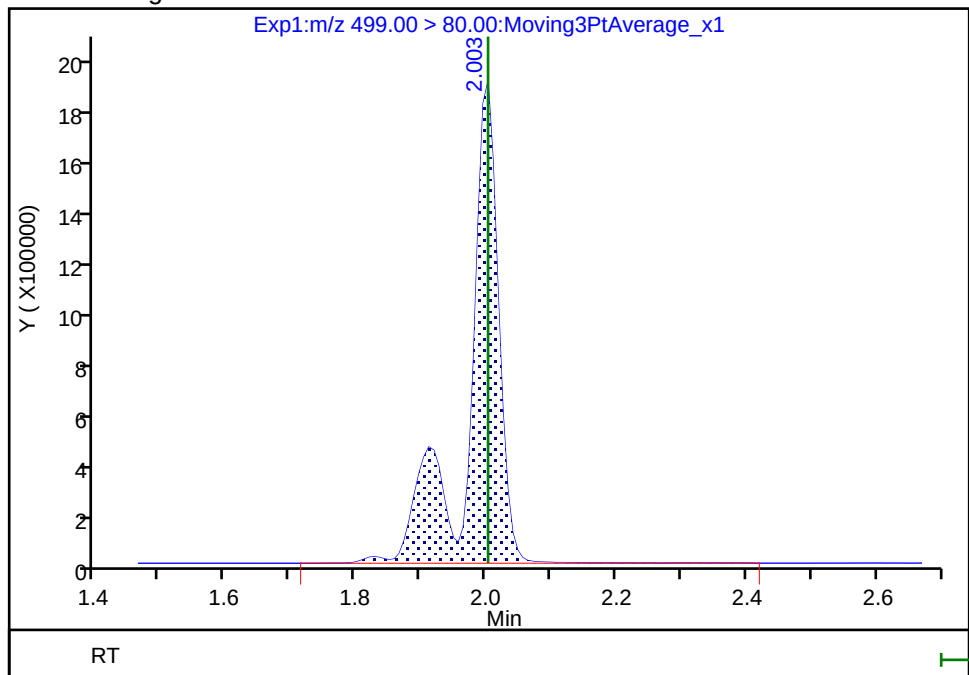
Not Detected
Expected RT: 2.00

Processing Integration Results



RT: 2.00
Area: 6172127
Amount: 61.001922
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 25-Jul-2018 13:32:37
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected
Page 194 of 233

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: CCVL 320-236171/2 Calibration Date: 07/25/2018 15:18
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.25_537A_003.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.177	1.279		21.8	20.0	8.7	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	1.029		2.11	2.16	-2.4	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.650		6.49	6.72	-3.5	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	1.045		4.26	4.40	-3.1	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	1.030		8.49	8.79	-3.3	50.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.7540		4.19	4.40	-4.8	50.0
13C2 PFHxA	Ave	1.076	1.062		9.87	10.0	-1.3	30.0
13C2 PFDA	Ave	0.6956	0.6728		9.67	10.0	-3.3	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_003.d
 Lims ID: CCVL
 Client ID:
 Sample Type: CCVL
 Inject. Date: 25-Jul-2018 15:18:07 ALS Bottle#: 2 Worklist Smp#: 2
 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\20180725-61648.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 26-Jul-2018 11:35:11 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK022

First Level Reviewer: barnettj

Date: 26-Jul-2018 10:45:20

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.358	1.350	0.008	1.000	2822005	21.8		7900	
298.90 > 99.00	1.358	1.350	0.008	1.000	1910683		1.48(0.00-0.00)	3838	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.472	1.464	0.008	1.000	1412243	9.87		15288	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.616	1.601	0.015	1.000	1222625	6.49		911	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.616	1.601	0.015	1.000	295600	2.11		53.6	
* 6 13C2-PFOA									
415.00 > 370.00	1.791	1.775	0.016		1330079	10.0		13836	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.791	1.775	0.016	1.000	611428	4.26		69.4	
413.00 > 169.00	1.791	1.775	0.016	1.000	321102		1.90(0.00-0.00)	844	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.041	2.018	0.023	1.000	997391	8.49		1675	a
499.00 > 99.00	2.041	2.018	0.023	1.000	218948		4.56(0.00-0.00)	350	a
* 7 13C4 PFOS									
503.00 > 80.00	2.041	2.018	0.023		3161499	28.7		5729	
9 Perfluorononanoic acid									
463.00 > 419.00	2.048	2.026	0.022	1.000	441251	4.19		53.1	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.238	2.223	0.015	1.000	894844	9.67		8855	

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\20180725-61648.b\2018.07.25_537A_003.d

Injection Date: 25-Jul-2018 15:18:07

Instrument ID: A8_N

Lims ID: CCVL

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 2

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

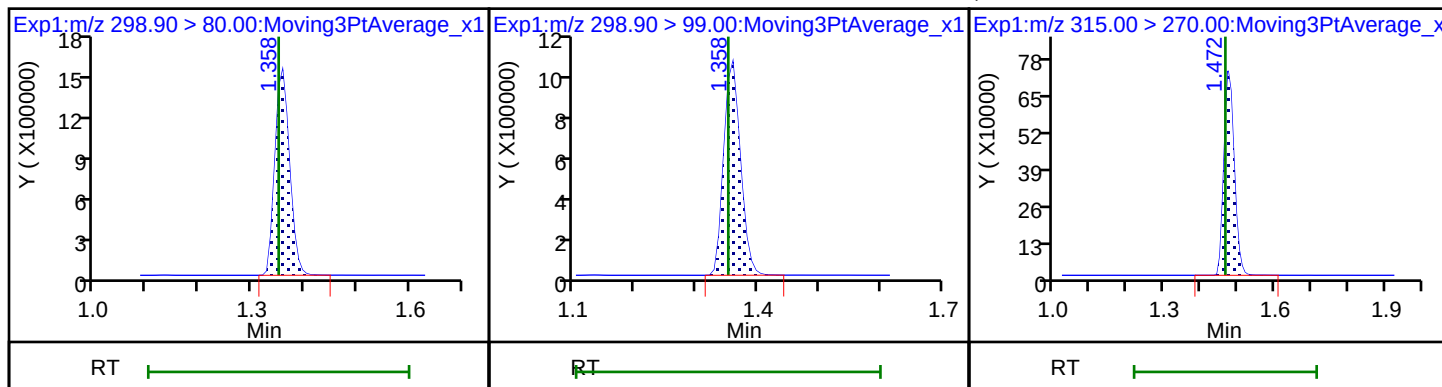
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

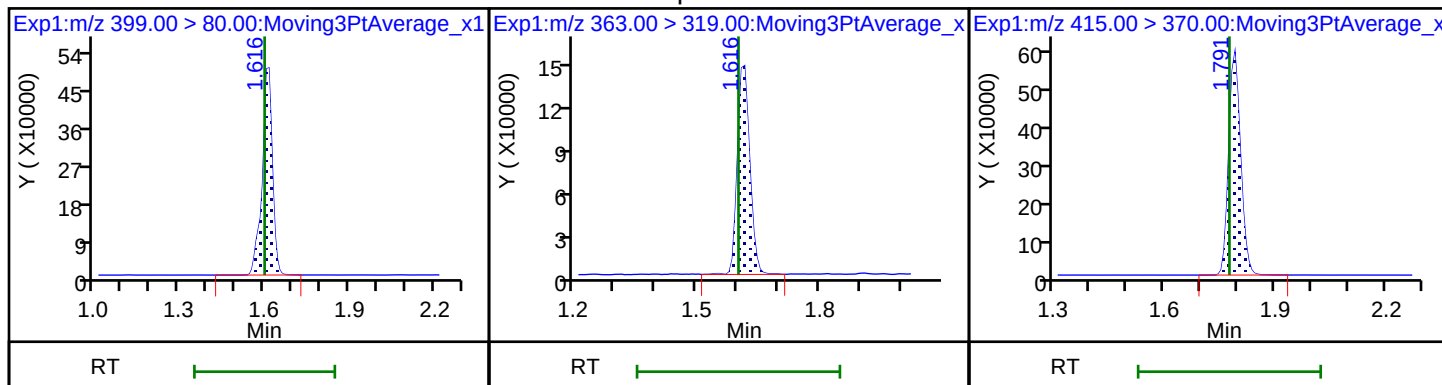
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

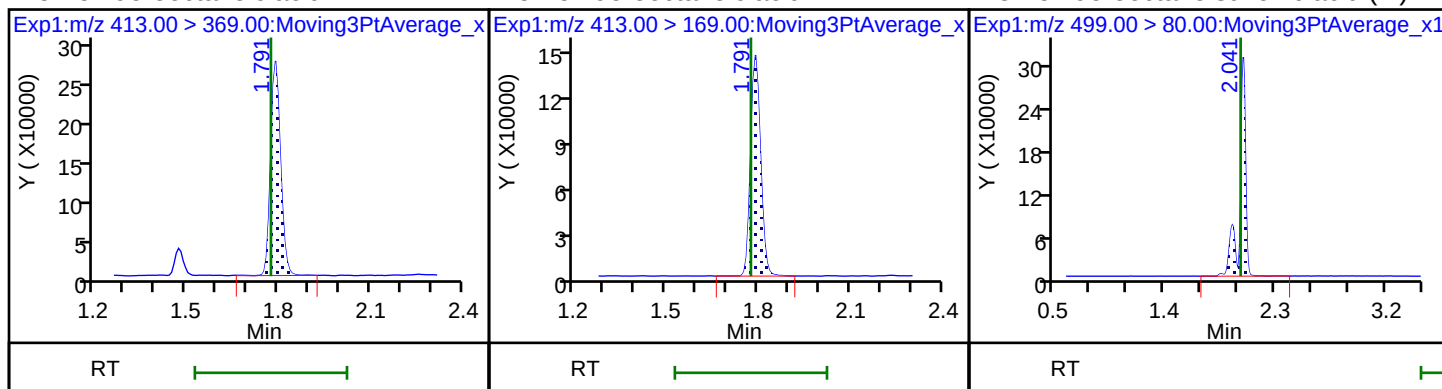
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

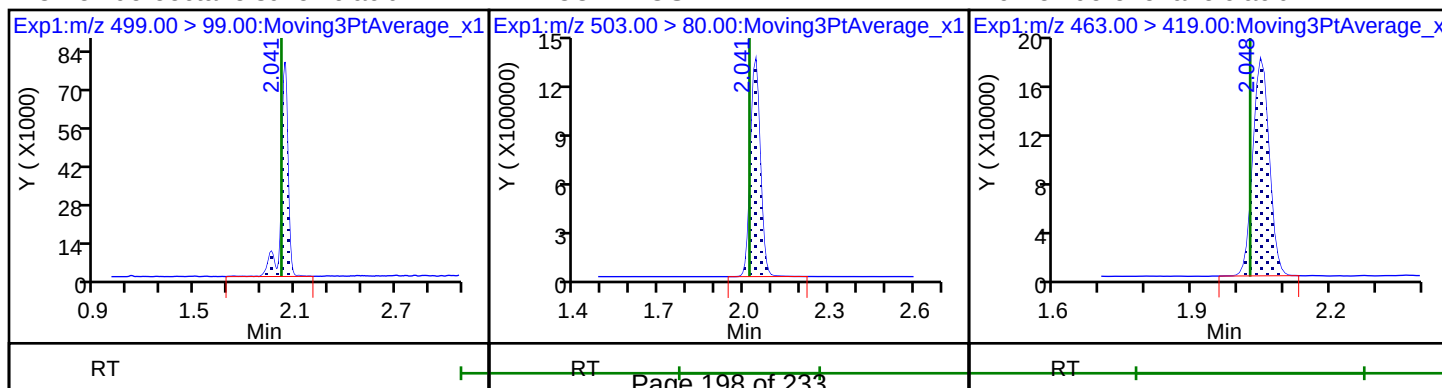
8 Perfluorooctane sulfonic acid (M)



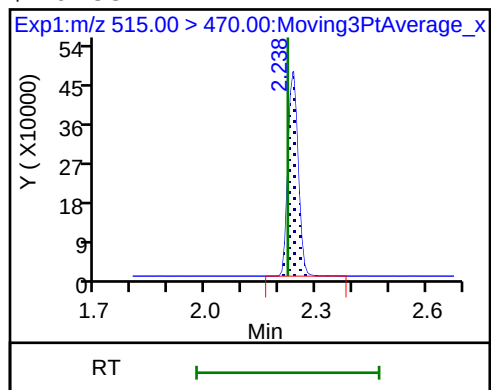
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

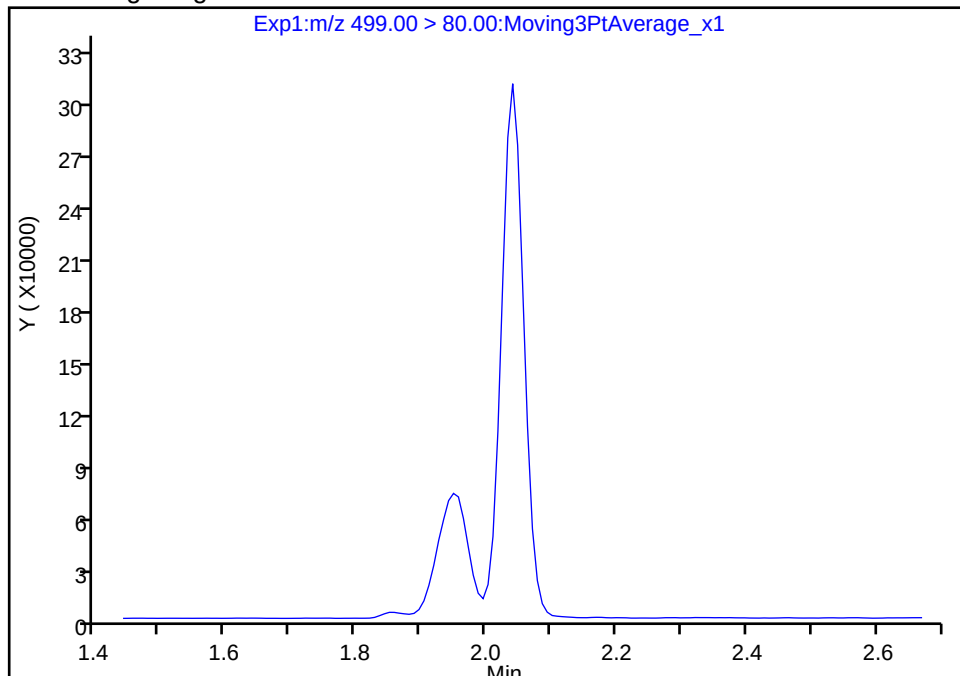
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Injection Date: 25-Jul-2018 15:18:07 Instrument ID: A8_N
Lims ID: CCVL
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 2
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

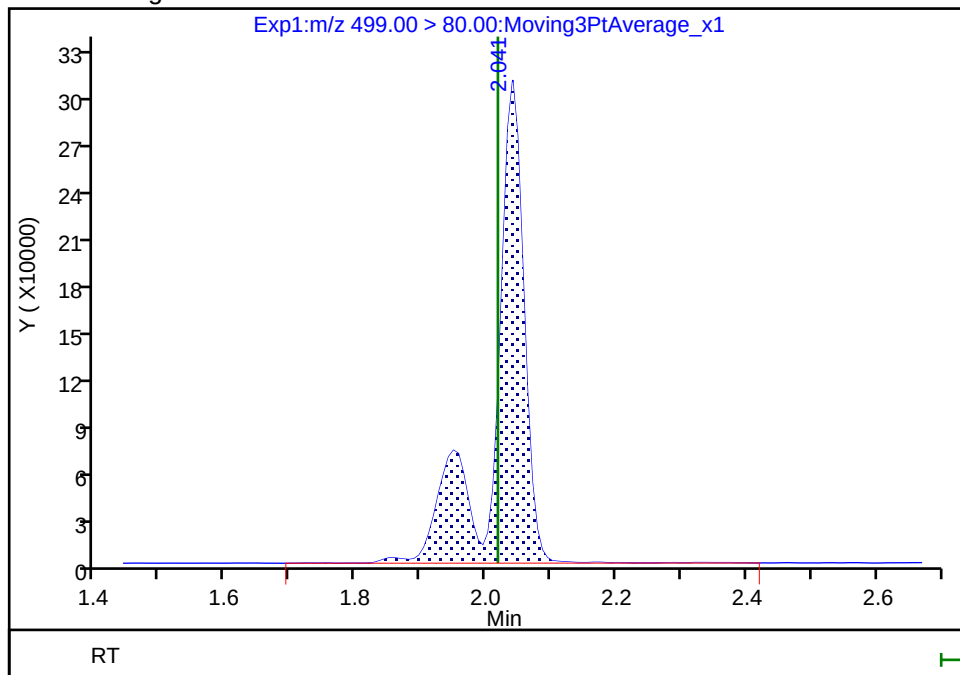
Not Detected
Expected RT: 2.02

Processing Integration Results



RT: 2.04
Area: 997391
Amount: 8.494149
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 26-Jul-2018 10:45:15

Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: CCV 320-236171/3 Calibration Date: 07/25/2018 15:22
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.25_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	1.177	1.091		125	135	-7.3	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	1.043		14.4	14.6	-1.1	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.754		46.5	45.4	2.5	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	1.064		29.3	29.7	-1.3	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	1.105		61.5	59.3	3.7	30.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.7728		29.0	29.7	-2.4	30.0
13C2 PFHxA	Ave	1.076	1.063		9.87	10.0	-1.3	30.0
13C2 PFDA	Ave	0.6956	0.6868		9.87	10.0	-1.3	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_004.d
 Lims ID: CCV L5
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 25-Jul-2018 15:22:47 ALS Bottle#: 5 Worklist Smp#: 3
 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\20180725-61648.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 26-Jul-2018 11:35:14 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK022

First Level Reviewer: barnettj

Date: 26-Jul-2018 10:45:32

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.358	1.358	0.0	1.000	14950097	125.3		21287	
298.90 > 99.00	1.358	1.358	0.0	1.000	10903783		1.37(0.00-0.00)	15546	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.479	1.479	0.0	1.000	1315903	9.87		14820	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.616	1.616	0.0	1.000	8070000	46.5		5540	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.616	1.616	0.0	1.000	1882278	14.4		350	
* 6 13C2-PFOA									
415.00 > 370.00	1.791	1.791	0.0		1238255	10.0		10532	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.791	1.791	0.0	1.000	3914568	29.3		429	
413.00 > 169.00	1.791	1.791	0.0	1.000	2102227		1.86(0.00-0.00)	5032	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.041	2.018	0.023	1.000	6644876	61.5		8650	a
499.00 > 99.00	2.041	2.018	0.023	1.000	1455011		4.57(0.00-0.00)	2190	a
* 7 13C4 PFOS									
503.00 > 80.00	2.041	2.041	0.0		2908789	28.7		5780	
9 Perfluorononanoic acid									
463.00 > 419.00	2.048	2.048	0.0	1.000	2841881	29.0		320	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.238	2.238	0.0	1.000	850368	9.87		9144	

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\20180725-61648.b\2018.07.25_537A_004.d

Injection Date: 25-Jul-2018 15:22:47

Instrument ID: A8_N

Lims ID: CCV L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 3

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

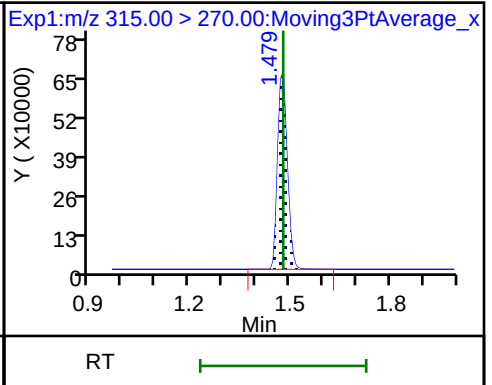
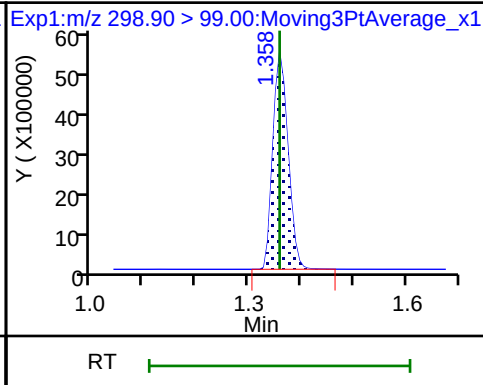
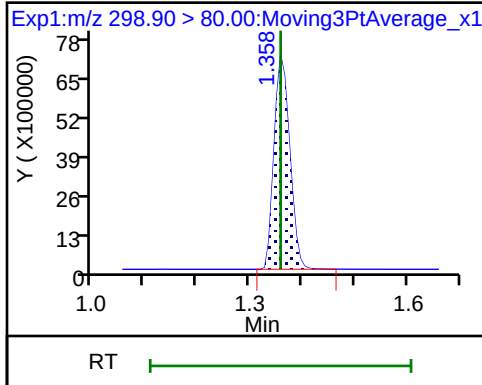
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

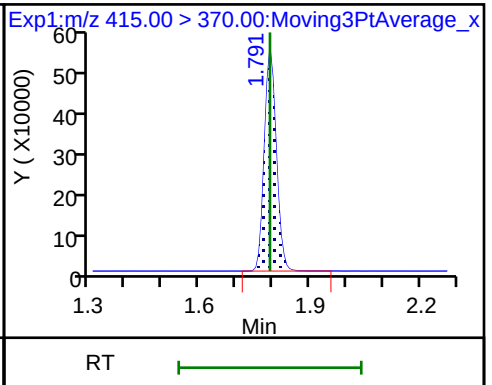
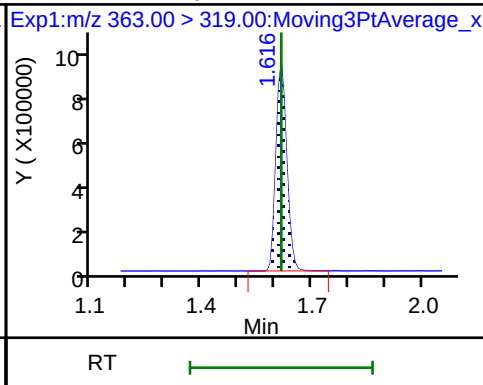
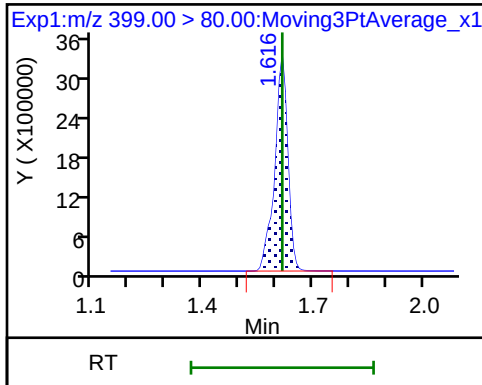
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

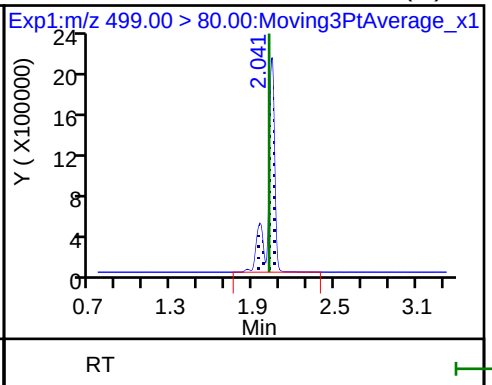
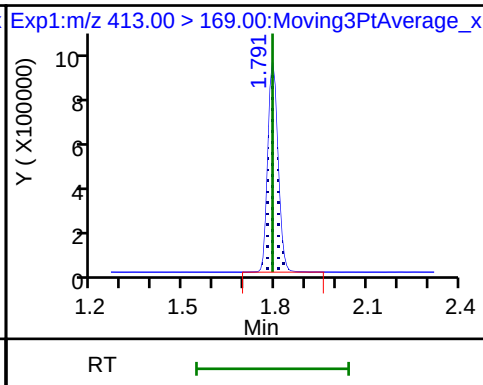
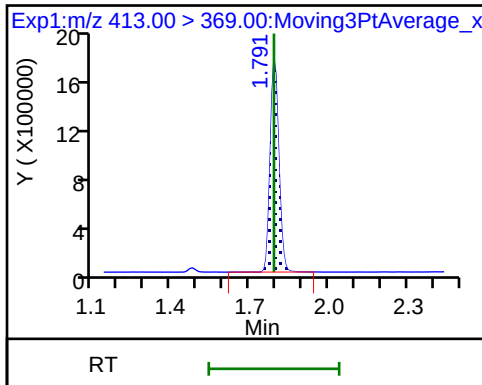
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

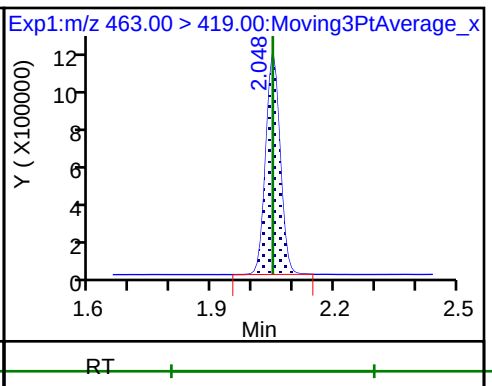
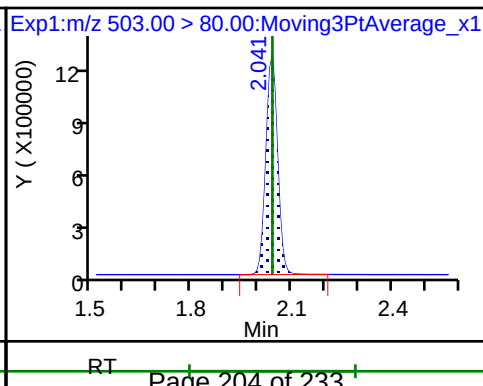
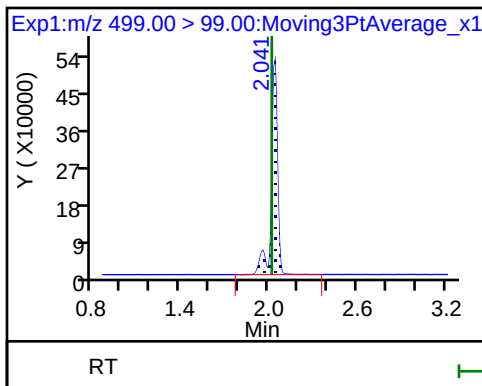
8 Perfluorooctane sulfonic acid (M)



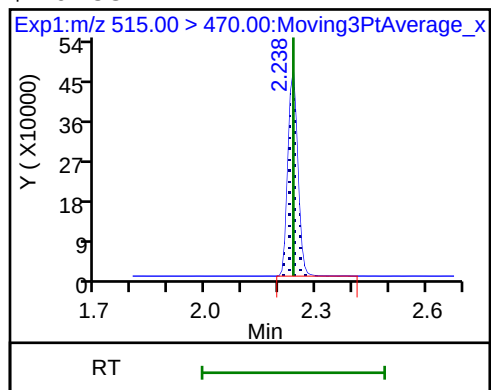
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_004.d

Injection Date: 25-Jul-2018 15:22:47

Instrument ID: A8_N

Lims ID: CCV L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#:

5

Worklist Smp#: 3

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

Method: 537_A8_N

Limit Group: LC 537 ICAL

Column:

Detector EXP1

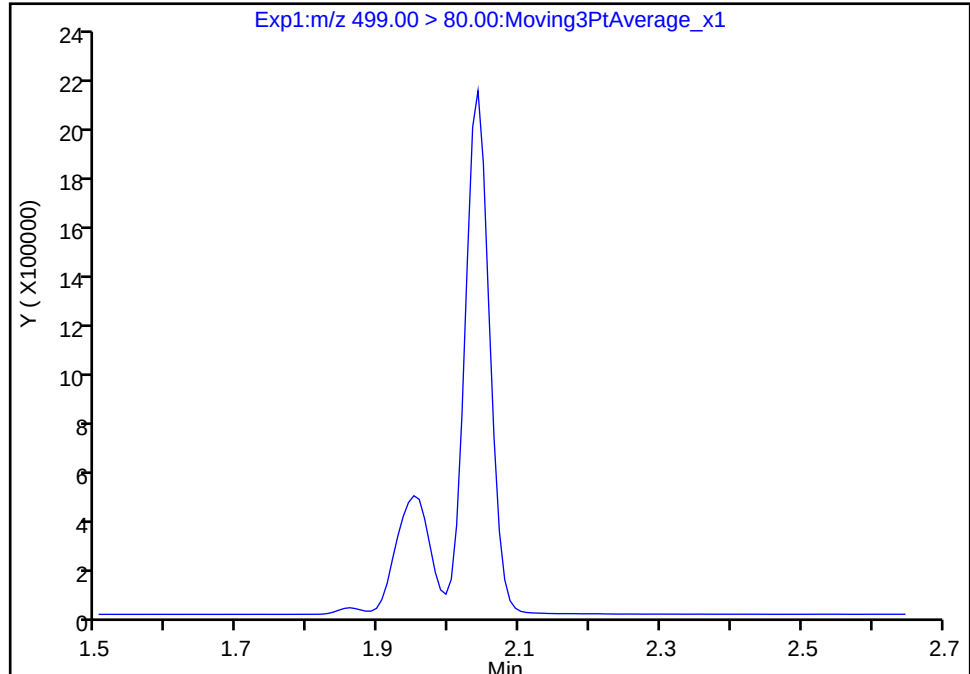
8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

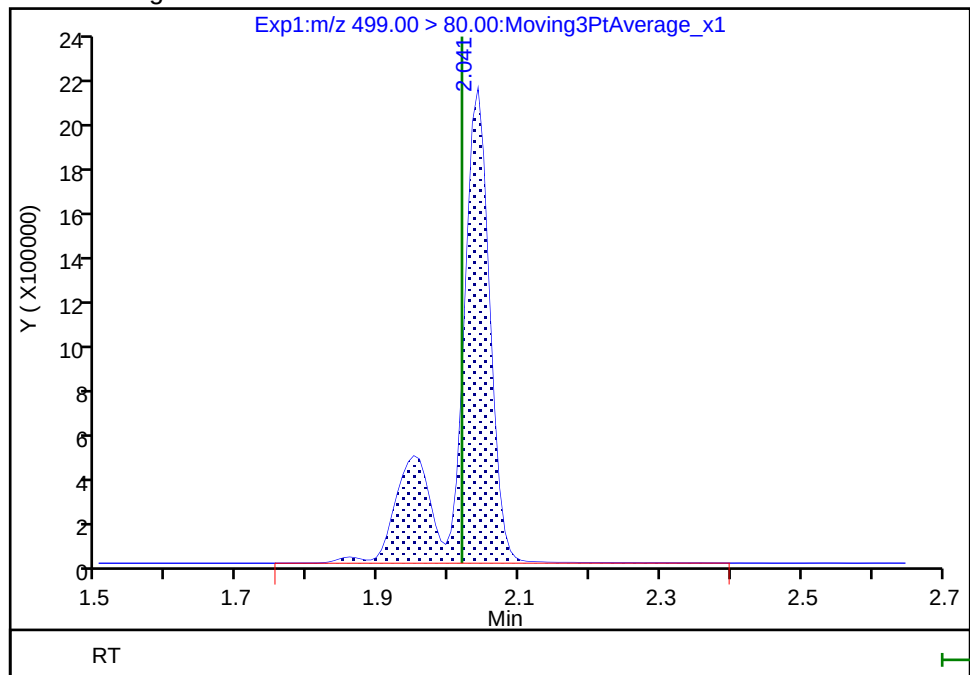
Not Detected

Expected RT: 2.02

Processing Integration Results



Manual Integration Results



RT: 2.04
Area: 6644876
Amount: 61.506662
Amount Units: ng/ml

Reviewer: barnettj, 26-Jul-2018 10:45:27

Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: CCV 320-236171/14 Calibration Date: 07/25/2018 16:14
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.25_537A_015.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.177	1.259		48.2	45.0	7.0	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	1.077		4.96	4.86	2.1	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.735		15.3	15.1	1.5	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	1.072		9.84	9.90	-0.6	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	1.060		19.7	19.8	-0.4	30.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.7807		9.76	9.90	-1.4	30.0
13C2 PFHxA	Ave	1.076	1.073		9.97	10.0	-0.3	30.0
13C2 PFDA	Ave	0.6956	0.6904		9.92	10.0	-0.8	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_015.d
 Lims ID: CCV L3
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 25-Jul-2018 16:14:13 ALS Bottle#: 3 Worklist Smp#: 14
 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\20180725-61648.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 26-Jul-2018 11:35:31 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d

Column 1 : Det: EXP1

Process Host: XAWRK022

First Level Reviewer: barnettj

Date: 26-Jul-2018 10:45:45

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.358	1.358	0.0	1.000	5896579	48.2		12363	
298.90 > 99.00	1.358	1.358	0.0	1.000	4167162		1.42(0.00-0.00)	7480	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.472	1.472	0.0	1.000	1320156	9.97		17453	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.608	1.608	0.0	1.000	2730921	15.3		1943	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.608	1.608	0.0	1.000	644379	4.96		123	
* 6 13C2-PFOA									
415.00 > 370.00	1.775	1.775	0.0		1230742	10.0		10851	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.783	1.783	0.0	1.000	1305866	9.84		142	
413.00 > 169.00	1.783	1.783	0.0	1.000	691852		1.89(0.00-0.00)	1687	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.026	2.018	0.008	1.000	2180916	19.7		3410	a
499.00 > 99.00	2.026	2.018	0.008	1.000	486530		4.48(0.00-0.00)	698	a
* 7 13C4 PFOS									
503.00 > 80.00	2.026	2.026	0.0		2984072	28.7		5632	
9 Perfluorononanoic acid									
463.00 > 419.00	2.033	2.033	0.0	1.000	951274	9.76		99.8	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.231	2.231	0.0	1.000	849671	9.92		8179	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L3_00025

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_015.d

Injection Date: 25-Jul-2018 16:14:13

Instrument ID: A8_N

Lims ID: CCV L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 14

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

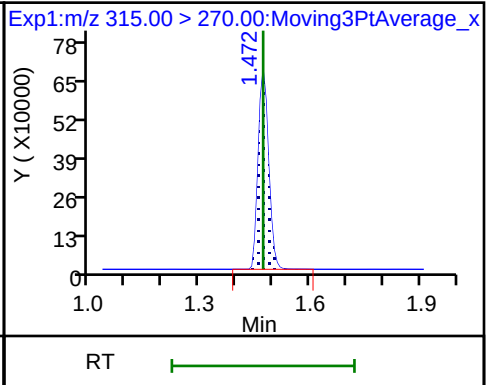
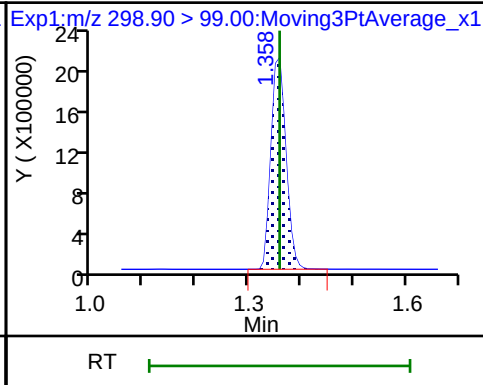
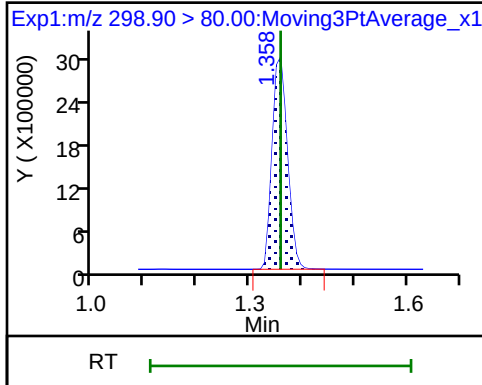
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

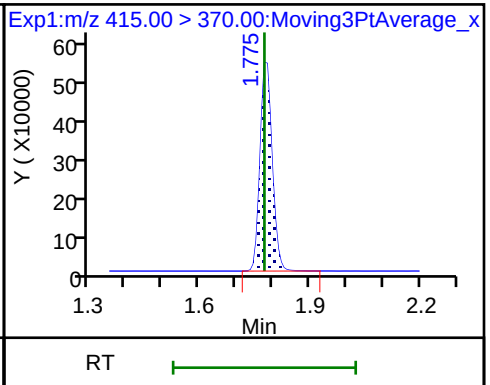
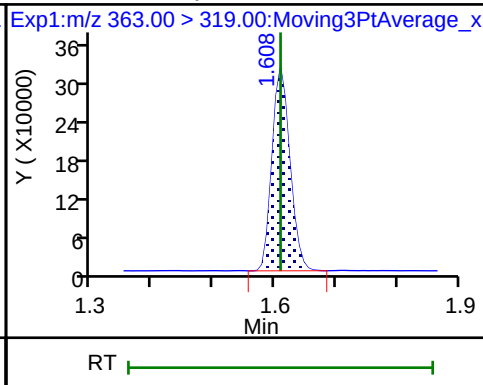
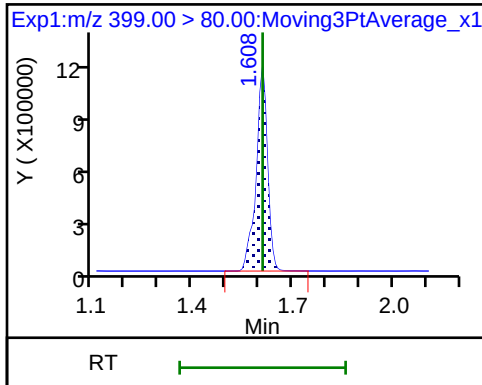
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

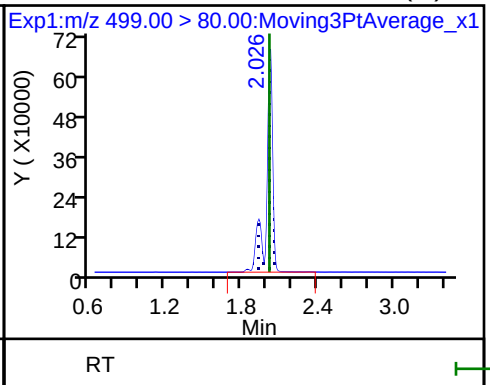
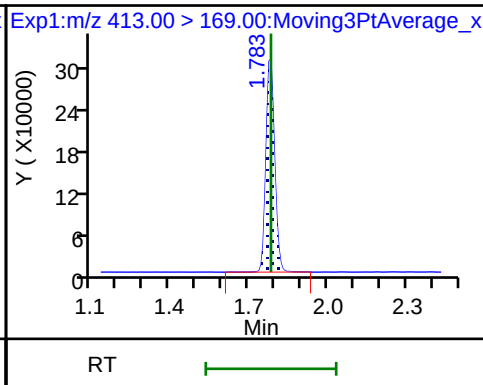
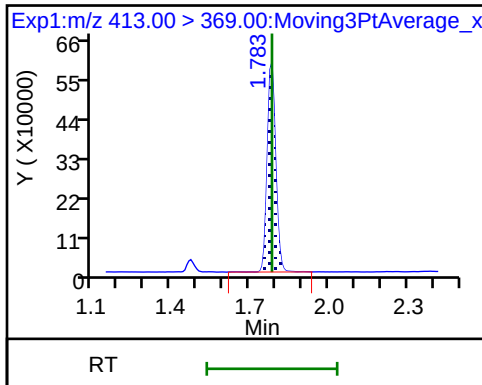
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

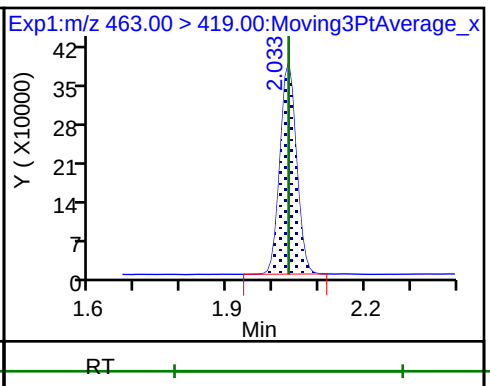
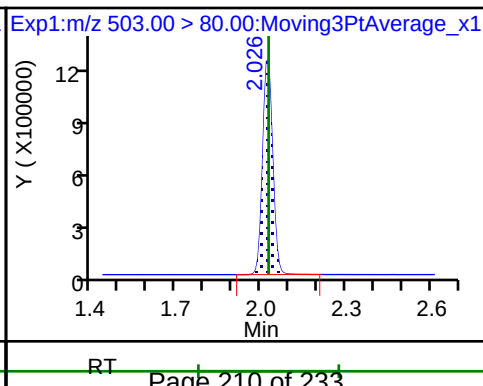
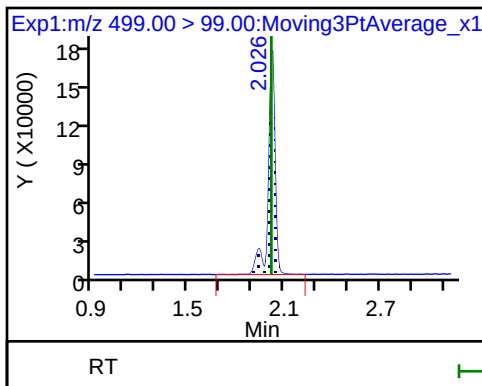
8 Perfluorooctane sulfonic acid (M)



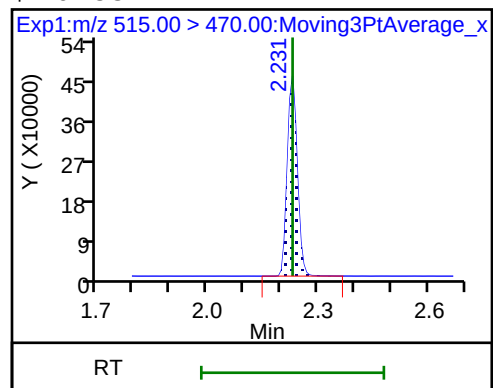
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

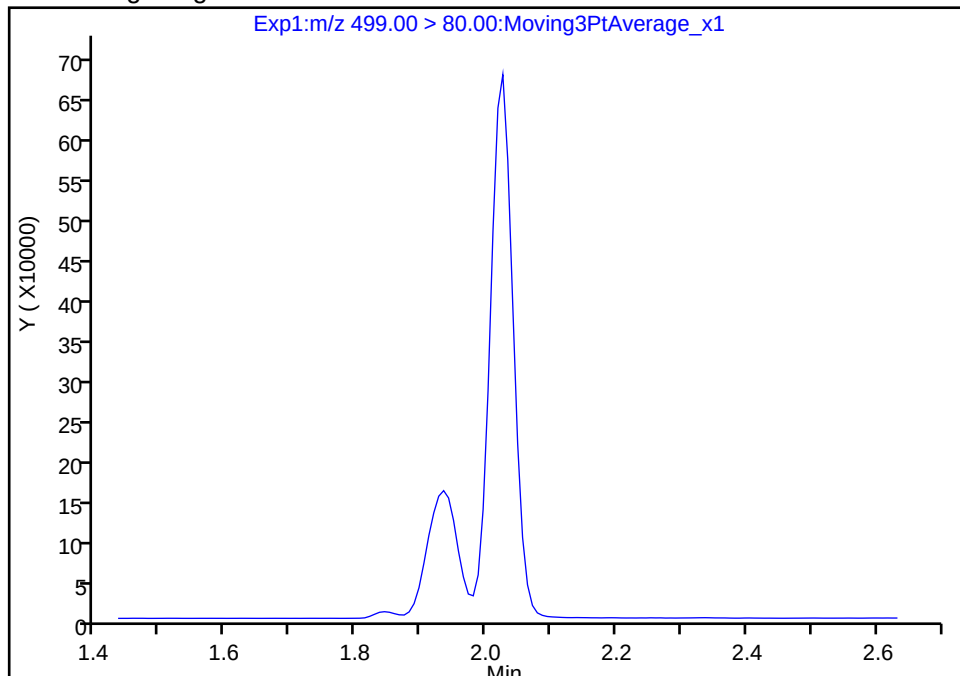
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_015.d
Injection Date: 25-Jul-2018 16:14:13 Instrument ID: A8_N
Lims ID: CCV L3
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 14
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

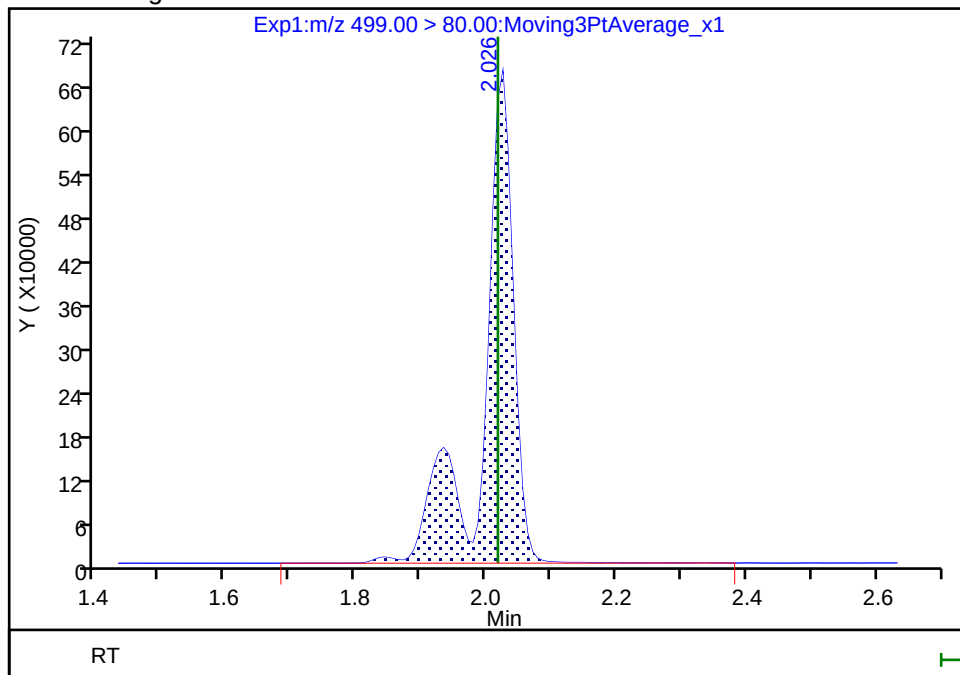
Not Detected
Expected RT: 2.02

Processing Integration Results



RT: 2.03
Area: 2180916
Amount: 19.677827
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 26-Jul-2018 10:45:40
Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected
Page 212 of 233

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: MB 320-234028/1-A
 Matrix: Water Lab File ID: 2018.07.25_537A_007.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 07/14/2018 08:08
 Sample wt/vol: 250 (mL) Date Analyzed: 07/25/2018 15:36
 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.: 236171 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	78		70-130
STL00996	13C2 PFDA	87		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_007.d
 Lims ID: MB 320-234028/1-A
 Client ID:
 Sample Type: MB
 Inject. Date: 25-Jul-2018 15:36:46 ALS Bottle#: 2 Worklist Smp#: 6
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: mb 320-234028/1-a
 Misc. Info.: Plate: 1 Rack: 2
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 26-Jul-2018 11:35:14 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.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	1.472	1.479	-0.007	1.000	1350066	7.79		12367	
* 6 13C2-PFOA									
415.00 > 370.00	1.783	1.791	-0.008		1611038	10.0		11916	
* 7 13C4 PFOS									
503.00 > 80.00	2.026	2.041	-0.015		3986531	28.7		6920	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.231	2.238	-0.007	1.000	976198	8.71		10803	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_007.d

Injection Date: 25-Jul-2018 15:36:46

Instrument ID: A8_N

Lims ID: MB 320-234028/1-A

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 6

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

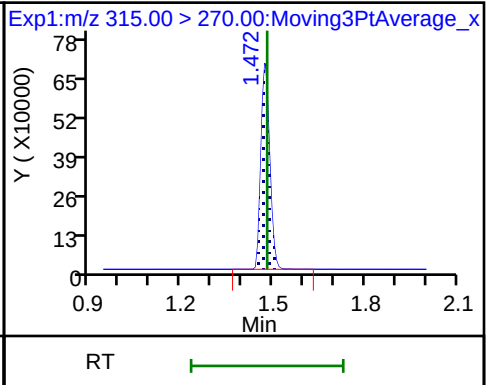
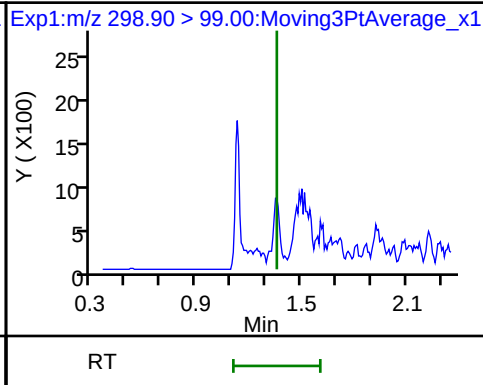
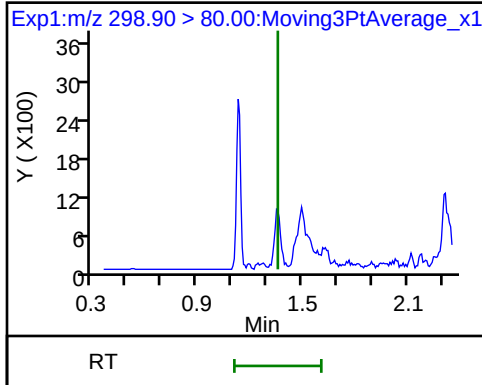
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid (ND)

1 Perfluorobutanesulfonic acid (ND)

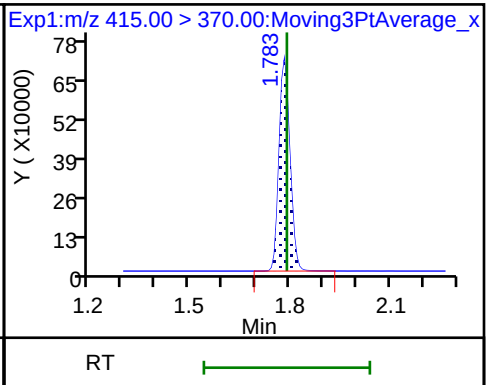
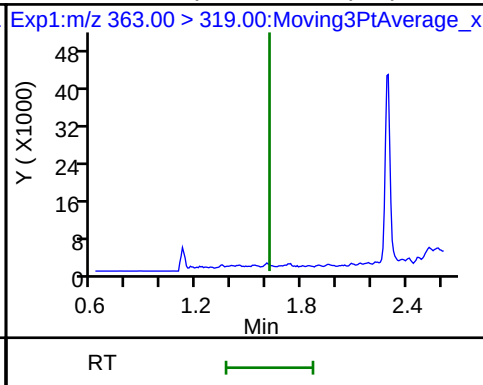
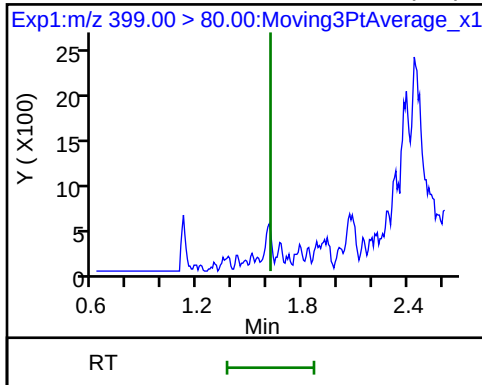
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid (ND)

4 Perfluoroheptanoic acid (ND)

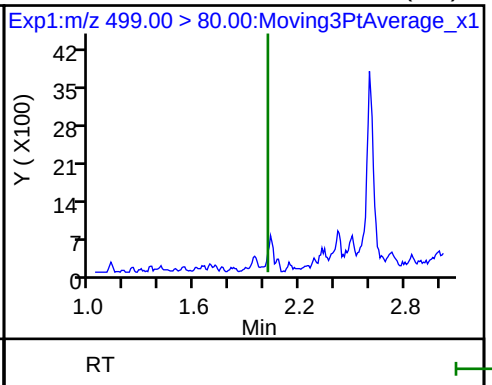
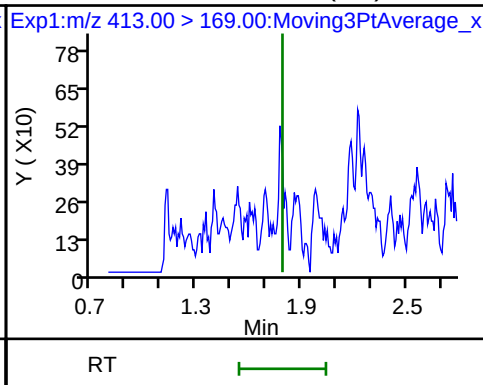
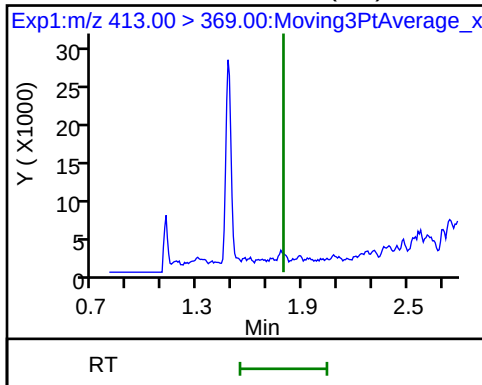
* 6 13C2-PFOA



5 Perfluorooctanoic acid (ND)

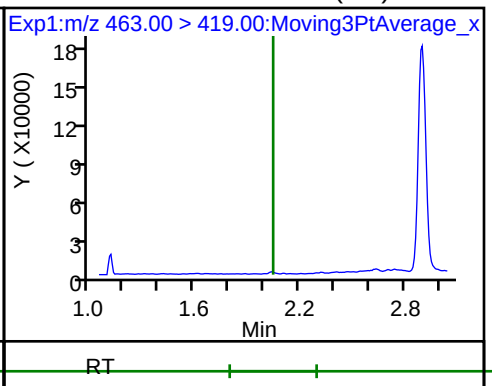
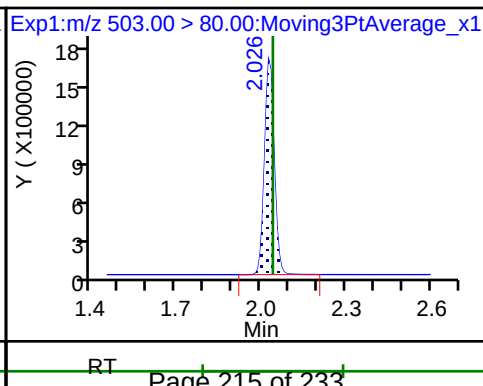
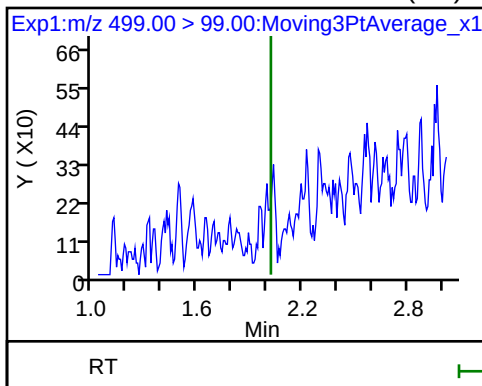
5 Perfluorooctanoic acid (ND)

8 Perfluorooctane sulfonic acid (ND)

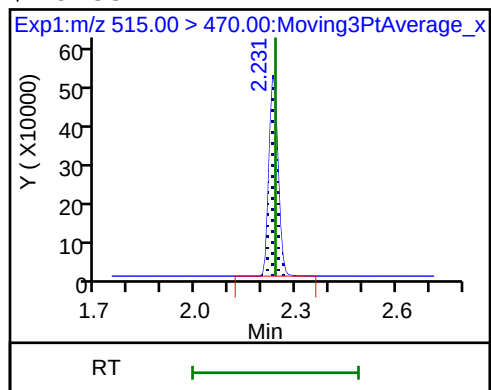


8 Perfluorooctane sulfonic acid (ND) * 7 13C4 PFOS

9 Perfluorononanoic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\2018.07.25_537A_007.d
Lims ID: MB 320-234028/1-A
Client ID:
Sample Type: MB
Inject. Date: 25-Jul-2018 15:36:46 ALS Bottle#: 2 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-234028/1-a
Misc. Info.: Plate: 1 Rack: 2
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Method: \\ChromNa\Sacramento\ChromData\A8_N\20180725-61648.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 26-Jul-2018 11:35:14 Calib Date: 21-Jul-2018 12:45:07
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d
Column 1 : Det: EXP1
Process Host: XAWRK022

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	7.79	77.87
\$ 10 13C2 PFDA	10.0	8.71	87.11

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: LCS 320-234028/2-A
 Matrix: Water Lab File ID: 2018.07.24_537A_027.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 07/14/2018 08:08
 Sample wt/vol: 250 (mL) Date Analyzed: 07/24/2018 10:10
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 235922 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	214	M	40	16	6.8
335-67-1	Perfluorooctanoic acid (PFOA)	102		20	8.0	2.8
375-95-1	Perfluorononanoic acid (PFNA)	104		24	20	8.0
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	155		30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	47.7		10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	384		90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	86		70-130
STL00996	13C2 PFDA	88		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180724-61574.b\2018.07.24_537A_027.d
 Lims ID: LCS 320-234028/2-A
 Client ID:
 Sample Type: LCS
 Inject. Date: 24-Jul-2018 10:10:46 ALS Bottle#: 17 Worklist Smp#: 25
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: lcs 320-234028/2-
 Misc. Info.: Plate: 1 Rack: 4
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20180724-61574.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 25-Jul-2018 13:50:27 Calib Date: 21-Jul-2018 12:45:07
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d
 Column 1 : Det: EXP1
 Process Host: XAWRK017

First Level Reviewer: barnettj

Date: 25-Jul-2018 13:39:35

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.350	1.350	0.0	1.000	14905044	96.1		2899	
298.90 > 99.00	1.350	1.350	0.0	1.000	10808891		1.38(0.00-0.00)	3168	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.464	1.464	0.0	1.000	1375485	8.56		15936	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.601	1.601	0.0	1.000	8756944	38.8		4922	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.601	1.601	0.0	1.000	1880498	11.9		178	
* 6 13C2-PFOA									
415.00 > 370.00	1.768	1.768	0.0		1493913	10.0		12485	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.768	1.768	0.0	1.000	4104596	25.5		517	
413.00 > 169.00	1.768	1.768	0.0	1.000	2204658		1.86(0.00-0.00)	5705	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.011	2.003	0.008	1.000	7508715	53.5		5509	a
499.00 > 99.00	2.011	2.003	0.008	1.000	1606922		4.67(0.00-0.00)	2262	a
* 7 13C4 PFOS									
503.00 > 80.00	2.011	2.011	0.0		3780803	28.7		5602	
9 Perfluorononanoic acid									
463.00 > 419.00	2.018	2.018	0.0	1.000	3062356	25.9		116	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.223	2.215	0.008	1.000	910213	8.76		7470	

QC Flag Legend

Review Flags

a - User Assigned ID

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180724-61574.b\2018.07.24_537A_027.d

Injection Date: 24-Jul-2018 10:10:46

Instrument ID: A8_N

Lims ID: LCS 320-234028/2-A

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 17

Worklist Smp#: 25

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

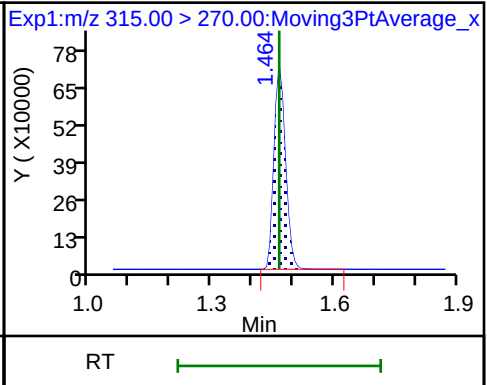
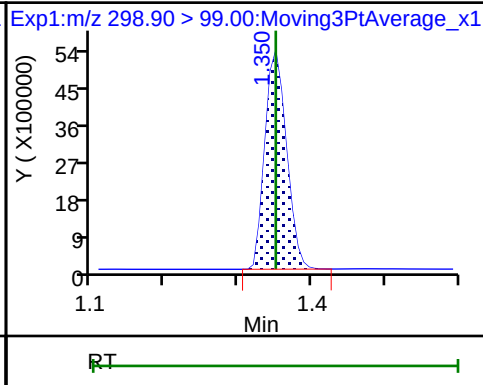
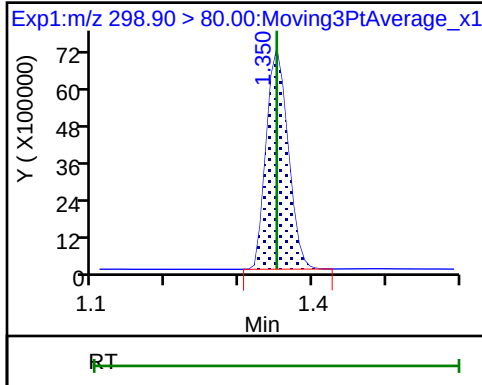
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

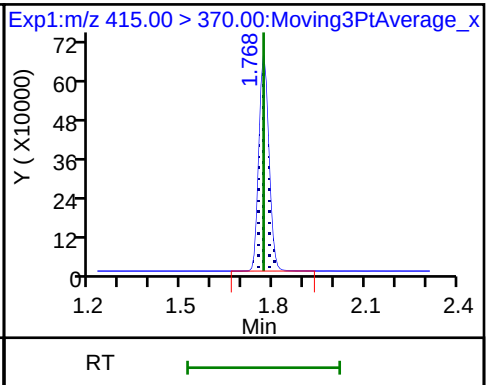
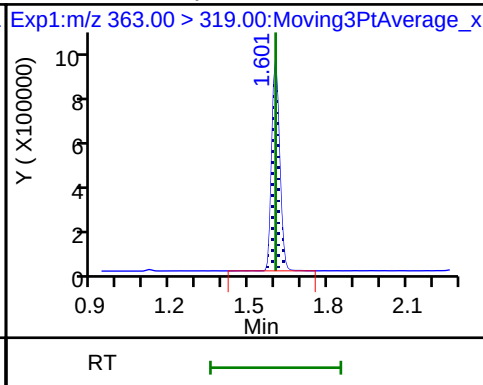
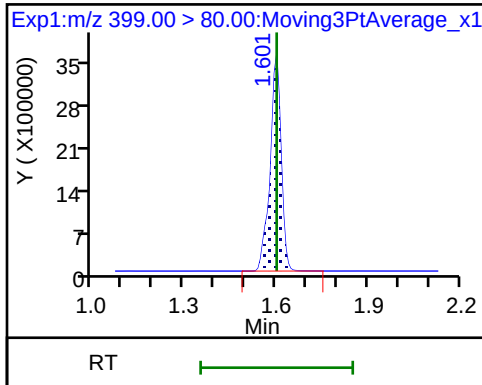
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

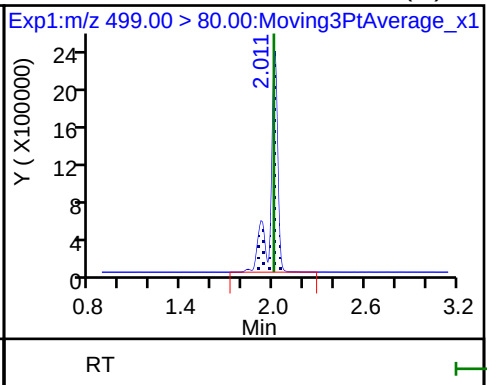
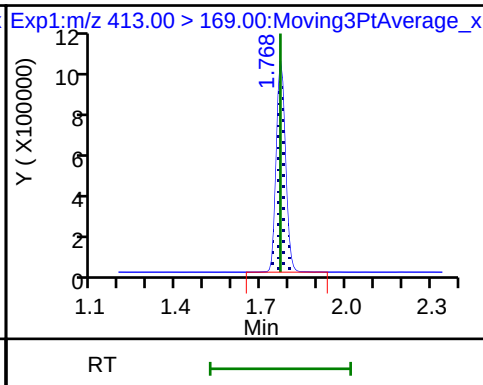
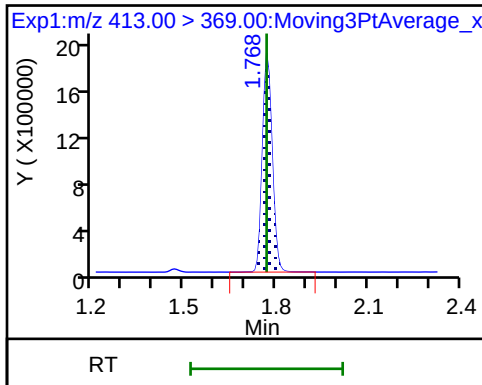
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

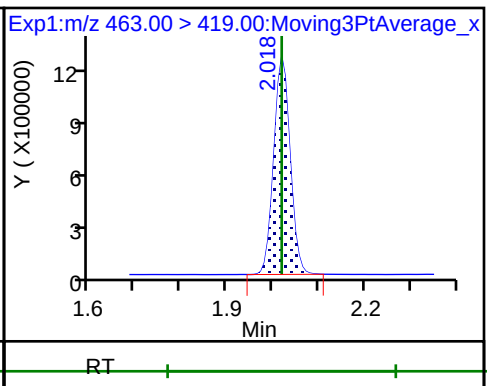
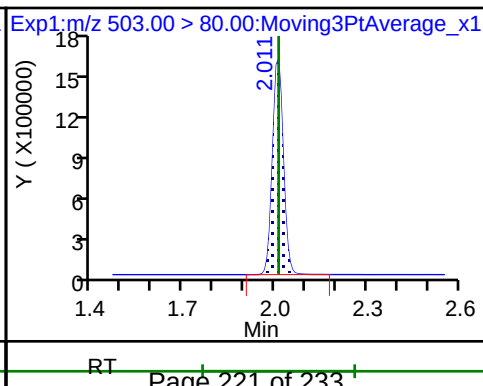
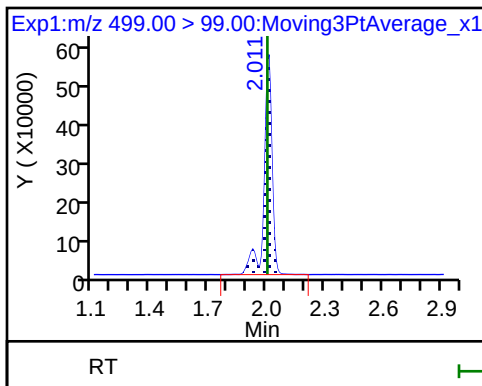
8 Perfluorooctane sulfonic acid (M)



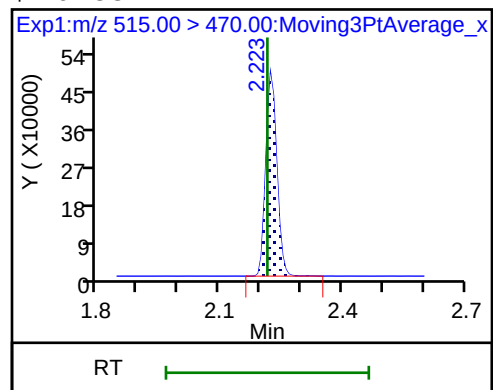
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180724-61574.b\2018.07.24_537A_027.d
Lims ID: LCS 320-234028/2-A
Client ID:
Sample Type: LCS
Inject. Date: 24-Jul-2018 10:10:46 ALS Bottle#: 17 Worklist Smp#: 25
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-234028/2-
Misc. Info.: Plate: 1 Rack: 4
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Method: \\ChromNa\Sacramento\ChromData\A8_N\20180724-61574.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 25-Jul-2018 13:50:27 Calib Date: 21-Jul-2018 12:45:07
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180721-61414.b\2018.07.21_537CURVE_008.d
Column 1 : Det: EXP1
Process Host: XAWRK017

First Level Reviewer: barnettj

Date: 25-Jul-2018 13:39:35

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	8.56	85.55
\$ 10 13C2 PFDA	10.0	8.76	87.59

TestAmerica Sacramento

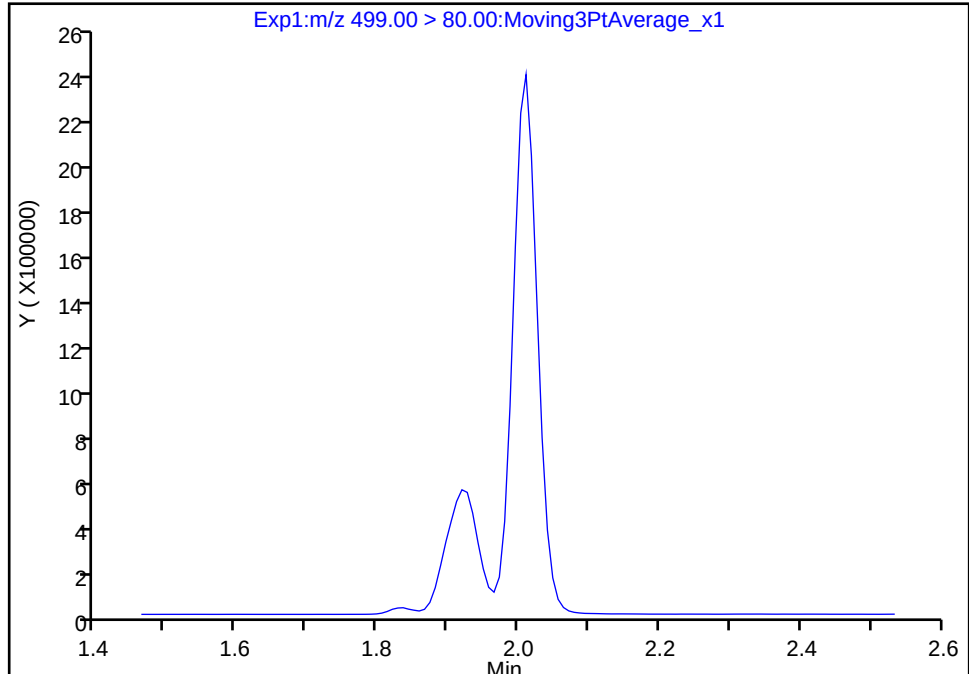
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180724-61574.b\2018.07.24_537A_027.d
Injection Date: 24-Jul-2018 10:10:46 Instrument ID: A8_N
Lims ID: LCS 320-234028/2-A
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 17 Worklist Smp#: 25
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

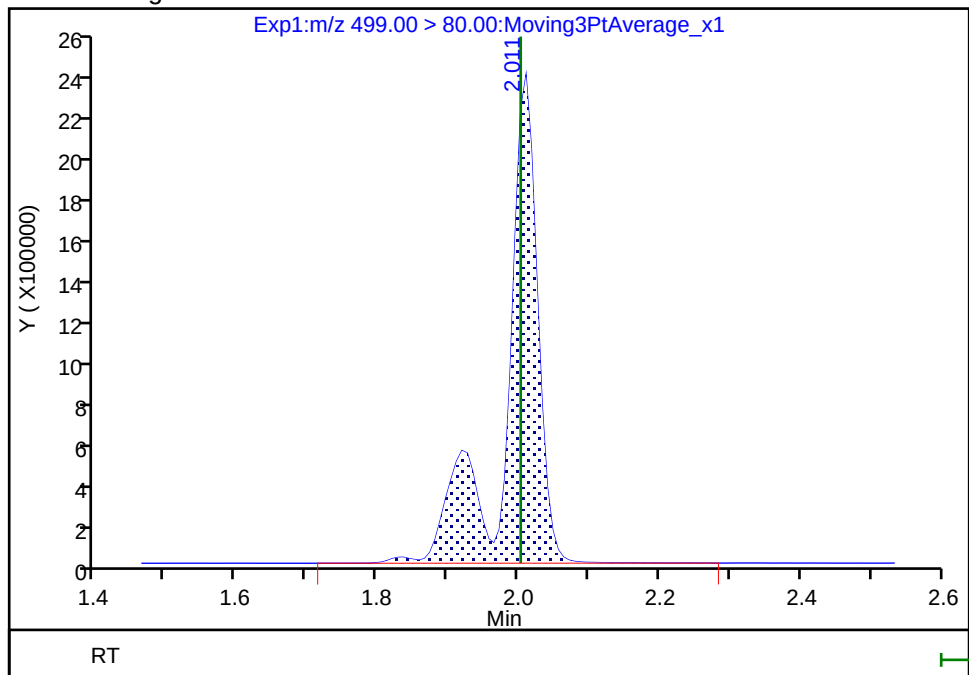
Not Detected
Expected RT: 2.00

Processing Integration Results



RT: 2.01
Area: 7508715
Amount: 53.472325
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 25-Jul-2018 13:39:22

Audit Action: Assigned Compound ID

Audit Reason: Peak assignment corrected

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

SDG No.: _____

Instrument ID: A8_N Start Date: 07/21/2018 12:21Analysis Batch Number: 235370 End Date: 07/21/2018 13:03

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-235370/3		07/21/2018 12:21	1	2018.07.21_537C URVE 003.d	GeminiC18 3x100 3(mm)
IC 320-235370/4		07/21/2018 12:26	1	2018.07.21_537C URVE 004.d	GeminiC18 3x100 3(mm)
IC 320-235370/5		07/21/2018 12:31	1	2018.07.21_537C URVE 005.d	GeminiC18 3x100 3(mm)
IC 320-235370/6 ICISAV		07/21/2018 12:35	1	2018.07.21_537C URVE 006.d	GeminiC18 3x100 3(mm)
IC 320-235370/7		07/21/2018 12:40	1	2018.07.21_537C URVE 007.d	GeminiC18 3x100 3(mm)
IC 320-235370/8		07/21/2018 12:45	1	2018.07.21_537C URVE 008.d	GeminiC18 3x100 3(mm)
ZZZZZ		07/21/2018 12:49	1		GeminiC18 3x100 3(mm)
CCVL 320-235370/11		07/21/2018 12:54	1	2018.07.21_537C URVE 010.d	GeminiC18 3x100 3(mm)
ICB 320-235370/12		07/21/2018 12:59	1		GeminiC18 3x100 3(mm)
ICV 320-235370/13		07/21/2018 13:03	1	2018.07.21_537C URVE 012.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

SDG No.: _____

Instrument ID: A8_N Start Date: 07/24/2018 08:18Analysis Batch Number: 235918 End Date: 07/24/2018 09:19

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-235918/2		07/24/2018 08:18	1	2018.07.24_537A 003.d	GeminiC18 3x100 3(mm)
CCV 320-235918/3 CCVIS		07/24/2018 08:23	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 08:27	1		GeminiC18 3x100 3(mm)
CCV 320-235918/14 CCVIS		07/24/2018 09:19	1		GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-41028-1

SDG No.: _____

Instrument ID: A8_NStart Date: 07/24/2018 09:56Analysis Batch Number: 235922End Date: 07/24/2018 10:52

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-235922/22 CCVIS		07/24/2018 09:56	1	2018.07.24_537A 024.d	GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:01	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:06	1		GeminiC18 3x100 3(mm)
LCS 320-234028/2-A		07/24/2018 10:10	1	2018.07.24_537A 027.d	GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:15	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:20	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:24	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:29	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:34	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:38	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:43	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:48	1		GeminiC18 3x100 3(mm)
CCV 320-235922/34 CCVIS		07/24/2018 10:52	1	2018.07.24_537A 036.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

SDG No.: _____

Instrument ID: A8_N Start Date: 07/25/2018 15:18Analysis Batch Number: 236171 End Date: 07/25/2018 16:14

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-236171/2		07/25/2018 15:18	1	2018.07.25_537A 003.d	GeminiC18 3x100 3(mm)
CCV 320-236171/3 CCVIS		07/25/2018 15:22	1	2018.07.25_537A 004.d	GeminiC18 3x100 3(mm)
ZZZZZ		07/25/2018 15:27	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/25/2018 15:32	1		GeminiC18 3x100 3(mm)
MB 320-234028/1-A		07/25/2018 15:36	1	2018.07.25_537A 007.d	GeminiC18 3x100 3(mm)
ZZZZZ		07/25/2018 15:41	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/25/2018 15:46	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/25/2018 15:50	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/25/2018 15:55	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/25/2018 16:00	1		GeminiC18 3x100 3(mm)
320-41028-1		07/25/2018 16:04	1	2018.07.25_537A 013.d	GeminiC18 3x100 3(mm)
320-41028-2		07/25/2018 16:09	1	2018.07.25_537A 014.d	GeminiC18 3x100 3(mm)
CCV 320-236171/14 CCVIS		07/25/2018 16:14	1	2018.07.25_537A 015.d	GeminiC18 3x100 3(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

SDG No.: _____

Batch Number: 234028 Batch Start Date: 07/14/18 08:07 Batch Analyst: Kouchari, ShamiranBatch Method: 537 Batch End Date: 07/16/18 13:30

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-HSP 00029
MB 320-234028/1		537, 537				250 mL	1.00 mL	7 SU	
LCS 320-234028/2		537, 537				250 mL	1.00 mL	7 SU	100 uL
320-41028-A-1	WGNA-071018-RW-3142	537, 537	T	297.45 g	30.26 g	267.2 mL	1.00 mL	7 SU	
320-41028-A-2	WGNA-071018-FRB-3142	537, 537	T	279.08 g	28.43 g	250.7 mL	1.00 mL	7 SU	

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-IS 00074	LC537-SU 00073				
MB 320-234028/1		537, 537		100 uL	100 uL				
LCS 320-234028/2		537, 537		100 uL	100 uL				
320-41028-A-1	WGNA-071018-RW-3142	537, 537	T	100 uL	100 uL				
320-41028-A-2	WGNA-071018-FRB-3142	537, 537	T	100 uL	100 uL				

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.: 320-41028-1

SDG No.: _____

Batch Number: 234028 Batch Start Date: 07/14/18 08:07 Batch Analyst: Kouchari, ShamiranBatch Method: 537 Batch End Date: 07/16/18 13:30

Batch Notes	
Analyst ID - Aliquot Step	SKD
Batch Comment	Client labels match TA label, SKD 07/14/18
Analyst ID - Concentration	SKD
Analyst ID - Final Volume Step	SKD
Internal Standard ID#	1279435
Manifold ID	1, 3
Methanol ID	1294755
pH Indicator ID	1718
Pipette ID	R40538G, N32728F
Analyst ID - IS Reagent Drop	SKD
Analyst ID - IS Reagent Drop Witness	JCB
Analyst ID - SU Reagent Drop	SKD
Analyst ID - SU Reagent Drop Witness	TWL
Analyst ID - TA Reagent Drop	SKD
Analyst ID - TA Reagent Drop Witness	TWL
SPE Cartridge Lot ID	6390138-02
Trizma ID	SLBR5241V
Reagent Water ID	07/12/18

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Shipping and Receiving Documents

Test America Sacramento 880 Riverside Parkway West Sacramento, CA 95605-1500 Phone 916.373.5600 Fax 303.467.7248

[illegible]

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 320-41028-1

Login Number: 41028

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	453752/453753
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	

"WGNA-071018-RW-3142","537","RES","320-41028-1","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","17","ng/L","J M","6.4","DL","","","TRG","","","37","LOQ","YES","-99","","267.2","1.00","15","","
"WGNA-071018-RW-3142","537","RES","320-41028-1","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","12","ng/L","J","2.6","DL","","","TRG","","","19","LOQ","YES","-99","","267.2","1.00","7.5","","
"WGNA-071018-RW-3142","537","RES","320-41028-1","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","7.2","ng/L","J","5.1","DL","","","TRG","","","28","LOQ","YES","-99","","267.2","1.00","11","","
"WGNA-071018-RW-3142","537","RES","320-41028-1","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","34","ng/L","U","15","DL","","","TRG","","","84","LOQ","YES","-99","","267.2","1.00","34","","
"WGNA-071018-RW-3142","537","RES","320-41028-1","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","3.0","ng/L","J","1.8","DL","","","TRG","","","9.4","LOQ","YES","-99","","267.2","1.00","3.7","","
"WGNA-071018-RW-3142","537","RES","320-41028-1","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","19","ng/L","U","7.5","DL","","","TRG","","","22","LOQ","YES","-99","","267.2","1.00","19","","
"WGNA-071018-RW-3142","537","RES","320-41028-1","TALSAC","STL00993","13C2 PFHxA","28","ng/L","","","-99","DL","","","SURR","74","","","-99","LOQ","YES","37.4","","267.2","1.00","0","","
"WGNA-071018-RW-3142","537","RES","320-41028-1","TALSAC","STL00996","13C2 PFDA","32","ng/L","","","-99","DL","","","SURR","85","","","-99","LOQ","YES","37.4","","267.2","1.00","0","","
"WGNA-071018-FRB-3142","537","RES","320-41028-2","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","16","ng/L","U","6.8","DL","","","TRG","","","40","LOQ","YES","-99","","250.7","1.00","16","","
"WGNA-071018-FRB-3142","537","RES","320-41028-2","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","8.0","ng/L","U","2.8","DL","","","TRG","","","20","LOQ","YES","-99","","250.7","1.00","8.0","","
"WGNA-071018-FRB-3142","537","RES","320-41028-2","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","12","ng/L","U","5.5","DL","","","TRG","","","30","LOQ","YES","-99","","250.7","1.00","12","","
"WGNA-071018-FRB-3142","537","RES","320-41028-2","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","36","ng/L","U","16","DL","","","TRG","","","90","LOQ","YES","-99","","250.7","1.00","36","","
"WGNA-071018-FRB-3142","537","RES","320-41028-2","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","4.0","ng/L","U","1.9","DL","","","TRG","","","10","LOQ","YES","-99","","250.7","1.00","4.0","","
"WGNA-071018-FRB-3142","537","RES","320-41028-2","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","20","ng/L","U","8.0","DL","","","TRG","","","24","LOQ","YES","-99","","250.7","1.00","20","","
"WGNA-071018-FRB-3142","537","RES","320-41028-2","TALSAC","STL00993","13C2 PFHxA","34","ng/L","","","-99","DL","","","SURR","85","","","-99","LOQ","YES","39.9","","250.7","1.00","0","","
"WGNA-071018-FRB-3142","537","RES","320-41028-2","TALSAC","STL00996","13C2 PFDA","34","ng/L","","","-99","DL","","","SURR","84","","","-99","LOQ","YES","39.9","","250.7","1.00","0","","
"LCS 320-234028/2-A","537","RES","LCS 320-234028/2-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","214","ng/L","M","6.8","DL","","","SPK","97","","","40","LOQ","YES","220","","250","1.00","16","","
"LCS 320-234028/2-A","537","RES","LCS 320-234028/2-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","102","ng/L","","","2.8","DL","","","SPK","93","","","20","LOQ","YES","110","","250","1.00","8.0","","
"LCS 320-234028/2-A","537","RES","LCS 320-234028/2-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","155","ng/L","","","5.5","DL","","","SPK","92","","","30","LOQ","YES","168","","250","1.00","12","","
"LCS 320-234028/2-A","537","RES","LCS 320-234028/2-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","384","ng/L","","","16","DL","","","SPK","77","","","90","LOQ","YES","500","","250","1.00","36","","
"LCS 320-234028/2-A","537","RES","LCS 320-234028/2-A","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","47.7","ng/L","","","1.9","DL","","","SPK","88","","","10","LOQ","YES","54.0","","250","1.00","4.0","","
"LCS 320-234028/2-A","537","RES","LCS 320-234028/2-A","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","104","ng/L","","","8.0","DL","","","SPK","94","","","24","LOQ","YES","110","","250","1.00","20","","
"LCS 320-234028/2-A","537","RES","LCS 320-234028/2-A","TALSAC","STL00993","13C2 PFHxA","34.2","ng/L","","","-99","DL","","","SURR","86","","","-99","LOQ","YES","40.0","","250","1.00","0","","
"LCS 320-234028/2-A","537","RES","LCS 320-234028/2-A","TALSAC","STL00996","13C2 PFDA","35.0","ng/L","","","-99","DL","","","SURR","88","","","-99","LOQ","YES","40.0","","250","1.00","0","","
"MB 320-234028/1-A","537","RES","MB 320-234028/1-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 320-234028/1-A","537","RES","MB 320-234028/1-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 320-234028/1-A","537","RES","MB 320-234028/1-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 320-234028/1-A","537","RES","MB 320-234028/1-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid
(PFBS)","36","ng/L","U","16","DL","","","TRG","","","90","LOQ","YES","-99","","","250","1.00","36","","
"MB 320-234028/1-A","537","RES","MB 320-234028/1-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 320-234028/1-A","537","RES","MB 320-234028/1-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 320-234028/1-A","537","RES","MB 320-234028/1-A","TALSAC","STL00993","13C2
PFHxA","31.1","ng/L","","","-99","DL","","","SURR","78","","","-99","LOQ","YES","40.0","","","250","1.00","0","","
"MB 320-234028/1-A","537","RES","MB 320-234028/1-A","TALSAC","STL00996","13C2
PFDA","34.8","ng/L","","","-99","DL","","","SURR","87","","","-99","LOQ","YES","40.0","","","250","1.00","0","","
"Unknown","Unknown","WGNA-071018-RW-3142","07/10/2018 15:10","AQ","320-41028-
1","NM","","","2.40","537","METHOD","RES","07/14/2018 08:08","07/25/2018
16:04","TALSAC","COA","WET","NA","1","NA","NA","","","100","320-234028","320-234028","NA","320-
236171","320-41028-1","07/11/2018 09:30","07/11/2018 15:45","","
"Unknown","Unknown","WGNA-071018-FRB-3142","07/10/2018 15:05","AQ","320-41028-
2","FB","","","2.40","537","METHOD","RES","07/14/2018 08:08","07/25/2018
16:09","TALSAC","COA","WET","NA","1","NA","NA","","","100","320-234028","320-234028","NA","320-
236171","320-41028-1","07/11/2018 09:30","07/11/2018 15:45","","
"Unknown","Unknown","LCS 320-234028/2-A","","","AQ","LCS 320-234028/2-
A","LCS","","","-99","537","METHOD","RES","07/14/2018 08:08","07/24/2018
10:10","TALSAC","COA","WET","NA","1","NA","NA","","","100","320-234028","320-234028","NA","320-
235922","320-41028-1","07/14/2018 08:08","07/11/2018 15:45","","
"Unknown","Unknown","MB 320-234028/1-A","","","AQ","MB 320-234028/1-
A","MB","","","-99","537","METHOD","RES","07/14/2018 08:08","07/25/2018
15:36","TALSAC","COA","WET","NA","1","NA","NA","","","100","320-234028","320-234028","NA","320-
236171","320-41028-1","07/14/2018 08:08","07/11/2018 15:45","","



TO:	A. FREBOWITZ	DATE:	AUGUST 23, 2018
FROM:	TERRI L. SOLOMON	COPIES:	DV FILE
SUBJECT:	ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS) NAS JRB WILLOW GROVE SAMPLE DELIVERY GROUP (SDG) 320-41028-1		
SAMPLES:	1/Field Reagent Blank (FRB) WGNA-071018-FRB-3142 1/Drinking Water WGNA-071018-RW-3142		

The sample set for NAS JRB Willow Grove, SDG 320-41028-1, consisted of one (1) drinking water sample and one (1) FRB sample. 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 July 10, 2018 and analyzed by Test America-Sacramento. All sample analyses were conducted in accordance with EPA Method 537 version 1.1 analytical and reporting protocols.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, mass calibration, mass spectral acquisition rate, tune check, instrument sensitivity check, initial/continuing calibrations, ion transitions, laboratory method/FRBs, surrogate spike recoveries, laboratory control sample results, injected internal standard areas and recoveries, chromatographic resolution, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

None.

Detected results reported below the limit of quantitation (LOQ) but above the detection limit (DL) were qualified as estimated (J).

The sample with detections and its associated FRB is summarized below. No detected results were present in the FRB.

Associated FRB
WGNA-071018-FRB-3142

TO: A. FREBOWITZ
SDG: 320-41028-1

PAGE 2

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

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

Executive Summary

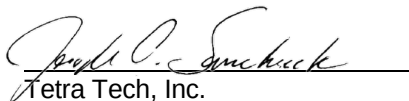
Laboratory Performance: None.

Other Factors Affecting Data Quality: Results below the RL were estimated.

The data for these analyses were reviewed with reference to the Environmental Protection Agency document EPA/600/R-08/092, Method 537, "Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)", (September 2009), US EPA National Functional Guidelines for Organic Data Review (January 2017), and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories" (July 2013) as applicable. The text of this report has been formulated to address only those areas affecting data quality.



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 detection limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
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.
NJ	The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value is the estimated concentration in the sample.
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.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

Appendix A

Qualified Analytical Results

Qualifier Codes:

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
- C01 = GC/MS Tuning Noncompliance
- D = MS/MSD Recovery Noncompliance
- E = LCS/LCSD Recovery Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
- K = ICP Interference - includes ICS % R Noncompliance
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation Noncompliance
- N = Internal Standard Noncompliance
- N01 = Internal Standard Recovery Noncompliance Dioxins
- N02 = Recovery Standard Noncompliance Dioxins
- N03 = Clean-up Standard Noncompliance Dioxins
- O = Poor Instrument Performance (i.e., base-time drifting)
- P = Uncertainty near detection limit ($< 2 \times$ IDL for inorganics and $<$ CRQL for organics)
- Q = Other problems (can encompass a number of issues; i.e. chromatography, interferences, etc.)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = RPD between columns/detectors $>40\%$ for positive results determined via GC/HPLC
- V = Non-linear calibrations; correlation coefficient $r < 0.995$
- W = EMPC result
- X = Signal to noise response drop
- Y = Percent solids $<30\%$
- Z = Uncertainty at 2 standard deviations is greater than sample activity
- Z1 = Tentatively Identified Compound considered presumptively present
- Z2 = Tentatively Identified Compound column bleed
- Z3 = Tentatively Identified Compound aldol condensate
- Z4 = Sample activity is less than the at uncertainty at 3 standard deviations and greater than the MDC
- Z5 = Sample activity is less than the at uncertainty at 3 standard deviations and less than the MDC

PROJ_NO: 08005-WE04 SDG: 320-41028-1 FRACTION: PFAS MEDIA: WATER	NSAMPLE	WGNA-071018-FRB-3142			WGNA-071018-RW-3142		
	LAB_ID	320-41028-2			320-41028-1		
	SAMP_DATE	7/10/2018			7/10/2018		
	QC_TYPE	FB			NM		
	UNITS	NG/L			NG/L		
	PCT_SOLIDS	0.0			0.0		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
PENTADECAFLUOROOCTANOIC ACID (PFOA)		8	U		12	J	P
PERFLUOROBUTANESULFONIC ACID (PFBS)		36	U		34	U	
PERFLUOROHEPTANOIC ACID (PFHPA)		4	U		3	J	P
PERFLUOROHXANESULFONIC ACID (PFHXS)		12	U		7.2	J	P
PERFLUORONONANOIC ACID (PFNA)		20	U		19	U	
PERFLUOROOCTANESULFONIC ACID (PFOS)		16	U		17	J	P

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Client Sample ID: WGNA-071018-RW-3142 Lab Sample ID: 320-41028-1
 Matrix: Water Lab File ID: 2018.07.25_537A_013.d
 Analysis Method: 537 Date Collected: 07/10/2018 15:10
 Extraction Method: 537 Date Extracted: 07/14/2018 08:08
 Sample wt/vol: 267.2 (mL) Date Analyzed: 07/25/2018 16:04
 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.: 236171 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	17	J M	37	15	6.4
335-67-1	Perfluorooctanoic acid (PFOA)	12	J	19	7.5	2.6
375-95-1	Perfluorononanoic acid (PFNA)	19	U	22	19	7.5
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	7.2	J	28	11	5.1
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.0	J	9.4	3.7	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	34	U	84	34	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	74		70-130
STL00996	13C2 PFDA	85		70-130

Ali L. Salem
08/23/2018

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-41028-1</u>
SDG No.: _____	
Client Sample ID: <u>WGNA-071018-FRB-3142</u>	Lab Sample ID: <u>320-41028-2</u>
Matrix: <u>Water</u>	Lab File ID: <u>2018.07.25_537A_014.d</u>
Analysis Method: <u>537</u>	Date Collected: <u>07/10/2018 15:05</u>
Extraction Method: <u>537</u>	Date Extracted: <u>07/14/2018 08:08</u>
Sample wt/vol: <u>250.7(mL)</u>	Date Analyzed: <u>07/25/2018 16:09</u>
Con. Extract Vol.: <u>1.00(mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>2(uL)</u>	GC Column: <u>GeminiC18 3x100 ID: 3(mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>236171</u>	Units: <u>ng/L</u>

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	85		70-130
STL00996	13C2 PFDA	84		70-130

Steve L. Salomon
08/23/2018

Appendix B

Results as Reported by the Laboratory

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Client Sample ID: WGNA-071018-RW-3142 Lab Sample ID: 320-41028-1
 Matrix: Water Lab File ID: 2018.07.25_537A_013.d
 Analysis Method: 537 Date Collected: 07/10/2018 15:10
 Extraction Method: 537 Date Extracted: 07/14/2018 08:08
 Sample wt/vol: 267.2 (mL) Date Analyzed: 07/25/2018 16:04
 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.: 236171 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	17	J M	37	15	6.4
335-67-1	Perfluorooctanoic acid (PFOA)	12	J	19	7.5	2.6
375-95-1	Perfluorononanoic acid (PFNA)	19	U	22	19	7.5
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	7.2	J	28	11	5.1
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.0	J	9.4	3.7	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	34	U	84	34	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	74		70-130
STL00996	13C2 PFDA	85		70-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-41028-1</u>
SDG No.: _____	
Client Sample ID: <u>WGNA-071018-FRB-3142</u>	Lab Sample ID: <u>320-41028-2</u>
Matrix: <u>Water</u>	Lab File ID: <u>2018.07.25_537A_014.d</u>
Analysis Method: <u>537</u>	Date Collected: <u>07/10/2018 15:05</u>
Extraction Method: <u>537</u>	Date Extracted: <u>07/14/2018 08:08</u>
Sample wt/vol: <u>250.7(mL)</u>	Date Analyzed: <u>07/25/2018 16:09</u>
Con. Extract Vol.: <u>1.00(mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>2(uL)</u>	GC Column: <u>GeminiC18 3x100 ID: 3(mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>236171</u>	Units: <u>ng/L</u>

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	85		70-130
STL00996	13C2 PFDA	84		70-130

Appendix C

Support Documentation

Page 232 of 236

[illegible]

Job Narrative
320-41028-1

Receipt

The samples were received on 7/11/2018 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.4° 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

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

Method Summary

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

TestAmerica Job ID: 320-41028-1

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: 320-41028-1

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

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-41028-1	WGNA-071018-RW-3142	Water	07/10/18 15:10	07/11/18 09:30
320-41028-2	WGNA-071018-FRB-3142	Water	07/10/18 15:05	07/11/18 09:30

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

SDG No.: _____

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
WGNA-071018-RW-314 2	320-41028-1	74	85
WGNA-071018-FRB-31 42	320-41028-2	85	84
	MB 320-234028/1-A	78	87
	LCS 320-234028/2-A	86	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.: 320-41028-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 2018.07.24_537A_027.d
 Lab ID: LCS 320-234028/2-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	220	214	97	70-130	M
Perfluorooctanoic acid (PFOA)	110	102	93	70-130	
Perfluorononanoic acid (PFNA)	110	104	94	70-130	
Perfluorohexanesulfonic acid (PFHxS)	168	155	92	70-130	
Perfluoroheptanoic acid (PFHpA)	54.0	47.7	88	70-130	
Perfluorobutanesulfonic acid (PFBS)	500	384	77	70-130	

Column to be used to flag recovery and RPD values

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
SDG No.: _____
Lab File ID: 2018.07.25_537A_007.d Lab Sample ID: MB 320-234028/1-A
Matrix: Water Date Extracted: 07/14/2018 08:08
Instrument ID: A8_N Date Analyzed: 07/25/2018 15:36
Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-234028/2-A	2018.07.24_537A_027.d	07/24/2018 10:10
WGNA-071018-RW-3142	320-41028-1	2018.07.25_537A_013.d	07/25/2018 16:04
WGNA-071018-FRB-3142	320-41028-2	2018.07.25_537A_014.d	07/25/2018 16:09

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: MB 320-234028/1-A
 Matrix: Water Lab File ID: 2018.07.25_537A_007.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 07/14/2018 08:08
 Sample wt/vol: 250 (mL) Date Analyzed: 07/25/2018 15:36
 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.: 236171 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	78		70-130
STL00996	13C2 PFDA	87		70-130

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Instrument ID: A8_N Calibration Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 07/21/2018 12:45
 Calibration ID: 40229

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1182254	1.80	2951502	2.06		
UPPER LIMIT		1773381	2.30	4427253	2.56		
LOWER LIMIT		591127	1.30	1475751	1.56		
LAB SAMPLE ID	CLIENT SAMPLE ID						
CCVL 320-235370/11		1220813	1.80	2998753	2.05		
ICV 320-235370/13		1160905	1.81	2863082	2.06		
CCVL 320-235918/2		1293103	1.77	3041132	2.01		
CCV 320-235922/22 CCVIS		1099648	1.77	2754805	2.01		
LCS 320-234028/2-A		1493913	1.77	3780803	2.01		
CCV 320-235922/34 CCVIS		1129599	1.76	2724199	2.00		
CCVL 320-236171/2		1330079	1.79	3161499	2.04		
CCV 320-236171/3 CCVIS		1238255	1.79	2908789	2.04		
MB 320-234028/1-A		1611038	1.78	3986531	2.03		
320-41028-1	WGNA-071018-RW-3142	1554295	1.78	3865534	2.03		
320-41028-2	WGNA-071018-FRB-3142	1553792	1.78	3932583	2.02		
CCV 320-236171/14 CCVIS		1230742	1.78	2984072	2.03		

13PFOA = 13C2-PFOA

PFOS = 13C4 PFOS

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

RT Limit = $\pm$ 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.: 320-41028-1
 SDG No.: _____
 Sample No.: CCV 320-235922/22 Date Analyzed: 07/24/2018 09:56
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2018.07.24_537A_024 Heated Purge: (Y/N) N
 Calibration ID: 40229

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	1099648	1.77	2754805	2.01		
UPPER LIMIT	1539507	2.27	3856727	2.51		
LOWER LIMIT	769754	1.27	1928364	1.51		
LAB SAMPLE ID	CLIENT SAMPLE ID					
LCS 320-234028/2-A		1493913	1.77	3780803	2.01	

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

Area Limit = 70%-140% of internal standard area
 RT Limit = $\pm$ 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.: 320-41028-1
 SDG No.: _____
 Sample No.: CCV 320-235922/34 Date Analyzed: 07/24/2018 10:52
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2018.07.24_537A_036 Heated Purge: (Y/N) N
 Calibration ID: 40229

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	1129599	1.76	2724199	2.00		
UPPER LIMIT	1581439	2.26	3813879	2.50		
LOWER LIMIT	790719	1.26	1906939	1.50		
LAB SAMPLE ID	CLIENT SAMPLE ID					
LCS 320-234028/2-A		1493913	1.77	3780803	2.01	

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

Area Limit = 70%-140% of internal standard area
 RT Limit = $\pm$ 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.: 320-41028-1
 SDG No.: _____
 Sample No.: CCV 320-236171/3 Date Analyzed: 07/25/2018 15:22
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2018.07.25_537A_004 Heated Purge: (Y/N) N
 Calibration ID: 40229

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	1238255	1.79	2908789	2.04		
UPPER LIMIT	1733557	2.29	4072305	2.54		
LOWER LIMIT	866779	1.29	2036152	1.54		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-234028/1-A		1611038	1.78	3986531	2.03	
320-41028-1	WGNA-071018-RW-3142	1554295	1.78	3865534	2.03	
320-41028-2	WGNA-071018-FRB-3142	1553792	1.78	3932583	2.02	

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

Area Limit = 70%-140% of internal standard area
 RT Limit = $\pm$ 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.: 320-41028-1
 SDG No.: _____
 Sample No.: CCV 320-236171/14 Date Analyzed: 07/25/2018 16:14
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2018.07.25_537A_015 Heated Purge: (Y/N) N
 Calibration ID: 40229

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	1230742	1.78	2984072	2.03		
UPPER LIMIT	1723039	2.28	4177701	2.53		
LOWER LIMIT	861519	1.28	2088850	1.53		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-234028/1-A		1611038	1.78	3986531	2.03	
320-41028-1	WGNA-071018-RW-3142	1554295	1.78	3865534	2.03	
320-41028-2	WGNA-071018-FRB-3142	1553792	1.78	3932583	2.02	

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

Area Limit = 70%-140% of internal standard area
 RT Limit = $\pm$ 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.: 320-41028-1 Analy Batch No.: 235370

SDG No.: _____

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

Calibration Start Date: 07/21/2018 12:21 Calibration End Date: 07/21/2018 12:45 Calibration ID: 40229

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-235370/3	2018.07.21_537CURVE_003.d
Level 2	IC 320-235370/4	2018.07.21_537CURVE_004.d
Level 3	IC 320-235370/5	2018.07.21_537CURVE_005.d
Level 4	IC 320-235370/6	2018.07.21_537CURVE_006.d
Level 5	IC 320-235370/7	2018.07.21_537CURVE_007.d
Level 6	IC 320-235370/8	2018.07.21_537CURVE_008.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanesulfonic acid (PFBS)	1.2841 0.9803	1.2507	1.2835	1.1823	1.0785	Ave		1.1766				10.5		30.0			
Perfluorohexanesulfonic acid (PFHxS)	1.7376 1.6801	1.6578	1.6904	1.7641	1.7310	Ave		1.7102				2.4		30.0			
Perfluoroheptanoic acid (PFHpA)	1.0605 1.0815	1.0202	1.0617	1.0668	1.0373	Ave		1.0547				2.1		30.0			
Perfluorooctanoic acid (PFOA)	1.1368 1.0843	1.0080	1.0656	1.0950	1.0783	Ave		1.0780				3.9		30.0			
Perfluorooctanesulfonic acid (PFOS)	1.0575 1.0736	1.0083	1.0628	1.0977	1.0913	Ave		1.0652				3.0		30.0			
Perfluorononanoic acid (PFNA)	0.8343 0.7942	0.7572	0.7864	0.8079	0.7724	Ave		0.7921				3.4		30.0			
13C2 PFHxA	1.1056 1.1532	1.0045	1.0481	1.1035	1.0426	Ave		1.0762				5.0		30.0			
13C2 PFDA	0.7178 0.7112	0.6728	0.6860	0.7012	0.6847	Ave		0.6956				2.5		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.: 320-41028-1 Analy Batch No.: 235370

SDG No.: _____

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

Calibration Start Date: 07/21/2018 12:21 Calibration End Date: 07/21/2018 12:45 Calibration ID: 40229

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-235370/3	2018.07.21_537CURVE_003.d
Level 2	IC 320-235370/4	2018.07.21_537CURVE_004.d
Level 3	IC 320-235370/5	2018.07.21_537CURVE_005.d
Level 4	IC 320-235370/6	2018.07.21_537CURVE_006.d
Level 5	IC 320-235370/7	2018.07.21_537CURVE_007.d
Level 6	IC 320-235370/8	2018.07.21_537CURVE_008.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5
Perfluorobutanesulfonic acid (PFBS)	PFOS	Ave	1132773 17778336	2723028	6349004	10832159	14336242	9.00 180	20.0	45.0	90.1	135
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	511502 10233792	1212277	2808334	5428281	7728080	3.00 60.5	6.72	15.1	30.2	45.4
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	112443 2367732	282953	652127	1194139	1759394	0.960 19.4	2.16	4.86	9.72	14.6
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	248606 4835518	569483	1333317	2496915	3725583	1.98 39.6	4.40	9.90	19.8	29.7
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	409813 8546272	963630	2307715	4414336	6367762	3.95 79.1	8.79	19.8	39.5	59.3
Perfluorononanoic acid (PFNA)	13PF OA	Ave	182463 3541730	427768	984001	1842282	2668663	1.98 39.6	4.40	9.90	19.8	29.7
13C2 PFHxA	13PF OA	Ave	1221139 1298612	1289770	1324630	1270784	1212894	10.0 10.0	10.0	10.0	10.0	10.0
13C2 PFDA	13PF OA	Ave	792860 800909	863900	867028	807504	796607	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.: 320-41028-1 Analy Batch No.: 235370

SDG No.: _____

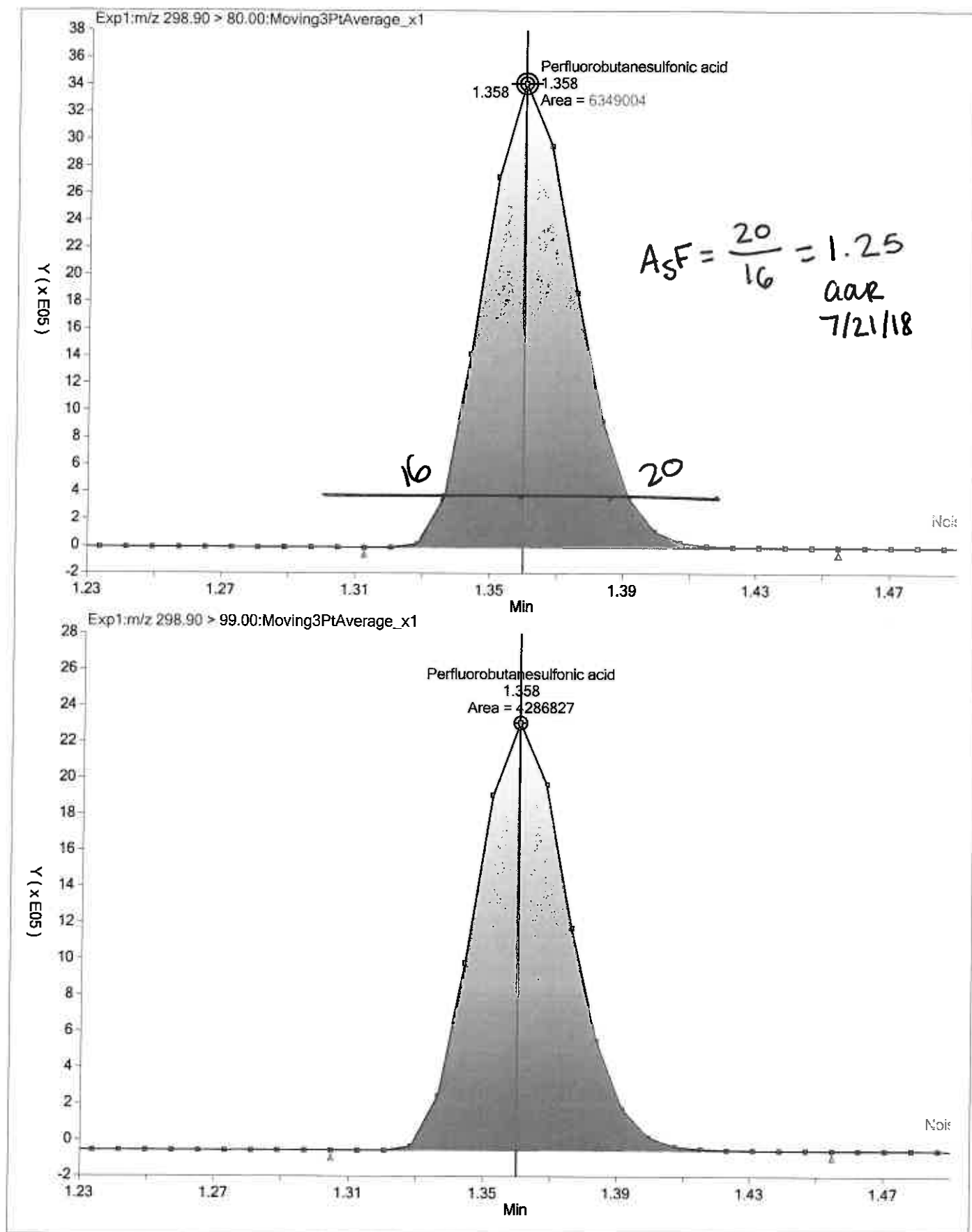
Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

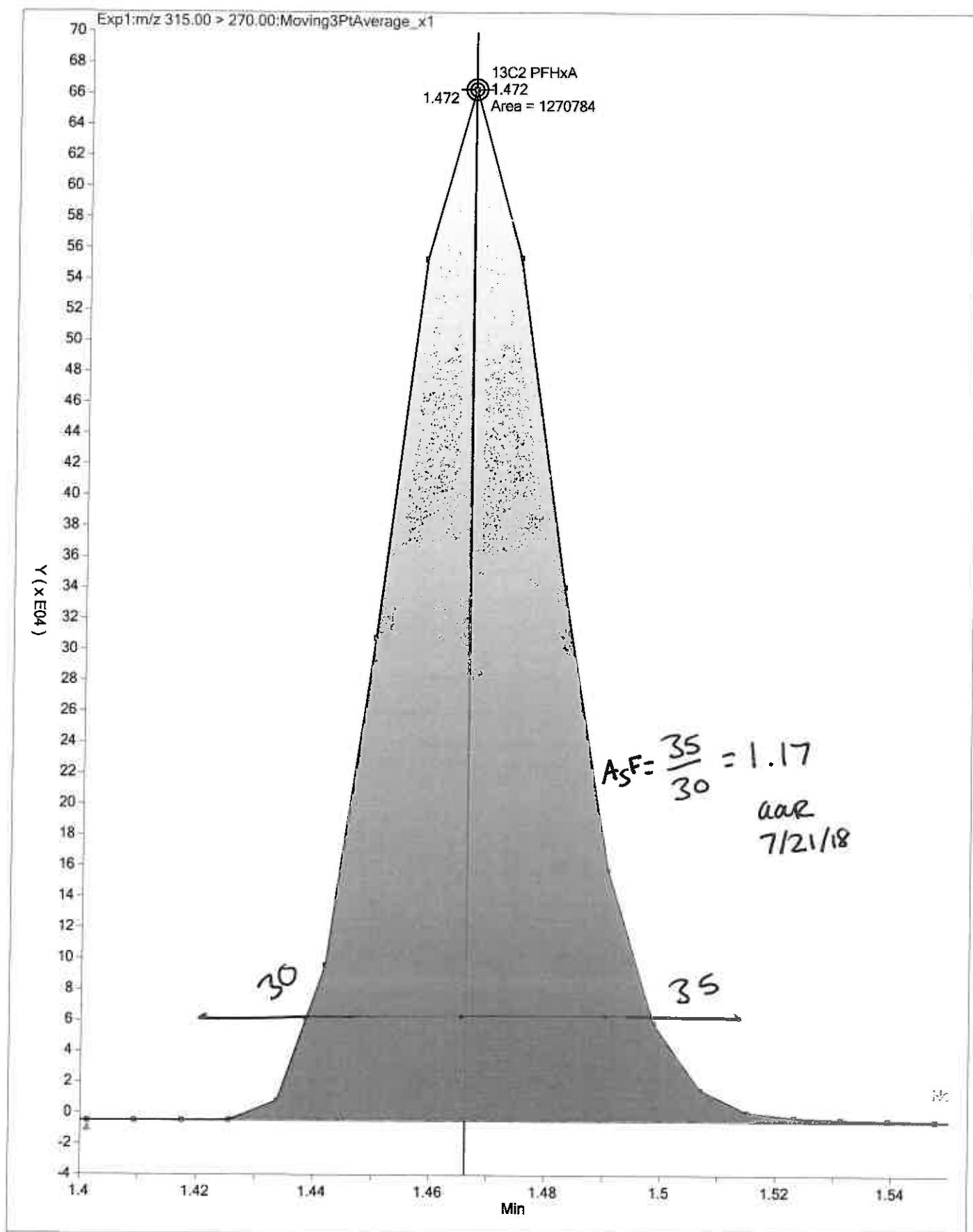
Calibration Start Date: 07/21/2018 12:21 Calibration End Date: 07/21/2018 12:45 Calibration ID: 40229

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-235370/3	2018.07.21_537CURVE_003.d
Level 2	IC 320-235370/4	2018.07.21_537CURVE_004.d
Level 3	IC 320-235370/5	2018.07.21_537CURVE_005.d
Level 4	IC 320-235370/6	2018.07.21_537CURVE_006.d
Level 5	IC 320-235370/7	2018.07.21_537CURVE_007.d
Level 6	IC 320-235370/8	2018.07.21_537CURVE_008.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanesulfonic acid (PFBS)	9.1	6.3	9.1	0.5	-8.3	-16.7	50	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	1.6	-3.1	-1.2	3.2	1.2	-1.8	50	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	0.6	-3.3	0.7	1.2	-1.6	2.5	50	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	5.5	-6.5	-1.2	1.6	0.0	0.6	50	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	-0.7	-5.3	-0.2	3.0	2.5	0.8	50	30	30	30	30	30
Perfluorononanoic acid (PFNA)	5.3	-4.4	-0.7	2.0	-2.5	0.3	50	30	30	30	30	30
13C2 PFHxA	2.7	-6.7	-2.6	2.5	-3.1	7.1	30	30	30	30	30	30
13C2 PFDA	3.2	-3.3	-1.4	0.8	-1.6	2.2	30	30	30	30	30	30





FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: CCVL 320-235370/11 Calibration Date: 07/21/2018 12:54
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.21_537CURVE_010.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.177	1.256		21.4	20.0	6.8	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	1.048		2.15	2.16	-0.6	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.662		6.53	6.72	-2.8	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	1.024		4.18	4.40	-5.0	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	1.041		8.59	8.79	-2.2	50.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.7981		4.43	4.40	0.8	50.0
13C2 PFHxA	Ave	1.076	1.070		9.95	10.0	-0.5	30.0
13C2 PFDA	Ave	0.6956	0.6772		9.73	10.0	-2.7	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: ICV 320-235370/13 Calibration Date: 07/21/2018 13:03
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.21_537CURVE_012.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.177	1.013		86.2	100	-13.9	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	0.9445		8.96	10.0	-10.4	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.586		18.7	20.2	-7.3	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	0.8738		16.3	20.2	-18.9	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	0.9567		18.1	20.2	-10.2	30.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.7091		18.1	20.2	-10.5	30.0
13C2 PFHxA	Ave	1.076	1.028		9.55	10.0	-4.5	30.0
13C2 PFDA	Ave	0.6956	0.6576		9.45	10.0	-5.5	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: CCVL 320-235918/2 Calibration Date: 07/24/2018 08:18
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.24_537A_003.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.177	1.331		22.6	20.0	13.1	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	1.114		2.28	2.16	5.6	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.726		6.78	6.72	0.9	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	1.064		4.34	4.40	-1.3	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	1.058		8.72	8.79	-0.7	50.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.8481		4.71	4.40	7.1	50.0
13C2 PFHxA	Ave	1.076	1.061		9.86	10.0	-1.4	30.0
13C2 PFDA	Ave	0.6956	0.7059		10.1	10.0	1.5	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: CCV 320-235922/22 Calibration Date: 07/24/2018 09:56
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.24_537A_024.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.177	1.253		48.0	45.0	6.5	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	1.109		5.11	4.86	5.2	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.703		15.1	15.1	-0.4	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	1.086		9.97	9.90	0.7	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	1.040		19.3	19.8	-2.3	30.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.8350		10.4	9.90	5.4	30.0
13C2 PFHxA	Ave	1.076	1.079		10.0	10.0	0.2	30.0
13C2 PFDA	Ave	0.6956	0.7313		10.5	10.0	5.1	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: CCV 320-235922/34 Calibration Date: 07/24/2018 10:52
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.24_537A_036.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.177	1.098		126	135	-6.7	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	1.045		14.5	14.6	-0.9	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.790		47.5	45.4	4.7	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	1.106		30.5	29.7	2.6	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	1.096		61.0	59.3	2.9	30.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.8031		30.1	29.7	1.4	30.0
13C2 PFHxA	Ave	1.076	1.089		10.1	10.0	1.2	30.0
13C2 PFDA	Ave	0.6956	0.7008		10.1	10.0	0.7	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: CCVL 320-236171/2 Calibration Date: 07/25/2018 15:18
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.25_537A_003.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.177	1.279		21.8	20.0	8.7	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	1.029		2.11	2.16	-2.4	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.650		6.49	6.72	-3.5	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	1.045		4.26	4.40	-3.1	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	1.030		8.49	8.79	-3.3	50.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.7540		4.19	4.40	-4.8	50.0
13C2 PFHxA	Ave	1.076	1.062		9.87	10.0	-1.3	30.0
13C2 PFDA	Ave	0.6956	0.6728		9.67	10.0	-3.3	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: CCV 320-236171/3 Calibration Date: 07/25/2018 15:22
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.25_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	1.177	1.091		125	135	-7.3	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	1.043		14.4	14.6	-1.1	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.754		46.5	45.4	2.5	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	1.064		29.3	29.7	-1.3	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	1.105		61.5	59.3	3.7	30.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.7728		29.0	29.7	-2.4	30.0
13C2 PFHxA	Ave	1.076	1.063		9.87	10.0	-1.3	30.0
13C2 PFDA	Ave	0.6956	0.6868		9.87	10.0	-1.3	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Lab Sample ID: CCV 320-236171/14 Calibration Date: 07/25/2018 16:14
 Instrument ID: A8_N Calib Start Date: 07/21/2018 12:21
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 07/21/2018 12:45
 Lab File ID: 2018.07.25_537A_015.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.177	1.259		48.2	45.0	7.0	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.055	1.077		4.96	4.86	2.1	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.710	1.735		15.3	15.1	1.5	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.078	1.072		9.84	9.90	-0.6	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.065	1.060		19.7	19.8	-0.4	30.0
Perfluorononanoic acid (PFNA)	Ave	0.7921	0.7807		9.76	9.90	-1.4	30.0
13C2 PFHxA	Ave	1.076	1.073		9.97	10.0	-0.3	30.0
13C2 PFDA	Ave	0.6956	0.6904		9.92	10.0	-0.8	30.0

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

SDG No.: _____

Instrument ID: A8_N Start Date: 07/21/2018 12:21Analysis Batch Number: 235370 End Date: 07/21/2018 13:03

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-235370/3		07/21/2018 12:21	1	2018.07.21_537C URVE 003.d	GeminiC18 3x100 3(mm)
IC 320-235370/4		07/21/2018 12:26	1	2018.07.21_537C URVE 004.d	GeminiC18 3x100 3(mm)
IC 320-235370/5		07/21/2018 12:31	1	2018.07.21_537C URVE 005.d	GeminiC18 3x100 3(mm)
IC 320-235370/6 ICISAV		07/21/2018 12:35	1	2018.07.21_537C URVE 006.d	GeminiC18 3x100 3(mm)
IC 320-235370/7		07/21/2018 12:40	1	2018.07.21_537C URVE 007.d	GeminiC18 3x100 3(mm)
IC 320-235370/8		07/21/2018 12:45	1	2018.07.21_537C URVE 008.d	GeminiC18 3x100 3(mm)
ZZZZZ		07/21/2018 12:49	1		GeminiC18 3x100 3(mm)
CCVL 320-235370/11		07/21/2018 12:54	1	2018.07.21_537C URVE 010.d	GeminiC18 3x100 3(mm)
ICB 320-235370/12		07/21/2018 12:59	1		GeminiC18 3x100 3(mm)
ICV 320-235370/13		07/21/2018 13:03	1	2018.07.21_537C URVE 012.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

SDG No.: _____

Instrument ID: A8_N Start Date: 07/24/2018 08:18Analysis Batch Number: 235918 End Date: 07/24/2018 09:19

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-235918/2		07/24/2018 08:18	1	2018.07.24_537A 003.d	GeminiC18 3x100 3(mm)
CCV 320-235918/3 CCVIS		07/24/2018 08:23	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 08:27	1		GeminiC18 3x100 3(mm)
CCV 320-235918/14 CCVIS		07/24/2018 09:19	1		GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-41028-1

SDG No.: _____

Instrument ID: A8_NStart Date: 07/24/2018 09:56Analysis Batch Number: 235922End Date: 07/24/2018 10:52

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-235922/22 CCVIS		07/24/2018 09:56	1	2018.07.24_537A 024.d	GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:01	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:06	1		GeminiC18 3x100 3(mm)
LCS 320-234028/2-A		07/24/2018 10:10	1	2018.07.24_537A 027.d	GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:15	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:20	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:24	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:29	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:34	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:38	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:43	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/24/2018 10:48	1		GeminiC18 3x100 3(mm)
CCV 320-235922/34 CCVIS		07/24/2018 10:52	1	2018.07.24_537A 036.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1
 SDG No.: _____
 Instrument ID: A8_N Start Date: 07/25/2018 15:18
 Analysis Batch Number: 236171 End Date: 07/25/2018 16:14

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-236171/2		07/25/2018 15:18	1	2018.07.25_537A 003.d	GeminiC18 3x100 3(mm)
CCV 320-236171/3 CCVIS		07/25/2018 15:22	1	2018.07.25_537A 004.d	GeminiC18 3x100 3(mm)
ZZZZZ		07/25/2018 15:27	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/25/2018 15:32	1		GeminiC18 3x100 3(mm)
MB 320-234028/1-A		07/25/2018 15:36	1	2018.07.25_537A 007.d	GeminiC18 3x100 3(mm)
ZZZZZ		07/25/2018 15:41	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/25/2018 15:46	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/25/2018 15:50	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/25/2018 15:55	1		GeminiC18 3x100 3(mm)
ZZZZZ		07/25/2018 16:00	1		GeminiC18 3x100 3(mm)
320-41028-1		07/25/2018 16:04	1	2018.07.25_537A 013.d	GeminiC18 3x100 3(mm)
320-41028-2		07/25/2018 16:09	1	2018.07.25_537A 014.d	GeminiC18 3x100 3(mm)
CCV 320-236171/14 CCVIS		07/25/2018 16:14	1	2018.07.25_537A 015.d	GeminiC18 3x100 3(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-41028-1

SDG No.: _____

Batch Number: 234028 Batch Start Date: 07/14/18 08:07 Batch Analyst: Kouchari, ShamiranBatch Method: 537 Batch End Date: 07/16/18 13:30

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-HSP 00029
MB 320-234028/1		537, 537				250 mL	1.00 mL	7 SU	
LCS 320-234028/2		537, 537				250 mL	1.00 mL	7 SU	100 uL
320-41028-A-1	WGNA-071018-RW-3 142	537, 537	T	297.45 g	30.26 g	267.2 mL	1.00 mL	7 SU	
320-41028-A-2	WGNA-071018-FRB- 3142	537, 537	T	279.08 g	28.43 g	250.7 mL	1.00 mL	7 SU	

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-IS 00074	LC537-SU 00073				
MB 320-234028/1		537, 537		100 uL	100 uL				
LCS 320-234028/2		537, 537		100 uL	100 uL				
320-41028-A-1	WGNA-071018-RW-3 142	537, 537	T	100 uL	100 uL				
320-41028-A-2	WGNA-071018-FRB- 3142	537, 537	T	100 uL	100 uL				

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.: 320-41028-1

SDG No.: _____

Batch Number: 234028 Batch Start Date: 07/14/18 08:07 Batch Analyst: Kouchari, ShamiranBatch Method: 537 Batch End Date: 07/16/18 13:30

Batch Notes	
Analyst ID - Aliquot Step	SKD
Batch Comment	Client labels match TA label, SKD 07/14/18
Analyst ID - Concentration	SKD
Analyst ID - Final Volume Step	SKD
Internal Standard ID#	1279435
Manifold ID	1, 3
Methanol ID	1294755
pH Indicator ID	1718
Pipette ID	R40538G, N32728F
Analyst ID - IS Reagent Drop	SKD
Analyst ID - IS Reagent Drop Witness	JCB
Analyst ID - SU Reagent Drop	SKD
Analyst ID - SU Reagent Drop Witness	TWL
Analyst ID - TA Reagent Drop	SKD
Analyst ID - TA Reagent Drop Witness	TWL
SPE Cartridge Lot ID	6390138-02
Trizma ID	SLBR5241V
Reagent Water ID	07/12/18

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

PFAS Calibration Calculations:

Initial Calibration
Instrument A8_N

7/21/2018

PFOA

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	Reported RRF
1.98	248606	1104504	10	1.1368	1.1368
4.4	569483	1284004	10	1.0080	1.008
9.9	1333317	1263898	10	1.0656	1.0656
19.8	2496915	1151615	10	1.0950	1.095
29.7	3725583	1163367	10	1.0783	1.0783
39.6	4835518	1126134	10	1.0843	1.0843
Average				1.07800	1.078
Standard Deviation				0.0420	
RSD				0.0390	
%RSD				3.90059	3.9

Continuing Calibration
PFOA

07/24/2018 @ 09:56

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	%D	Reported RRF	Reported %D
9.9	1182114	1099648	10	1.0859	0.7283492	1.086	0.7

Sample Identification
Compound

WGNA-071018-RW-3142
PFOA

Compound Area	528442	Average RRF	1.078
Internal Standard Amount (ng)	10	Sample Volume(ml)	267.2
Dilution Factor	1	Volume Extract (ml)	1
Internal Standard Area	1554295	Injection Volume (µl)	1

Concentration
Reported Result

11.8034 ng/L
12 ng/L

Surrogate PFHxA

WGNA-071018-RW-3142			
Compound Area	1233530		
Internal Standard Amount (ng)	10		
Dilution Factor	1	Volume Extract (ml)	1
Internal Standard Area	1554295	Injection Volume (µl)	1
Average RRF	1.0762		
Concentration	7.3743		
Surrogate %R	73.74	Spike amount	10

LCS %R

320-234028/2-A			
PFOA	Spike amount	LCS concentration	
92.73	110	102	

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