



**Groundwater Sample Results,
Combined Level 2 and Level 4 Laboratory Report,
Electronic Data Deliverable, Data Validation Report,
and the Sample Location Report, SDG 320-30136-1**

*Naval Air Station Willow Grove
Willow Grove, Pennsylvania*

August 2019

N00158_000748
WILLOW_GROVE_NAS
SSIC 5000-33c

**LABORATORY DATA PACKAGE, 320-30136-1, NAWC WARMINSTER NAS
WILLOW GROVE PA**

08/21/2017
TESTAMERICA LABORATORIES INC

Approved for public release: distribution unlimited.

ANALYTICAL REPORT

Job Number: 320-30136-1

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
8/21/2017 1:33 PM

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Definitions/Glossary

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

TestAmerica Job ID: 320-30136-1

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.
E	Result exceeded calibration range.
Q	One or more quality control criteria failed.

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
320-30136-1

Receipt

The samples were received on 7/26/2017 9:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.7° C.

LCMS

Method(s) 537: Internal standard (ISTD) response for the following samples was outside control limits: WGNA-072517-RW-4842 (320-30136-1) and WGNA-072517-FRB-4842 (320-30136-2). The samples were re-analyzed with concurring results, and the original set of data has been reported.

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

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

Organic Prep

Method(s) 537: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-177417.

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

Detection Summary

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

TestAmerica Job ID: 320-30136-1

Client Sample ID: WGNA-072517-RW-4842 Lab Sample ID: 320-30136-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	11	J	39	6.6	ng/L	1		537	Total/NA
Perfluorooctanoic acid (PFOA)	12	J M	20	2.7	ng/L	1		537	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.1	J	9.8	1.9	ng/L	1		537	Total/NA

Client Sample ID: WGNA-072517-FRB-4842 Lab Sample ID: 320-30136-2

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: 320-30136-1

Client Sample ID: WGNA-072517-RW-4842

Date Collected: 07/25/17 12:50

Date Received: 07/26/17 09:20

Lab Sample ID: 320-30136-1

Matrix: Water

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	11	J	39	6.6	ng/L	—	08/03/17 10:02	08/16/17 12:12	1
Perfluorooctanoic acid (PFOA)	12	J M	20	2.7	ng/L	—	08/03/17 10:02	08/16/17 12:12	1
Perfluorononanoic acid (PFNA)	20	U	23	7.8	ng/L	—	08/03/17 10:02	08/16/17 12:12	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	29	5.4	ng/L	—	08/03/17 10:02	08/16/17 12:12	1
Perfluoroheptanoic acid (PFHpA)	4.1	J	9.8	1.9	ng/L	—	08/03/17 10:02	08/16/17 12:12	1
Perfluorobutanesulfonic acid (PFBS)	35	U	88	16	ng/L	—	08/03/17 10:02	08/16/17 12:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	75		70 - 130				08/03/17 10:02	08/16/17 12:12	1
13C2 PFDA	125		70 - 130				08/03/17 10:02	08/16/17 12:12	1

Client Sample ID: WGNA-072517-FRB-4842

Date Collected: 07/25/17 12:45

Date Received: 07/26/17 09:20

Lab Sample ID: 320-30136-2

Matrix: Water

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	15	U	39	6.6	ng/L	—	08/03/17 10:02	08/16/17 12:17	1
Perfluorooctanoic acid (PFOA)	7.7	U	19	2.7	ng/L	—	08/03/17 10:02	08/16/17 12:17	1
Perfluorononanoic acid (PFNA)	19	U	23	7.7	ng/L	—	08/03/17 10:02	08/16/17 12:17	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	29	5.3	ng/L	—	08/03/17 10:02	08/16/17 12:17	1
Perfluoroheptanoic acid (PFHpA)	3.9	U	9.7	1.8	ng/L	—	08/03/17 10:02	08/16/17 12:17	1
Perfluorobutanesulfonic acid (PFBS)	35	U	87	16	ng/L	—	08/03/17 10:02	08/16/17 12:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	87		70 - 130				08/03/17 10:02	08/16/17 12:17	1
13C2 PFDA	113		70 - 130				08/03/17 10:02	08/16/17 12:17	1

Default Detection Limits

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-30136-1

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: 320-30136-1

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

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	3C2 PFHx (70-130)	3C2 PFD/ (70-130)
320-30136-1	WGNA-072517-RW-4842	75	125
320-30136-2	WGNA-072517-FRB-4842	87	113
LCS 320-177417/2-A	Lab Control Sample	94	116
LCSD 320-177417/3-A	Lab Control Sample Dup	97	132 Q
MB 320-177417/1-A	Method Blank	98	124

Surrogate Legend

13C2 PFHxA = 13C2 PFHxA

13C2 PFDA = 13C2 PFDA

QC Sample Results

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

TestAmerica Job ID: 320-30136-1

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

Lab Sample ID: MB 320-177417/1-A

Matrix: Water

Analysis Batch: 179510

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 177417

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	16	U	40	6.8	ng/L		08/03/17 10:02	08/14/17 19:33	1
Perfluorooctanoic acid (PFOA)	8.0	U	20	2.8	ng/L		08/03/17 10:02	08/14/17 19:33	1
Perfluorononanoic acid (PFNA)	20	U	24	8.0	ng/L		08/03/17 10:02	08/14/17 19:33	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	30	5.5	ng/L		08/03/17 10:02	08/14/17 19:33	1
Perfluoroheptanoic acid (PFHpA)	4.0	U	10	1.9	ng/L		08/03/17 10:02	08/14/17 19:33	1
Perfluorobutanesulfonic acid (PFBS)	36	U	90	16	ng/L		08/03/17 10:02	08/14/17 19:33	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	98		70 - 130	08/03/17 10:02	08/14/17 19:33	1
13C2 PFDA	124		70 - 130	08/03/17 10:02	08/14/17 19:33	1

Lab Sample ID: LCS 320-177417/2-A

Matrix: Water

Analysis Batch: 179510

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 177417

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanesulfonic acid (PFOS)	300	323	E	ng/L		108	70 - 130
Perfluorooctanoic acid (PFOA)	150	144		ng/L		96	70 - 130
Perfluorononanoic acid (PFNA)	144	164	E	ng/L		113	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	225	201		ng/L		89	70 - 130
Perfluoroheptanoic acid (PFHpA)	74.3	91.6	E	ng/L		123	70 - 130
Perfluorobutanesulfonic acid (PFBS)	663	589		ng/L		89	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
13C2 PFHxA	94		70 - 130
13C2 PFDA	116		70 - 130

Lab Sample ID: LCSD 320-177417/3-A

Matrix: Water

Analysis Batch: 179510

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 177417

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)	300	315		ng/L		105	70 - 130	3	30
Perfluorooctanoic acid (PFOA)	150	145		ng/L		97	70 - 130	0	30
Perfluorononanoic acid (PFNA)	144	172	E	ng/L		119	70 - 130	5	30
Perfluorohexanesulfonic acid (PFHxS)	225	198		ng/L		88	70 - 130	2	30
Perfluoroheptanoic acid (PFHpA)	74.3	89.2	E	ng/L		120	70 - 130	3	30
Perfluorobutanesulfonic acid (PFBS)	663	575		ng/L		87	70 - 130	3	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
13C2 PFHxA	97		70 - 130
13C2 PFDA	132	Q	70 - 130

TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-30136-1

LCMS

Prep Batch: 177417

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-30136-1	WGNA-072517-RW-4842	Total/NA	Water	537	
320-30136-2	WGNA-072517-FRB-4842	Total/NA	Water	537	
MB 320-177417/1-A	Method Blank	Total/NA	Water	537	
LCS 320-177417/2-A	Lab Control Sample	Total/NA	Water	537	
LCSD 320-177417/3-A	Lab Control Sample Dup	Total/NA	Water	537	

Analysis Batch: 179510

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-177417/1-A	Method Blank	Total/NA	Water	537	177417
LCS 320-177417/2-A	Lab Control Sample	Total/NA	Water	537	177417
LCSD 320-177417/3-A	Lab Control Sample Dup	Total/NA	Water	537	177417

Analysis Batch: 179701

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-30136-1	WGNA-072517-RW-4842	Total/NA	Water	537	177417
320-30136-2	WGNA-072517-FRB-4842	Total/NA	Water	537	177417

Lab Chronicle

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

TestAmerica Job ID: 320-30136-1

Client Sample ID: WGNA-072517-RW-4842

Date Collected: 07/25/17 12:50

Date Received: 07/26/17 09:20

Lab Sample ID: 320-30136-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			177417	08/03/17 10:02	CCB	TAL SAC
Total/NA	Analysis	537		1	179701	08/16/17 12:12	JRB	TAL SAC

Client Sample ID: WGNA-072517-FRB-4842

Date Collected: 07/25/17 12:45

Date Received: 07/26/17 09:20

Lab Sample ID: 320-30136-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			177417	08/03/17 10:02	CCB	TAL SAC
Total/NA	Analysis	537		1	179701	08/16/17 12:17	JRB	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

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

TestAmerica Job ID: 320-30136-1

Laboratory: TestAmerica Sacramento

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oregon	NELAP	10	4040	01-28-18

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
537	537	Water	Perfluorobutanesulfonic acid (PFBS)
537	537	Water	Perfluoroheptanoic acid (PFHpA)
537	537	Water	Perfluorohexanesulfonic acid (PFHxS)
537	537	Water	Perfluorononanoic acid (PFNA)
537	537	Water	Perfluorooctanesulfonic acid (PFOS)
537	537	Water	Perfluorooctanoic acid (PFOA)

Method Summary

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

TestAmerica Job ID: 320-30136-1

Method	Method Description	Protocol	Laboratory
537	Perfluorinated Alkyl Acids (LC/MS)	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: 320-30136-1

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

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-30136-1	WGNA-072517-RW-4842	Water	07/25/17 12:50	07/26/17 09:20
320-30136-2	WGNA-072517-FRB-4842	Water	07/25/17 12:45	07/26/17 09:20

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1

SDG No.: _____

Instrument ID: A8_N Analysis Batch Number: 179510Lab Sample ID: CCV 320-179510/1 CCVIS Client Sample ID: _____Date Analyzed: 08/14/17 19:24 Lab File ID: 2017.08.14_537B_001.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.17	Missed Peak	barnettj	08/15/17 13:57

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1

SDG No.: _____

Instrument ID: A8_N Analysis Batch Number: 179701Lab Sample ID: CCV 320-179701/13 CCVIS Client Sample ID: _____Date Analyzed: 08/16/17 11:43 Lab File ID: 2017.08.16_537B_018.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.19	Missed Peak	barnettj	08/16/17 14:02

Lab Sample ID: 320-30136-1 Client Sample ID: WGNA-072517-RW-4842Date Analyzed: 08/16/17 12:12 Lab File ID: 2017.08.16_537B_024.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanoic acid (PFOA)	1.94	Isomers	barnettj	08/16/17 14:12

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-30136-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LC537-HSP_00018	08/09/17	03/23/17	Methanol, Lot 141039	20000 uL	LC537SPIM_00022	375 uL	Perfluorobutane Sulfonate	1656.41 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	1656.41 ng/mL
							Perfluoroheptanoic acid (PFHpA)	185.625 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	563.639 ng/mL
							Perfluorononanoic acid (PFNA)	361.125 ng/mL
							Perfluorooctanoic acid (PFOA)	374.625 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	750.617 ng/mL
.LC537SPIM_00022	08/09/17	03/22/17	Methanol, Lot 104453	10000 uL	LC537-PFBS_00007	440 uL	Perfluorobutane Sulfonate	88.3417 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	88.3417 ug/mL
					LC537-PFHpA_00014	100 uL	Perfluoroheptanoic acid (PFHpA)	9.9 ug/mL
					LC537-PFHxS_00009	150 uL	Perfluorohexanesulfonic acid (PFHxS)	30.0607 ug/mL
					LC537-PFNA_00012	200 uL	Perfluorononanoic acid (PFNA)	19.26 ug/mL
					LC537-PFOA_00012	200 uL	Perfluorooctanoic acid (PFOA)	19.98 ug/mL
					LC537-PFOS_00007	400 uL	Perfluorooctanesulfonic acid (PFOS)	40.0329 ug/mL
..LC537-PFBS_00007	01/04/18	01/04/17	Methanol, Lot 090285	51.5 mL	LC537_PFBS_00002	0.1034 g	Perfluorobutane Sulfonate	2007.77 ug/mL
				Perfluorobutanesulfonic acid (PFBS)			2007.77 ug/mL	
...LC537_PFBS_00002	04/01/18	Sigma, Lot MKBP8842V			(Purchased Reagent)		Perfluorobutane Sulfonate	1 g/g
							Perfluorobutanesulfonic acid (PFBS)	1 g/g
..LC537-PFHpA_00014	03/22/18	03/22/17	Methanol, Lot 090285	50 mL	LC537_PFHpA_00002	0.05 g	Perfluoroheptanoic acid (PFHpA)	990 ug/mL
...LC537_PFHpA_00002	04/01/18	Aldrich, Lot BCBM2579V			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	0.99 g/g
..LC537-PFHxS_00009	01/04/18	01/04/17	Methanol, Lot 090285	54 mL	LC537_PFHxS_00002	0.119 g	Perfluorohexanesulfonic acid (PFHxS)	2004.05 ug/mL
...LC537_PFHxS_00002	04/01/18	Sigma, Lot BCBL3545V			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	0.9094 g/g
..LC537-PFNA_00012	03/22/18	03/22/17	Methanol, Lot 090285	23 mL	LC537 PFNA_00002	0.023 g	Perfluorononanoic acid (PFNA)	963 ug/mL
...LC537 PFNA_00002	04/01/18	TCI America, Lot QN44F			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	0.963 g/g
..LC537-PFOA_00012	03/22/18	03/22/17	Methanol, Lot 090285	21.5 mL	LC537 PFOA_00002	0.0215 g	Perfluorooctanoic acid (PFOA)	999 ug/mL
...LC537 PFOA_00002	11/04/18	Fluka, Lot SZBD308XV			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	0.999 g/g
..LC537-PFOS_00007	08/09/17	01/04/17	Methanol, Lot 090285	48.95 mL	LC537_PFOS_00002	0.0538 g	Perfluorooctanesulfonic acid (PFOS)	1000.82 ug/mL
...LC537_PFOS_00002	08/09/17	Fluka, Lot SZBC222XV			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	0.9106 g/g
LC537-ICV_00028	01/05/18	08/02/17	MeOH/H2O, Lot 067374	10 mL	LC537-IS_00045	1000 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
.LC537-IS_00045	01/05/18	07/05/17	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00019	180 uL	13C4 PFOS	0.2868 ug/mL
..LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-30136-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCMPFOS_00019	08/03/21	Wellington Laboratories, Lot MPFOS0816			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
LC537-ICV_00028	01/05/18	08/02/17	MeOH/H2O, Lot 067374	10 mL	LC537-SU_00046	1000 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
					LC537ICIM_00019	20 uL	Perfluorobutanesulfonic acid (PFBS)	100.119 ng/mL
							Perfluoroheptanoic acid (PFHpA)	9.99613 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	20.0761 ng/mL
							Perfluorononanoic acid (PFNA)	20.1272 ng/mL
							Perfluorooctanoic acid (PFOA)	20.4843 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	19.698 ng/mL
..LC537-SU_00046	01/05/18	07/05/17	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
		LCMPFHxA_00013	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_00013	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
LC537ICIM_00019	01/25/18	08/01/17	Methanol, Lot 090285	25 mL	LC537-PFBS2_00008	0.6 mL	Perfluorobutanesulfonic acid (PFBS)	50.0597 ug/mL
					LC537-PFHxA2_00011	0.061 mL	Perfluoroheptanoic acid (PFHpA)	4.99806 ug/mL
					LC537-PFHxS2_00008	0.122 mL	Perfluorohexanesulfonic acid (PFHxS)	10.038 ug/mL
					LC537-PFNA2_00009	0.126 mL	Perfluorononanoic acid (PFNA)	10.0636 ug/mL
					LC537-PFOA2_00010	0.122 mL	Perfluorooctanoic acid (PFOA)	10.2421 ug/mL
					LC537-PFOS2_00010	0.124 mL	Perfluorooctanesulfonic acid (PFOS)	9.849 ug/mL
..LC537-PFBS2_00008	01/25/18	07/25/17	Methanol, Lot 090285	20 mL	LC537_PFBS2_00002	0.0418 g	Perfluorobutanesulfonic acid (PFBS)	2085.82 ug/mL
...LC537_PFBS2_00002	09/08/22	Santa Cruz Biotechnology, Lot F0917			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	0.998 g/g
..LC537-PFHxA2_00011	01/25/18	07/25/17	Methanol, Lot 09092	31 mL	LC537_PFHxA2_00002	0.0635 g	Perfluoroheptanoic acid (PFHpA)	2048.39 ug/mL
...LC537_PFHxA2_00002	06/13/22	Afla Aesar, Lot 10200390			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	1 g/g
..LC537-PFHxS2_00008	01/25/18	07/25/17	Methanol, Lot 090285	21 mL	LC537_PFHxS2_00002	0.0475 g	Perfluorohexanesulfonic acid (PFHxS)	2056.98 ug/mL
...LC537_PFHxS2_00002	06/08/22	Santa Cruz Biotechnology, Lot G2516			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	0.9094 g/g
..LC537-PFNA2_00009	01/25/18	07/25/17	Methanol, Lot 090285	21 mL	LC537_PFNA2_00002	0.0421 g	Perfluorononanoic acid (PFNA)	1996.74 ug/mL
...LC537_PFNA2_00002	06/14/22	Aldrich, Lot MKCC0699			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	0.996 g/g
..LC537-PFOA2_00010	01/25/18	08/01/17	Methanol, Lot 090285	20 mL	LC537_PFOA2_00002	0.0424 g	Perfluorooctanoic acid (PFOA)	2098.8 ug/mL
...LC537_PFOA2_00002	06/09/22	Afla Aesar, Lot 10199078			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	0.99 g/g
..LC537-PFOS2_00010	01/25/18	08/01/17	Methanol, Lot 090285	22 mL	LC537_PFOS2_00002	0.0561 g	Perfluorooctanesulfonic acid (PFOS)	1985.68 ug/mL
...LC537_PFOS2_00002	06/14/22	Sigma, Lot BCBQ0108V			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	0.7787 g/g
LC537-IS_00044	01/05/18	07/05/17	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00019	180 uL	13C4 PFOS	0.2868 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-30136-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
.LCMPFOS_00019	08/03/21	Wellington Laboratories, Lot MPFOS0816			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
LC537-IS_00046	02/04/18	08/04/17	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00021	180 uL	13C4 PFOS	0.2868 ug/mL
.LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
.LCMPFOS_00021	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
LC537-L1_00020	02/04/18	08/14/17	MeOH/H2O, Lot 090285	5 mL	LC537-IS_00048	500 uL	13C2-PFOA	10 ng/mL
					LC537-MSP_00029	60 uL	13C4 PFOS	28.68 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	9.0018 ng/mL
							Perfluoroheptanoic acid (PFHpA)	1.00036 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	3.00103 ng/mL
							Perfluorononanoic acid (PFNA)	2.0006 ng/mL
							Perfluorooctanoic acid (PFOA)	2.00191 ng/mL
					Perfluorooctanesulfonic acid (PFOS)	4.00146 ng/mL		
LC537-SU_00049	500 uL	13C2 PFDA	10 ng/mL					
.LC537-IS_00048	02/04/18	08/04/17	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2 PFHxA	10 ng/mL
					LCMPFOS_00021	180 uL	13C2-PFOA	0.1 ug/mL
..LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C4 PFOS	0.2868 ug/mL
..LCMPFOS_00021	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
.LC537-MSP_00029	02/10/18	08/10/17	Methanol, Lot 141039	20000 uL	LC537SPIM_00023	166.7 uL	13C4 PFOS	47.8 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	750.15 ng/mL
							Perfluoroheptanoic acid (PFHpA)	83.3637 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	250.086 ng/mL
							Perfluorononanoic acid (PFNA)	166.716 ng/mL
							Perfluorooctanoic acid (PFOA)	166.826 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	333.455 ng/mL
..LC537SPIM_00023	02/10/18	08/10/17	Methanol, Lot 104453	10000 uL	LC537-PFBS_00008	450 uL	Perfluorobutanesulfonic acid (PFBS)	90 ug/mL
					LC537-PFHpA_00015	100 uL	Perfluoroheptanoic acid (PFHpA)	10.0016 ug/mL
					LC537-PFHxS_00010	150 uL	Perfluorohexanesulfonic acid (PFHxS)	30.0043 ug/mL
					LC537-PFNA_00013	200 uL	Perfluorononanoic acid (PFNA)	20.002 ug/mL
					LC537-PFOA_00013	200 uL	Perfluorooctanoic acid (PFOA)	20.0151 ug/mL
					LC537-PFOS_00008	400 uL	Perfluorooctanesulfonic acid (PFOS)	40.0066 ug/mL
...LC537-PFBS_00008	02/10/18	08/10/17	Methanol, Lot 090285	49.6 mL	LC537_PFBS_00002	0.0992 g	Perfluorobutanesulfonic acid (PFBS)	2 mg/mL
....LC537_PFBS_00002	04/01/18	Sigma, Lot MKBP8842V			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	1 g/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LC537-PFHpa_00015	02/10/18	08/10/17	Methanol, Lot 090285	48.7 mL	LC537_PFHpa_00002	0.0492 g	Perfluoroheptanoic acid (PFHpA)	1.00016 mg/mL
....LC537_PFHpa_00002	04/01/18	Aldrich, Lot BCBM2579V			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	0.99 g/g
...LC537-PFHxS_00010	02/10/18	08/10/17	Methanol, Lot 090285	55.92 mL	LC537_PFHxS_00002	0.123 g	Perfluorohexanesulfonic acid (PFHxS)	2.00029 mg/mL
....LC537_PFHxS_00002	04/01/18	Sigma, Lot BCBL3545V			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	0.9094 g/g
...LC537-PFNA_00013	02/10/18	08/10/17	Methanol, Lot 090285	62.3 mL	LC537 PFNA_00002	0.0647 g	Perfluorononanoic acid (PFNA)	1000.1 ug/mL
....LC537 PFNA_00002	04/01/18	TCI America, Lot QN44F			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	0.963 g/g
...LC537-PFOA_00013	02/10/18	08/10/17	Methanol, Lot 090285	22.76 mL	LC537 PFOA_00003	0.0228 g	Perfluorooctanoic acid (PFOA)	1.00076 mg/mL
....LC537 PFOA_00003	10/31/23	SIGMA ALDRICH, Lot BCBS1198V			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	0.999 g/g
...LC537-PFOS_00008	02/10/18	08/10/17	Methanol, Lot 090285	44.43 mL	LC537_PFOS_00003	0.0488 g	Perfluorooctanesulfonic acid (PFOS)	1.00016 mg/mL
....LC537_PFOS_00003	04/17/19	sigma alrich, Lot SZBE107XV			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	0.9106 g/g
.LC537-SU_00049	02/04/18	08/04/17	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 PFDA	50 ug/mL
..LCMPFHxA_00013	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
LC537-L2_00020	02/04/18	08/14/17	MeOH/H2O, Lot 090285	5 mL	LC537-HSP_00025	80 uL	Perfluorobutanesulfonic acid (PFBS)	20.0016 ng/mL
							Perfluoroheptanoic acid (PFHpA)	2.22277 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	6.66817 ng/mL
							Perfluorononanoic acid (PFNA)	4.44524 ng/mL
							Perfluorooctanoic acid (PFOA)	4.44816 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	8.89106 ng/mL
					LC537-IS_00048	500 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
							13C2 PFDA	10 ng/mL
.LC537-HSP_00025	02/10/18	08/10/17	Methanol, Lot 141039	20000 uL	LC537SPIM_00023	277.8 uL	13C2 PFHxA	10 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	1250.1 ng/mL
							Perfluoroheptanoic acid (PFHpA)	138.923 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	416.76 ng/mL
							Perfluorononanoic acid (PFNA)	277.827 ng/mL
							Perfluorooctanoic acid (PFOA)	278.01 ng/mL
..LC537SPIM_00023	02/10/18	08/10/17	Methanol, Lot 104453	10000 uL	LC537-PFBS_00008	450 uL	Perfluorooctanesulfonic acid (PFOS)	555.691 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	90 ug/mL
					LC537-PFHpa_00015	100 uL	Perfluoroheptanoic acid (PFHpA)	10.0016 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-30136-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LC537-PFHxS_00010	150 uL	Perfluorohexanesulfonic acid (PFHxS)	30.0043 ug/mL
					LC537-PFNA_00013	200 uL	Perfluorononanoic acid (PFNA)	20.002 ug/mL
					LC537-PFOA_00013	200 uL	Perfluorooctanoic acid (PFOA)	20.0151 ug/mL
					LC537-PFOS_00008	400 uL	Perfluorooctanesulfonic acid (PFOS)	40.0066 ug/mL
...LC537-PFBS_00008	02/10/18	08/10/17	Methanol, Lot 090285	49.6 mL	LC537_PFBS_00002	0.0992 g	Perfluorobutanesulfonic acid (PFBS)	2 mg/mL
....LC537_PFBS_00002	04/01/18	Sigma, Lot MKBP8842V			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	1 g/g
...LC537-PFHpA_00015	02/10/18	08/10/17	Methanol, Lot 090285	48.7 mL	LC537_PFHpA_00002	0.0492 g	Perfluoroheptanoic acid (PFHpA)	1.00016 mg/mL
....LC537_PFHpA_00002	04/01/18	Aldrich, Lot BCM2579V			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	0.99 g/g
...LC537-PFHxS_00010	02/10/18	08/10/17	Methanol, Lot 090285	55.92 mL	LC537_PFHxS_00002	0.123 g	Perfluorohexanesulfonic acid (PFHxS)	2.00029 mg/mL
....LC537_PFHxS_00002	04/01/18	Sigma, Lot BCBL3545V			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	0.9094 g/g
...LC537-PFNA_00013	02/10/18	08/10/17	Methanol, Lot 090285	62.3 mL	LC537 PFNA_00002	0.0647 g	Perfluorononanoic acid (PFNA)	1000.1 ug/mL
....LC537 PFNA_00002	04/01/18	TCI America, Lot QN44F			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	0.963 g/g
...LC537-PFOA_00013	02/10/18	08/10/17	Methanol, Lot 090285	22.76 mL	LC537 PFOA_00003	0.0228 g	Perfluorooctanoic acid (PFOA)	1.00076 mg/mL
....LC537 PFOA_00003	10/31/23	SIGMA ALDRICH, Lot BCBS1198V			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	0.999 g/g
...LC537-PFOS_00008	02/10/18	08/10/17	Methanol, Lot 090285	44.43 mL	LC537_PFOS_00003	0.0488 g	Perfluorooctanesulfonic acid (PFOS)	1.00016 mg/mL
....LC537_PFOS_00003	04/17/19	sigma alrich, Lot SZBE107XV			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	0.9106 g/g
.LC537-IS_00048	02/04/18	08/04/17	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00021	180 uL	13C4 PFOS	0.2868 ug/mL
..LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
..LCMPFOS_00021	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LC537-SU_00049	02/04/18	08/04/17	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00013	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_00013	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
LC537-L3_00023	02/04/18	08/14/17	MeOH/H2O, Lot 090285	5 mL	LC537-HSP_00025	180 uL	Perfluorobutanesulfonic acid (PFBS)	45.0036 ng/mL
							Perfluoroheptanoic acid (PFHpA)	5.00122 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	15.0034 ng/mL
							Perfluorononanoic acid (PFNA)	10.0018 ng/mL
							Perfluorooctanoic acid (PFOA)	10.0084 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	20.0049 ng/mL
					LC537-IS_00048	500 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
					LC537-SU_00049	500 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-30136-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LC537-HSP_00025	02/10/18	08/10/17	Methanol, Lot 141039	20000 uL	LC537SPIM_00023	277.8 uL	Perfluorobutanesulfonic acid (PFBS)	1250.1 ng/mL
							Perfluoroheptanoic acid (PFHpA)	138.923 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	416.76 ng/mL
							Perfluorononanoic acid (PFNA)	277.827 ng/mL
							Perfluorooctanoic acid (PFOA)	278.01 ng/mL
..LC537SPIM_00023	02/10/18	08/10/17	Methanol, Lot 104453	10000 uL	LC537-PFBS_00008	450 uL	Perfluorobutanesulfonic acid (PFBS)	90 ug/mL
							Perfluoroheptanoic acid (PFHpA)	10.0016 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	30.0043 ug/mL
							Perfluorononanoic acid (PFNA)	20.002 ug/mL
							Perfluorooctanoic acid (PFOA)	20.0151 ug/mL
...LC537-PFOS_00008	02/10/18	08/10/17	Methanol, Lot 090285	49.6 mL	LC537-PFOS_00008	400 uL	Perfluorooctanesulfonic acid (PFOS)	40.0066 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	2 mg/mL
							Perfluoroheptanoic acid (PFHpA)	1.00016 mg/mL
							Perfluorohexanesulfonic acid (PFHxS)	2.00029 mg/mL
							Perfluorononanoic acid (PFNA)	1000.1 ug/mL
....LC537-PFBS_00002	04/01/18		Sigma, Lot MKBP8842V		(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	1 g/g
...LC537-PFHpA_00015	02/10/18	08/10/17	Methanol, Lot 090285	48.7 mL	LC537_PFHpA_00002	0.0492 g	Perfluoroheptanoic acid (PFHpA)	0.99 g/g
....LC537_PFHpA_00002	04/01/18		Aldrich, Lot BCM2579V		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	0.99 g/g
...LC537-PFHxS_00010	02/10/18	08/10/17	Methanol, Lot 090285	55.92 mL	LC537_PFHxS_00002	0.123 g	Perfluorohexanesulfonic acid (PFHxS)	0.9094 g/g
....LC537_PFHxS_00002	04/01/18		Sigma, Lot BCBL3545V		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	0.9094 g/g
...LC537-PFNA_00013	02/10/18	08/10/17	Methanol, Lot 090285	62.3 mL	LC537 PFNA_00002	0.0647 g	Perfluorononanoic acid (PFNA)	0.963 g/g
....LC537 PFNA_00002	04/01/18		TCI America, Lot QN44F		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	0.963 g/g
...LC537-PFOA_00013	02/10/18	08/10/17	Methanol, Lot 090285	22.76 mL	LC537 PFOA_00003	0.0228 g	Perfluorooctanoic acid (PFOA)	1.00076 mg/mL
....LC537 PFOA_00003	10/31/23		SIGMA ALDRICH, Lot BCBS1198V		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	0.999 g/g
...LC537-PFOS_00008	02/10/18	08/10/17	Methanol, Lot 090285	44.43 mL	LC537_PFOS_00003	0.0488 g	Perfluorooctanesulfonic acid (PFOS)	0.9106 g/g
....LC537_PFOS_00003	04/17/19		sigma alrich, Lot SZBE107XV		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	0.9106 g/g
.LC537-IS_00048	02/04/18	08/04/17	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00021	180 uL	13C4 PFOS	0.2868 ug/mL
..LCM2PFOA_00007	02/12/21		Wellington Laboratories, Lot M2PFOA0216		(Purchased Reagent)		13C2-PFOA	50 ug/mL
..LCMPFOS_00021	12/12/21		Wellington Laboratories, Lot MPFOS1216		(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LC537-SU_00049	02/04/18	08/04/17	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00013	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_00013	04/08/21		Wellington Laboratories, Lot MPFHxA0416		(Purchased Reagent)		13C2 PFHxA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-30136-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LC537-L4_00020	02/04/18	08/14/17	MeOH/H2O, Lot 090285	5 mL	LC537-HSP_00025	360 uL	Perfluorobutanesulfonic acid (PFBS)	90.0072 ng/mL
							Perfluoroheptanoic acid (PFHpA)	10.0024 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	30.0067 ng/mL
							Perfluorononanoic acid (PFNA)	20.0036 ng/mL
							Perfluorooctanoic acid (PFOA)	20.0167 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	40.0098 ng/mL
					LC537-IS_00048	500 uL	13C2-PFOA	10 ng/mL
					LC537-SU_00049	500 uL	13C4 PFOS	28.68 ng/mL
							13C2 PFDA	10 ng/mL
LC537-HSP_00025	02/10/18	08/10/17	Methanol, Lot 141039	20000 uL	LC537SPIM_00023	277.8 uL	13C2 PFHxA	10 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	1250.1 ng/mL
							Perfluoroheptanoic acid (PFHpA)	138.923 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	416.76 ng/mL
							Perfluorononanoic acid (PFNA)	277.827 ng/mL
							Perfluorooctanoic acid (PFOA)	278.01 ng/mL
LC537SPIM_00023	02/10/18	08/10/17	Methanol, Lot 104453	10000 uL	LC537-PFBS_00008	450 uL	Perfluorooctanesulfonic acid (PFOS)	555.691 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	90 ug/mL
							Perfluoroheptanoic acid (PFHpA)	10.0016 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	30.0043 ug/mL
							Perfluorononanoic acid (PFNA)	20.002 ug/mL
							Perfluorooctanoic acid (PFOA)	20.0151 ug/mL
LC537-PFBS_00008	02/10/18	08/10/17	Methanol, Lot 090285	49.6 mL	LC537-PFOA_00013	400 uL	Perfluorooctanesulfonic acid (PFOS)	40.0066 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	2 mg/mL
							Perfluoroheptanoic acid (PFHpA)	1.00016 mg/mL
							Perfluorohexanesulfonic acid (PFHxS)	2.00029 mg/mL
							Perfluorononanoic acid (PFNA)	1000.1 ug/mL
							Perfluorooctanoic acid (PFOA)	1.00076 mg/mL
LC537-PFBS_00002	04/01/18		Sigma, Lot MKBP8842V				Perfluorobutanesulfonic acid (PFBS)	0.999 g/g
LC537-PFHpA_00015	02/10/18	08/10/17	Methanol, Lot 090285	48.7 mL	LC537-PFHpA_00002	0.0492 g	Perfluoroheptanoic acid (PFHpA)	1.00016 mg/mL
LC537-PFHpA_00002	04/01/18		Aldrich, Lot BCBM2579V				Perfluoroheptanoic acid (PFHpA)	0.99 g/g
LC537-PFHxS_00010	02/10/18	08/10/17	Methanol, Lot 090285	55.92 mL	LC537-PFHxS_00002	0.123 g	Perfluorohexanesulfonic acid (PFHxS)	2.00029 mg/mL
LC537-PFHxS_00002	04/01/18		Sigma, Lot BCBL3545V				Perfluorohexanesulfonic acid (PFHxS)	0.9094 g/g
LC537-PFNA_00013	02/10/18	08/10/17	Methanol, Lot 090285	62.3 mL	LC537-PFNA_00002	0.0647 g	Perfluorononanoic acid (PFNA)	1000.1 ug/mL
LC537-PFNA_00002	04/01/18		TCI America, Lot QN44F				Perfluorononanoic acid (PFNA)	0.963 g/g
LC537-PFOA_00013	02/10/18	08/10/17	Methanol, Lot 090285	22.76 mL	LC537-PFOA_00003	0.0228 g	Perfluorooctanoic acid (PFOA)	1.00076 mg/mL
LC537-PFOA_00003	10/31/23		SIGMA ALDRICH, Lot BCBS1198V				Perfluorooctanoic acid (PFOA)	0.999 g/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LC537-PFOS_00008	02/10/18	08/10/17	Methanol, Lot 090285	44.43 mL	LC537_PFOS_00003	0.0488 g	Perfluorooctanesulfonic acid (PFOS)	1.00016 mg/mL
....LC537_PFOS_00003	04/17/19	sigma alrich, Lot SZBE107XV			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	0.9106 g/g
.LC537-IS_00048	02/04/18	08/04/17	Methanol, Lot 090285	30000 uL	LCM2PFOA 00007	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS 00021	180 uL	13C4 PFOS	0.2868 ug/mL
..LCM2PFOA 00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
..LCMPFOS 00021	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LC537-SU_00049	02/04/18	08/04/17	Methanol, Lot 104453	30000 uL	LCMPFDA 00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA 00013	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 00013	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
LC537-L5_00024	02/04/18	08/14/17	MeOH/H2O, Lot 090285	5 mL	LC537-HSP_00025	540 uL	Perfluorobutanesulfonic acid (PFBS)	135.011 ng/mL
							Perfluoroheptanoic acid (PFHpA)	15.0037 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	45.0101 ng/mL
							Perfluorononanoic acid (PFNA)	30.0053 ng/mL
							Perfluorooctanoic acid (PFOA)	30.0251 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	60.0146 ng/mL
					LC537-IS_00048	500 uL	13C2-PFOA	10 ng/mL
					LC537-SU_00049	500 uL	13C4 PFOS	28.68 ng/mL
							13C2 PFDA	10 ng/mL
.LC537-HSP_00025	02/10/18	08/10/17	Methanol, Lot 141039	20000 uL	LC537SPIM_00023	277.8 uL	13C2 PFHxA	10 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	1250.1 ng/mL
							Perfluoroheptanoic acid (PFHpA)	138.923 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	416.76 ng/mL
							Perfluorononanoic acid (PFNA)	277.827 ng/mL
							Perfluorooctanoic acid (PFOA)	278.01 ng/mL
..LC537SPIM_00023	02/10/18	08/10/17	Methanol, Lot 104453	10000 uL	LC537-PFBS_00008	450 uL	Perfluorooctanesulfonic acid (PFOS)	555.691 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	90 ug/mL
							Perfluoroheptanoic acid (PFHpA)	10.0016 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	30.0043 ug/mL
							Perfluorononanoic acid (PFNA)	20.002 ug/mL
							Perfluorooctanoic acid (PFOA)	20.0151 ug/mL
...LC537-PFBS_00008	02/10/18	08/10/17	Methanol, Lot 090285	49.6 mL	LC537-PFOS_00008	400 uL	Perfluorooctanesulfonic acid (PFOS)	40.0066 ug/mL
					LC537-PFBS_00002	0.0992 g	Perfluorobutanesulfonic acid (PFBS)	2 mg/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-30136-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
....LC537_PFBs_00002	04/01/18		Sigma, Lot MKBP8842V		(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	1 g/g
...LC537-PFHpA_00015	02/10/18	08/10/17	Methanol, Lot 090285	48.7 mL	LC537_PFHpA_00002	0.0492 g	Perfluoroheptanoic acid (PFHpA)	1.00016 mg/mL
....LC537_PFHpA_00002	04/01/18		Aldrich, Lot BCBM2579V		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	0.99 g/g
...LC537-PFHxS_00010	02/10/18	08/10/17	Methanol, Lot 090285	55.92 mL	LC537_PFHxS_00002	0.123 g	Perfluorohexanesulfonic acid (PFHxS)	2.00029 mg/mL
....LC537_PFHxS_00002	04/01/18		Sigma, Lot BCBL3545V		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	0.9094 g/g
...LC537-PFNA_00013	02/10/18	08/10/17	Methanol, Lot 090285	62.3 mL	LC537 PFNA_00002	0.0647 g	Perfluorononanoic acid (PFNA)	1000.1 ug/mL
....LC537 PFNA_00002	04/01/18		TCI America, Lot QN44F		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	0.963 g/g
...LC537-PFOA_00013	02/10/18	08/10/17	Methanol, Lot 090285	22.76 mL	LC537 PFOA_00003	0.0228 g	Perfluorooctanoic acid (PFOA)	1.00076 mg/mL
....LC537 PFOA_00003	10/31/23		SIGMA ALDRICH, Lot BCBS1198V		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	0.999 g/g
...LC537-PFOS_00008	02/10/18	08/10/17	Methanol, Lot 090285	44.43 mL	LC537_PFOS_00003	0.0488 g	Perfluorooctanesulfonic acid (PFOS)	1.00016 mg/mL
....LC537_PFOS_00003	04/17/19		sigma alrich, Lot SZBE107XV		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	0.9106 g/g
.LC537-IS_00048	02/04/18	08/04/17	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
..LCM2PFOA_00007	02/12/21		Wellington Laboratories, Lot M2PFOA0216		(Purchased Reagent)		13C4 PFOS	0.2868 ug/mL
..LCMPFOS_00021	12/12/21		Wellington Laboratories, Lot MPFOS1216		(Purchased Reagent)		13C2-PFOA	50 ug/mL
.LC537-SU_00049	02/04/18	08/04/17	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_00013	04/08/21		Wellington Laboratories, Lot MPFHxA0416		(Purchased Reagent)		13C2 PFDA	50 ug/mL
LC537-L6_00020	02/04/18	08/14/17	MeOH/H2O, Lot 090285	5 mL	LC537-HSP_00025	720 uL	Perfluorobutanesulfonic acid (PFBS)	180.014 ng/mL
							Perfluoroheptanoic acid (PFHpA)	20.0049 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	60.0135 ng/mL
							Perfluorononanoic acid (PFNA)	40.0071 ng/mL
							Perfluorooctanoic acid (PFOA)	40.0334 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	80.0195 ng/mL
					LC537-IS_00048	500 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
							13C2 PFDA	10 ng/mL
.LC537-HSP_00025	02/10/18	08/10/17	Methanol, Lot 141039	20000 uL	LC537SPIM_00023	277.8 uL	13C2 PFHxA	10 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	1250.1 ng/mL
							Perfluoroheptanoic acid (PFHpA)	138.923 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	416.76 ng/mL
							Perfluorononanoic acid (PFNA)	277.827 ng/mL
							Perfluorooctanoic acid (PFOA)	278.01 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanesulfonic acid (PFOS)	555.691 ng/mL
..LC537SPIM_00023	02/10/18	08/10/17	Methanol, Lot 104453	10000 uL	LC537-PFBS_00008	450 uL	Perfluorobutanesulfonic acid (PFBS)	90 ug/mL
					LC537-PFHpA_00015	100 uL	Perfluoroheptanoic acid (PFHpA)	10.0016 ug/mL
					LC537-PFHxS_00010	150 uL	Perfluorohexanesulfonic acid (PFHxS)	30.0043 ug/mL
					LC537-PFNA_00013	200 uL	Perfluorononanoic acid (PFNA)	20.002 ug/mL
					LC537-PFOA_00013	200 uL	Perfluorooctanoic acid (PFOA)	20.0151 ug/mL
					LC537-PFOS_00008	400 uL	Perfluorooctanesulfonic acid (PFOS)	40.0066 ug/mL
...LC537-PFBS_00008	02/10/18	08/10/17	Methanol, Lot 090285	49.6 mL	LC537_PFBS_00002	0.0992 g	Perfluorobutanesulfonic acid (PFBS)	2 mg/mL
....LC537_PFBS_00002	04/01/18	Sigma, Lot MKBP8842V			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	1 g/g
...LC537-PFHpA_00015	02/10/18	08/10/17	Methanol, Lot 090285	48.7 mL	LC537_PFHpA_00002	0.0492 g	Perfluoroheptanoic acid (PFHpA)	1.00016 mg/mL
....LC537_PFHpA_00002	04/01/18	Aldrich, Lot BCBM2579V			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	0.99 g/g
...LC537-PFHxS_00010	02/10/18	08/10/17	Methanol, Lot 090285	55.92 mL	LC537_PFHxS_00002	0.123 g	Perfluorohexanesulfonic acid (PFHxS)	2.00029 mg/mL
....LC537_PFHxS_00002	04/01/18	Sigma, Lot BCBL3545V			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	0.9094 g/g
...LC537-PFNA_00013	02/10/18	08/10/17	Methanol, Lot 090285	62.3 mL	LC537 PFNA_00002	0.0647 g	Perfluorononanoic acid (PFNA)	1000.1 ug/mL
....LC537 PFNA_00002	04/01/18	TCI America, Lot QN44F			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	0.963 g/g
...LC537-PFOA_00013	02/10/18	08/10/17	Methanol, Lot 090285	22.76 mL	LC537 PFOA_00003	0.0228 g	Perfluorooctanoic acid (PFOA)	1.00076 mg/mL
....LC537 PFOA_00003	10/31/23	SIGMA ALDRICH, Lot BCBS1198V			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	0.999 g/g
...LC537-PFOS_00008	02/10/18	08/10/17	Methanol, Lot 090285	44.43 mL	LC537_PFOS_00003	0.0488 g	Perfluorooctanesulfonic acid (PFOS)	1.00016 mg/mL
....LC537_PFOS_00003	04/17/19	sigma alrich, Lot SZBE107XV			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	0.9106 g/g
.LC537-IS_00048	02/04/18	08/04/17	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
..LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C4 PFOS	0.2868 ug/mL
..LCMPFOS_00021	12/12/21	Wellington Laboratories, Lot MPFOS1216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
.LC537-SU_00049	02/04/18	08/04/17	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C4 PFOS	47.8 ug/mL
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			LCMPFHxA_00013	60 uL	13C2 PFDA	0.1 ug/mL
..LCMPFHxA_00013	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	0.1 ug/mL
..LCMPFHxA_00013	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFDA	50 ug/mL
LC537-SU_00046	01/05/18	07/05/17	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
.LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			LCMPFHxA_00013	60 uL	13C2 PFHxA	0.1 ug/mL
.LCMPFHxA_00013	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFDA	50 ug/mL
.LCMPFHxA_00013	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	50 ug/mL

Reagent

LC537_PFB_00002

4/1/15 SPV

SIGMA-ALDRICH®

sigma-aldrich.com

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:

Nonafluorobutane-1-sulfonic acid - 97%

Product Number:

562629

Batch Number:

MKBP8842V

Brand:

ALDRICH

CAS Number:

375-73-5

MDL Number:

MFCD01320794

Formula:

C₄HF₉O₃S

Formula Weight:

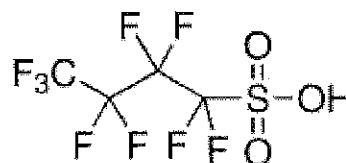
300.10 g/mol

Storage Temperature:

Store at 2 - 8 °C

Quality Release Date:

11 OCT 2013



PFBS

Test	Specification	Result
Appearance (Color)	Colorless	Colorless
Appearance (Form)	Liquid	Liquid
Infrared Spectrum	Conforms to Structure	Conforms
Fluorine NMR Spectrum	Conforms to Structure	Conforms
Purity (Titration by NaOH)	96.5 - 103.5 %	101.6 %

Jamie Gleason

Jamie Gleason, Manager

Quality Control

Milwaukee, Wisconsin US

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_PFBBS2_00002

17.6.8.17 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_PFHpA_00002

Certificate of Analysis

Product Name: PERFLUOROHEPTANOIC ACID
99 %
Product Number: 342041
Batch Number: BCBM2579V
Brand: Aldrich
CAS Number: 375-85-9
Formula: $\text{CF}_3(\text{CF}_2)_5\text{CO}_2\text{H}$
Formula Weight: 364.06
Quality Release Date: 06 DEC 2013
Recommended Retest Date: OCT 2018

PFH₇A

TEST	SPECIFICATION	RESULT
APPEARANCE (COLOR)	COLORLESS OR WHITE	WHITE
APPEARANCE (FORM)	LIQUID OR SOLID	SOLID
TITRATION	98.5 - 101.5 %	99.8 %
TITRATION (METHOD)	-	BACK TITRATION
PURITY (GC AREA %)	≥ 98.5 %	99.5 %
INFRARED SPECTRUM	CONFORMS TO STRUCTURE	CONFORMS



Dr. Claudia Geithner
Manager Quality Control
Buchs, Switzerland

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_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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Reagent

LC537_PFHxS_00002

r: 4/1/15 stw

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: TRIDECAFLUOROHXANE-1-SULFONIC ACID POTASSIUM SALT
Product Number: 50929
Batch Number: BCBL3545V
Brand: Aldrich
CAS Number: 3871-99-6
Formula: $C_{13}F_{27}KO_2S$
Formula Weight: 438.20
Quality Release Date: 20 JUN 2013

PFH₁₃S-K

TEST	SPECIFICATION	RESULT
APPEARANCE (COLOR)	WHITE TO FAINT BEIGE	WHITE
APPEARANCE (FORM)	POWDER OR CRYSTALS	POWDER
TITRATION (ION EXCHANGE)	≥ 98.0 %	99.5 %
INFRARED SPECTRUM	CONFORMS TO STRUCTURE	CONFORMS

Claudia Geitner

Dr. Claudia Geitner
Manager Quality Control
Buchs, Switzerland

$$MW_{corr} = \frac{(k_{form}) - (k) + (H)}{438.20 (k_{form})} = \frac{(438.20 - 39.10 + 1.01)}{438.20 (k_{form})} = 0.91307 \text{ (anion form)}$$

$$Purity = 90.94 \% \text{ w/m.w correction}$$

stw 4/1/15

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_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: $C_6F_{13}KO_3S$

Molecular Weight: 438.20

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

PFH₂S-K

$C_6F_{13}SO_3K$ 438.201

$C_6F_{13}SO_3H$ 400.111

$$MW \text{ correction} = \frac{400.11}{438.201} = 0.91307 \quad \frac{PFH_2S}{\text{CAS \# 355-46-4}}$$

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

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

Reagent

LC537_PFNA_00002

R: 4/1/15 SKV



Certificate of Analysis

Apr 2, 2015 (JST)

TOKYO CHEMICAL INDUSTRY CO.,LTD.
4-10-1 Nihonbashi-Honcho, Chuo-ku, Tokyo 103-0023 Japan

Chemical Name: Heptadecafluorononanoic Acid		
Product Number: H0843	Lot: QN44F	
CAS: 375-95-1		

Tests	Results	Specifications
Purity(GC)	96.3 %	min. 95.0 %
Purity(Neutralization titration)	98.1 %	min. 95.0 %
Melting point	63.3 deg-C	62.0 to 67.0 deg-C

TCI Lot numbers are 4-5 characters in length.
Characters listed after the first 4-5 characters are control numbers for internal purpose only.

Customer service:

TCI AMERICA
Tel: +1-800-423-8616 / +1-503-283-1681
Fax: +1-888-520-1075 / +1-503-283-1987
E-mail: Sales-US@TCIchemicals.com

PFNA

Reagent

LC537_PFNA2_00002

11.6.14.17 SKW

SIGMA-ALDRICH

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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:

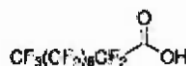
C₉H₁₇O₂

Formula Weight:

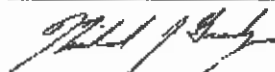
464.08 g/mol

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_PFOA_00002

3/20/15

SIGMA-ALDRICH®

CERTIFICATE OF ANALYSIS

Sigma-Aldrich Laborchemikalien GmbH D-30918 Seelze
Telefon: +49 5137 8238-150

Seelze, 13.11.2013/505378/13/24029

Order-No.:

Customer-No.:

Order-Code:

Quantity:

Production Date: 04.Nov.2013

Expiry Date: 04.Nov.2018

Article/Product: 33824

Batch : SZBD308XV

Pentadecafluorooctanoic acid OEKANAL®

PFOA

Reference Material (RM)

1. General Information

Formula: C₈HF₁₅O₂

CAS-No.: [335-67-1]

Usage : PFOA

Molar mass: 414.07 g/Mole

Recomm. storage temp.: roomtemp.

The estimated uncertainty of a single measurement of the assay can be expected to be 0.5 % relative (confidence level = 95%, n= 6) whereby the assay measurements are calculated by 100% minus found impurities.

2. Batch Analysis

identity (GC-MS)

Assay (GCMS)

Date of Analysis

complying

99.4 %

13.Nov.2013

3. Advice and Remarks

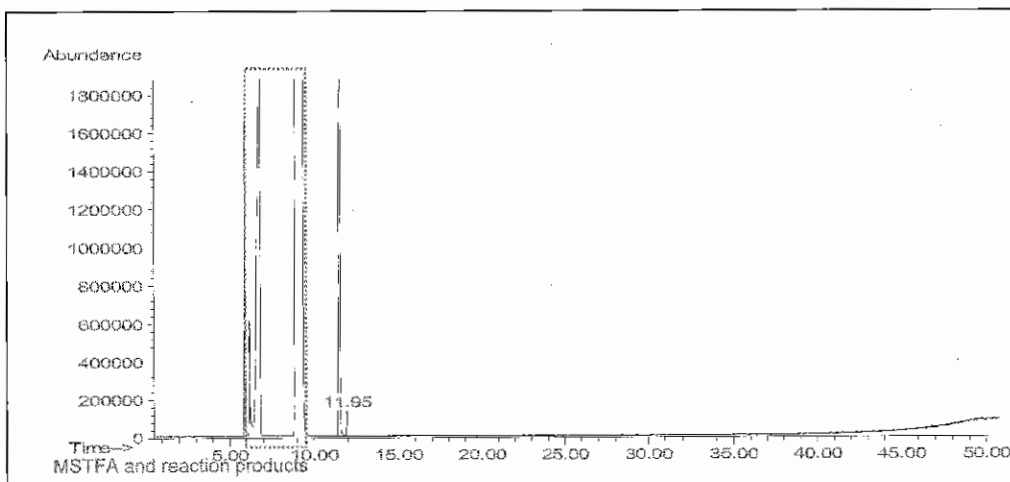
- The expiry date is based on the current knowledge and holds only for proper storage conditions in the originally closed flasks/ packages.
- Whenever the container is opened for removal of aliquot portions of the substance, the person handling the substance must assure, that the integrity of the substance is maintained and proper records of all its handlings are kept. Special care has to be taken to avoid any contamination or adulteration of the substance.
- We herewith confirm that the delivery is effected according to the technical delivery conditions agreed.
- Particular properties of the products or the suitability for a particular area of application are not assured.
- We guarantee a proper quality within our General Conditions of Sales.

Sigma-Aldrich Laborchemikalien GmbH
Quality Management SA-LC

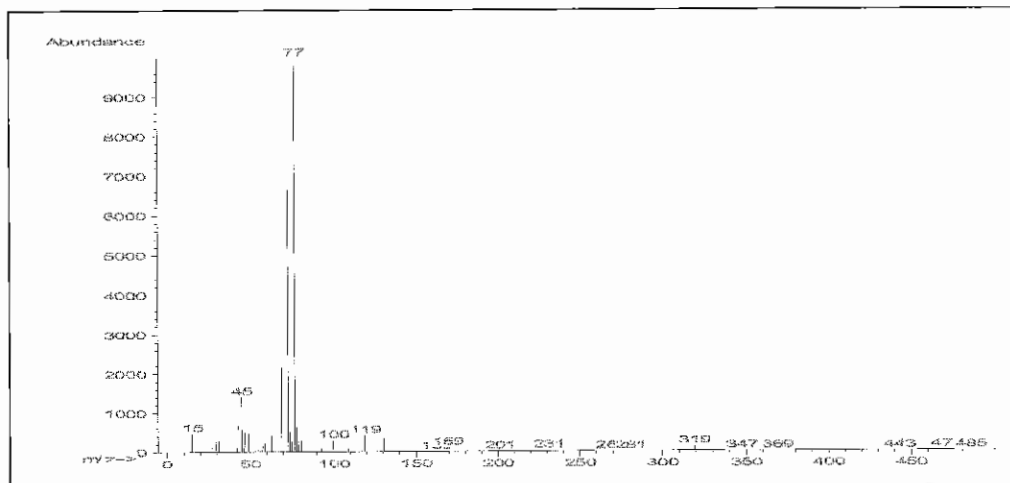
This document was produced electronically and is valid without a signature

GC/MS-Method**Analytical Department****Article:** Pentadecafluorooctanoic acid OEKANAL**Article-No.:** 33824**Batch:** SZBD308XV**Column:** XTI-5 (Restek); 30 m; fs cap.; I.D.:0.25 mm; 1 µm df**Injector:** Split mode**Injection:** approx. 1 µl of reaction mixture with MSTFA (approx. 10 mg + 200 µl MSTFA)**Inj.-temp.:** 280°C**Oven-temp.:** 40°C (for 2 min) to 320°C (6°C/min) hold for 2 min**Split:** 1:100**Flow:** 1 ml He/min (Constant flow mode)**Detector:** MSD**Mass range:** 10-600 amu (Scan mode)**Evaluation:** Purity: Total Ion Chromatogram
(MSTFA and reaction products blinded out in report)

Identity: Mass spectrum complies

Operator: Ahrens / 2013-11-13**Total Ion Chromatogram:**

Ret.time	Area	Area-%	Com
11.54	565.1670	99.4	Pentadecafluorooctanoic acid (as TMS-ester)
11.95	3.6792	0.64	

Mass spectrum (rt = 11.54 min):

Reagent

LC537_PFOA_00003

C: 11/30/16 SKV
PFA

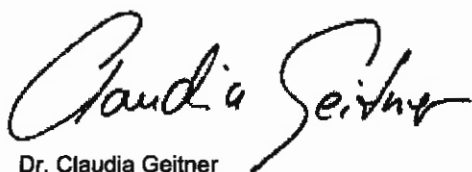
SIGMA-ALDRICH

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

Certificate of Analysis

Product Name: PENTADECAFLUOROOCTANOIC ACID
analytical standard
Product Number: 33824
Batch Number: BCBS1198V
Brand: Sigma-Aldrich
CAS Number: 335-67-1
Formula: $\text{CF}_3(\text{CF}_2)_6\text{COOH}$
Formula Weight: 414.07
Expiration Date: OCT 2023
Quality Release Date: 12 MAY 2016

TEST	SPECIFICATION	RESULT
PURITY (HPLC AREA %)	$\geq 98.0\%$	100.0%
IDENTIFICATION (LC-MS)	IDENTITY CONFORMS	CONFORMS



Dr. Claudia Geitner
Manager Quality Control
Buchs, Switzerland

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

17: 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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Order our products online www.alfa.com

ThermoFisher
SCIENTIFIC

Reagent

LC537_PFOS_00002

F: 4/1/15 SV

SIGMA-ALDRICH®

CERTIFICATE OF ANALYSIS

Sigma-Aldrich Laborchemikalien GmbH D-30918 Seelze
Telefon: +49 5137 8238-150

Seelze, 13.08.2012/419060/12/17583

Order-No.:

Customer-No.:

Order-Code:

Quantity:

Production Date: 09.Aug.2012

Expiry Date: 09.Aug.2017 - ex date

Article/Product: 33829

Batch : SZBC222XV

Heptadecafluorooctanesulfonic acid potassium salt OEKANAL®

PFOS-K⁺

Reference Material (RM)

1. General Information

Formula: C8F17KO3S

CAS-No.: [2795-39-3]

Usage : PFOS

Molar mass: 538.22 g/Mole

Recomm. storage temp.: roomtemp.

The estimated uncertainty of a single measurement of the assay can be expected to be 0.5 % relative (confidence level = 95%, n= 6) whereby the assay measurements are calculated by 100% minus found impurities.

2. Batch Analysis

Identity

Assay (LC-MS)

Date of Analysis

complying

98 %

10.Aug.2012

PW-correction:

$$\frac{538.22 - 39.10 + 1.01}{538.22} = \frac{500.13}{538.22} = 0.92923$$

Purity = 91.66 %

3. Advice and Remarks

- The minimum shelf life is based on the current knowledge and holds only for proper storage conditions in the originally closed flasks/ packages.
- Whenever the container is opened for removal of aliquot portions of the substance, the person handling the substance must assure, that the integrity of the substance is maintained and proper records of all its handlings are kept. Special care has to be taken to avoid any contamination or adulteration of the substance.
- We herewith confirm that the delivery is effected according to the technical delivery conditions agreed.
- Particular properties of the products or the suitability for a particular area of application are not assured.
- We guarantee a proper quality within our General Conditions of Sales.

Sigma-Aldrich Laborchemikalien GmbH
Quality Management SA-LC

Reagent

LC537_PFOS_00003

n: 11/30/16 SV
PFOS

SIGMA-ALDRICH

CERTIFICATE OF ANALYSIS

Sigma-Aldrich Laborchemikalien GmbH D-30918 Seelze
Telefon: +49 5137 8238-150

Seelze, 22.04.2014/524107/14/08646

Order-No.:

Customer-No.:

Order-Code:

Quantity:

Production Date: 17.Apr.2014

Expiry Date: 17.Apr.2019

Article/Product: 33829

Batch : SZBE107XV

Heptadecafluorooctanesulfonic acid potassium salt OEKANAL®

Reference Material (RM)

1. General Information

Formula: C₈F₁₇KO₃S

CAS-No.: [2795-39-3]

Usage : PFOS

Molar mass: 538.22 g/Mole

Recomm. storage temp.: roomtemp.

The estimated uncertainty of a single measurement of the assay can be expected to be 0.5 % relative (confidence level = 95%, n= 6) whereby the assay measurements are calculated by 100% minus found impurities.

2. Batch Analysis

Identity

Assay (LC-MS)

Date of Analysis

complying

98 %

22.Apr.2014

3. Advice and Remarks

- The expiry date is based on the current knowledge and holds only for proper storage conditions in the originally closed flasks/ packages.
- Whenever the container is opened for removal of aliquot portions of the substance, the person handling the substance must assure, that the integrity of the substance is maintained and proper records of all its handlings are kept. Special care has to be taken to avoid any contamination or adulteration of the substance.
- We herewith confirm that the delivery is effected according to the technical delivery conditions agreed.
- Particular properties of the products or the suitability for a particular area of application are not assured.
- We guarantee a proper quality within our General Conditions of Sales.

Sigma-Aldrich Laborchemikalien GmbH
Quality Management SA-LC

Reagent

LC537_PFOS2_00002

1: 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

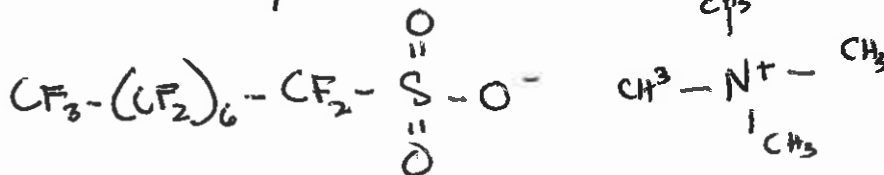
TEST	SPECIFICATION	RESULT
APPEARANCE (COLOR)	WHITE TO OFF WHITE	OFF-WHITE
APPEARANCE (FORM)	POWDER OR POWDER WITH CHUNK(S)	POWDER
CARBON CONTENT	29.77 % - 31.29 %	29.97 %
INFRARED SPECTRUM	CONFORMS TO STRUCTURE	CONFORMS

Claudia Geitner

Dr. Claudia Geitner
Manager Quality Control
Buchs, Switzerland

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

$$\text{Purity \& MW correction} = 77.37\%$$



$$\begin{array}{r} \text{C}_8\text{F}_{17}\text{SO}_3^+\text{H} \\ \text{C} = 12.011 \quad 96.088 \\ \text{F} = 18.998 \quad 322.966 \\ \text{S} = 32.066 \quad 32.066 \\ \text{O} = 16.000 \quad 47.947 \\ \text{H} = 1.008 \quad 1.008 \\ \text{N} = 14.007 \quad - \\ \hline 500.125 \end{array}$$

$$\begin{array}{r} \text{C}_8\text{H}_{20}\text{N} \\ 96.088 \\ - \\ - \\ 20.60 \\ 14.007 \\ \hline 130.255 \end{array}$$

Reagent

LCM2PFOA_00007



WELLINGTON LABORATORIES

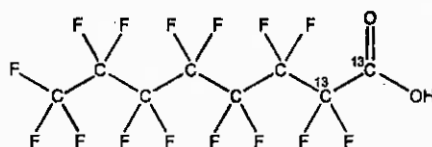
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: M2PFOA0216

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₂¹²C₆H₁₆F₁₆O₂
CONCENTRATION: 50 ± 2.5 µg/ml

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

CHEMICAL PURITY: >98%

ISOTOPIC PURITY: ≥99% ¹³C
(1,2-¹³C₂)

LAST TESTED: (mm/dd/yyyy) 02/12/2016

EXPIRY DATE: (mm/dd/yyyy) 02/12/2021

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 02/24/2016
(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

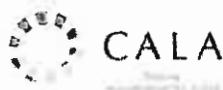
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

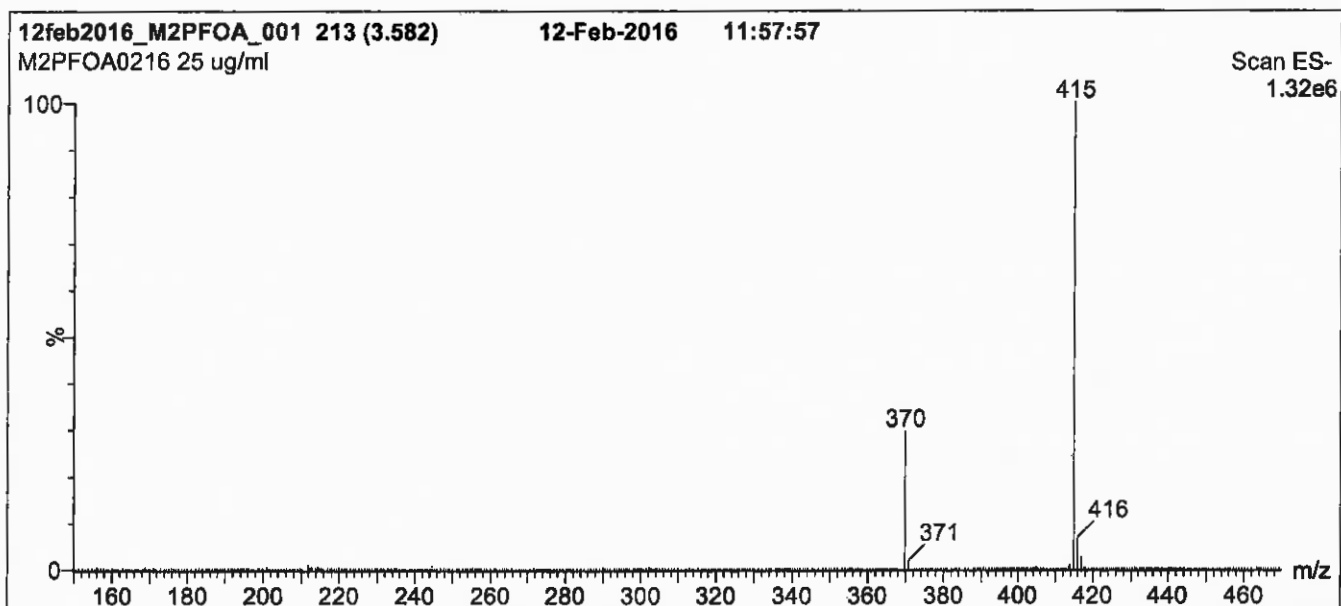
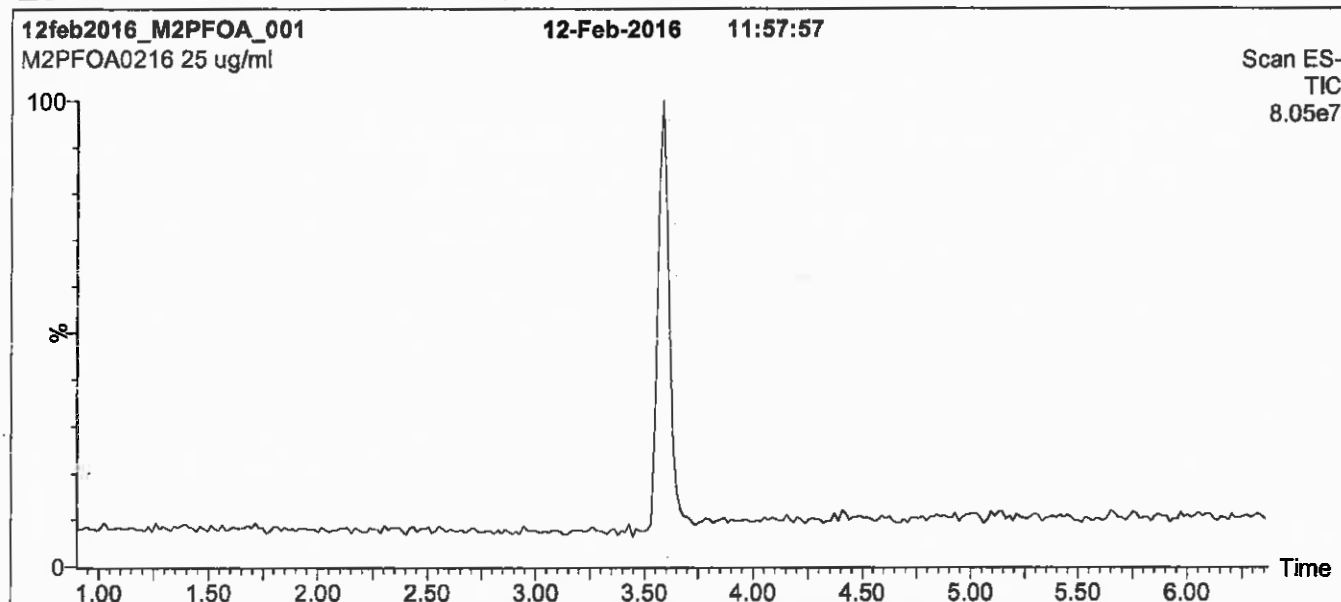
QUALITY MANAGEMENT:

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



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)

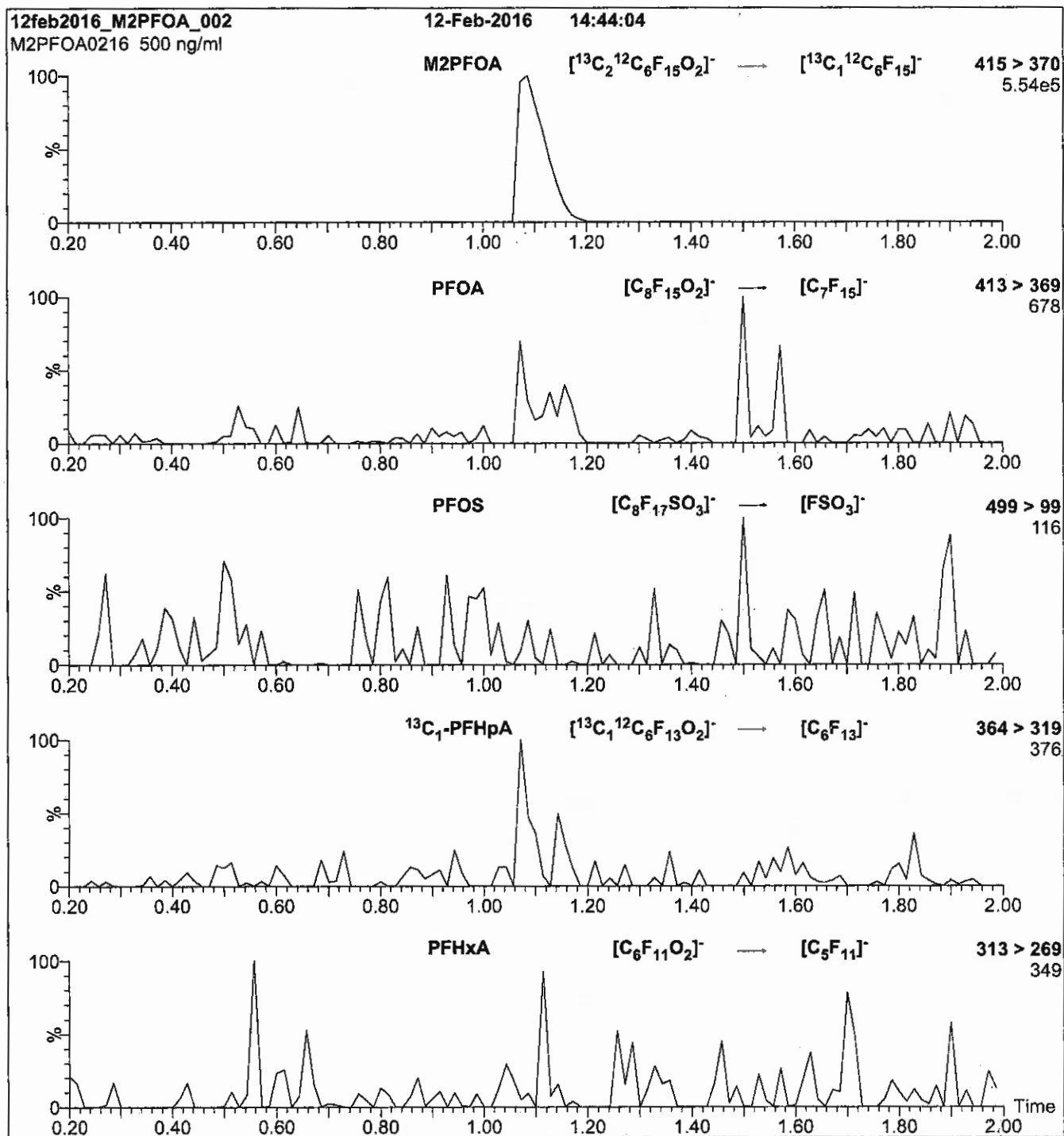
Capillary Voltage (kV) = 3.00

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

COMPOUND:

Perfluoro-n-[1,2-¹³C₂]decanoic acid

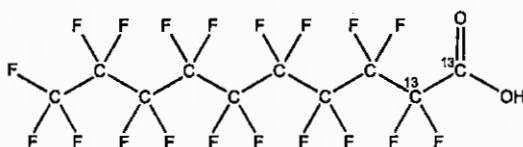
LOT NUMBER:

MPFDA0916

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

¹³C₂¹²C₈HF₁₉O₂

CONCENTRATION:

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

516.07

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99% ¹³C

LAST TESTED: (mm/dd/yyyy)

09/30/2016

EXPIRY DATE: (mm/dd/yyyy)

09/30/2021

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

(1,2-¹³C₂)

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. Chritton

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:

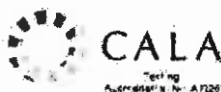
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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.

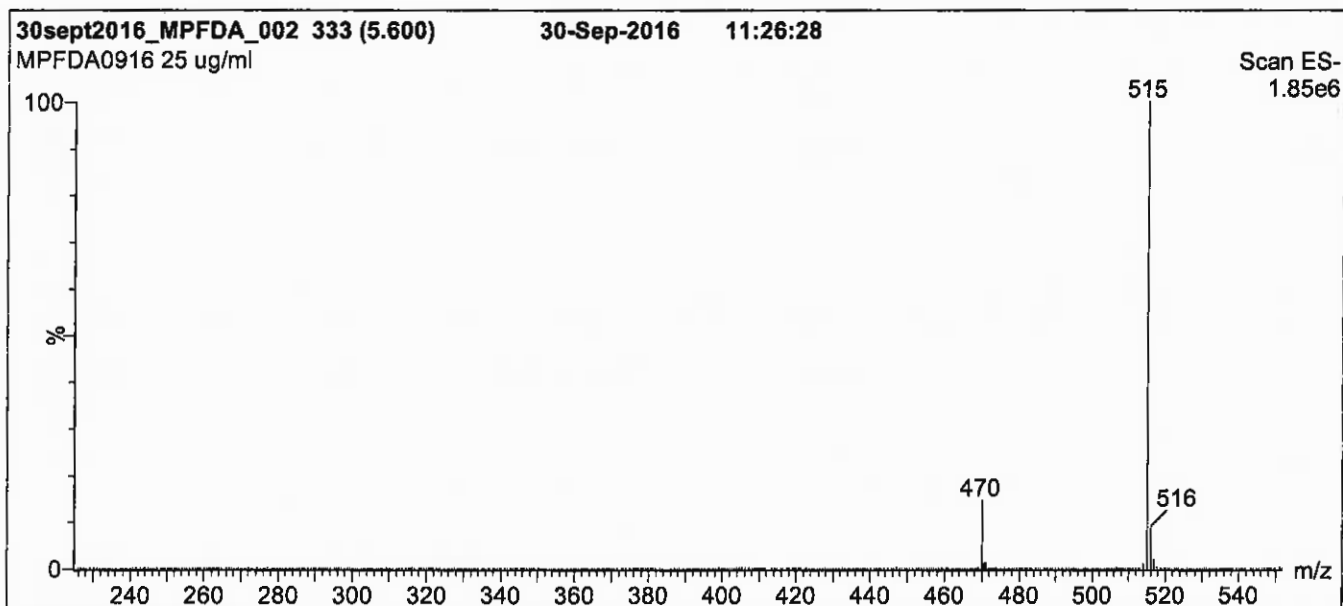
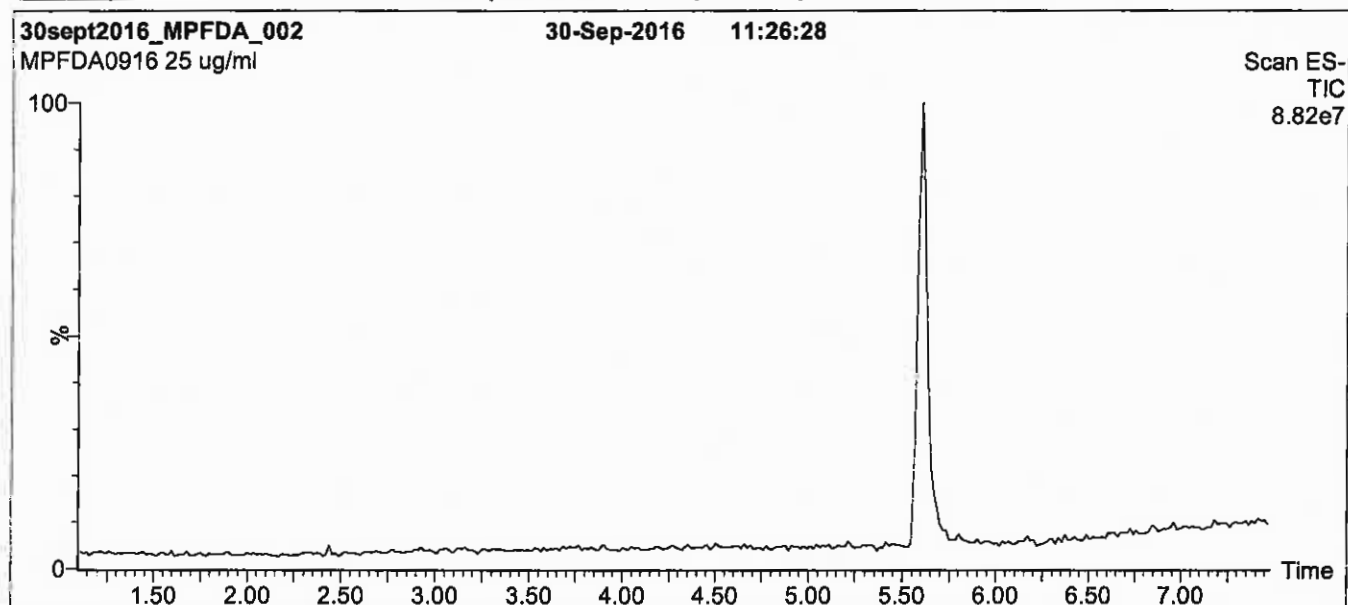
QUALITY MANAGEMENT:

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: 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

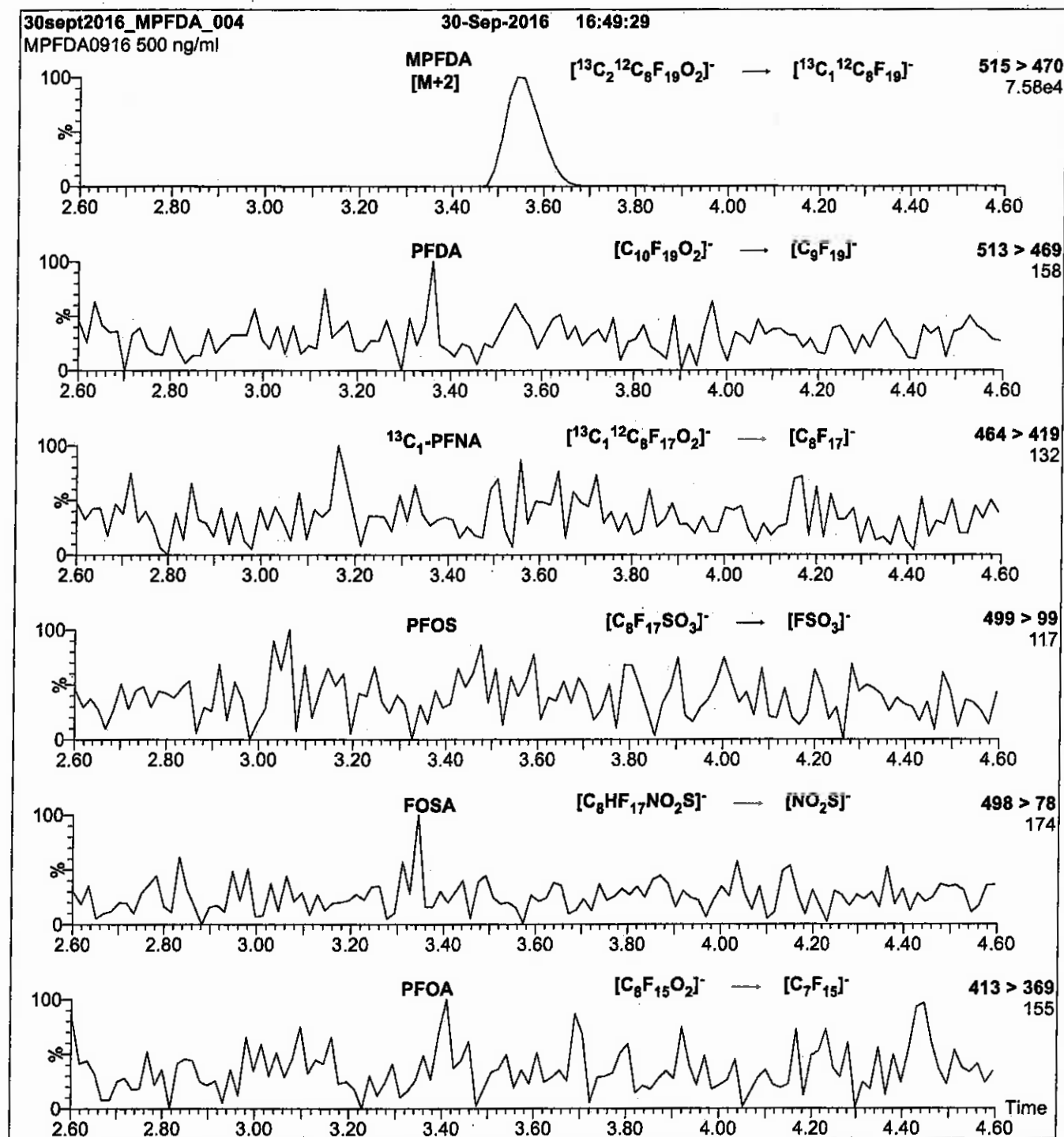
Flow: 300 μ l/min

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% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 μ l/min

MS Parameters

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

Reagent

LCMPFHxA_00013

R: SBC 12/21/16



814258

ID: LCMPFHxA_00013

Exp: 04/08/21 Ppdt: SBC

13C2-Perfluorohexanoic ac



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

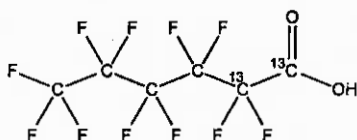
MPFHxA

LOT NUMBER:

MPFHxA0416

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

Not available

**MOLECULAR FORMULA:**¹³C₂¹²C₄HF₁₁O₂**CONCENTRATION:**

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

316.04

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

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

04/08/2016

(1,2-¹³C₂)**EXPIRY DATE:** (mm/dd/yyyy)

04/08/2021

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: 04/29/2016

(mm/dd/yyyy)

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

INTENDED USE:

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

HAZARDS:

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

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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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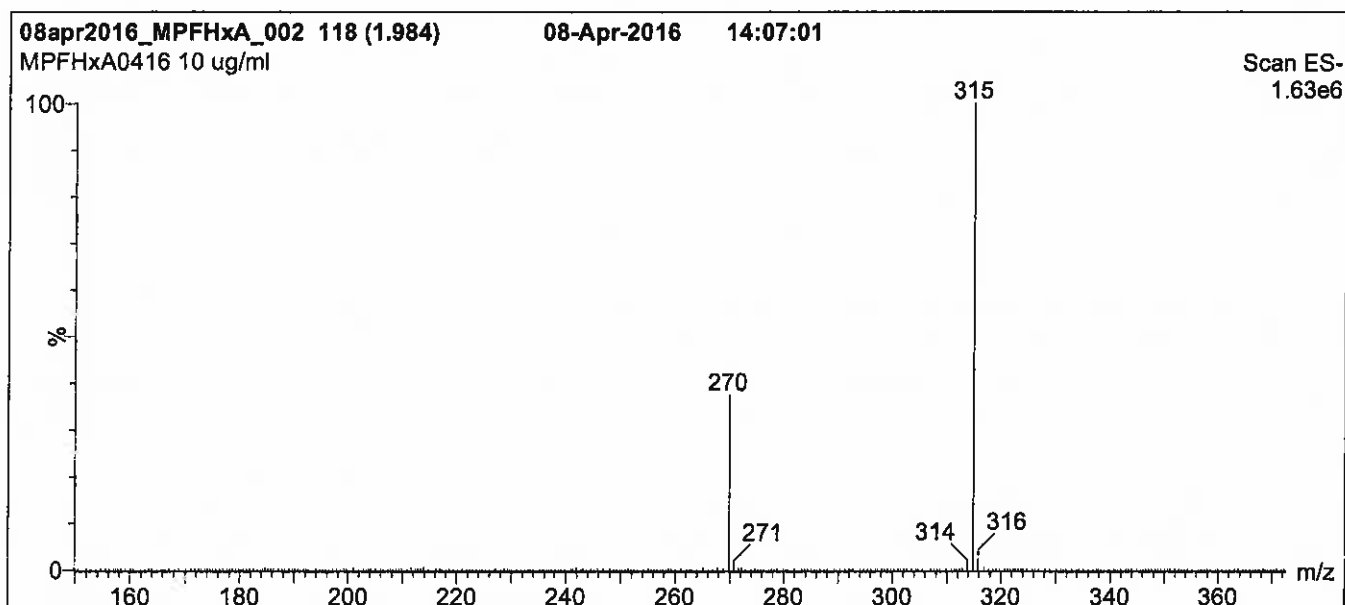
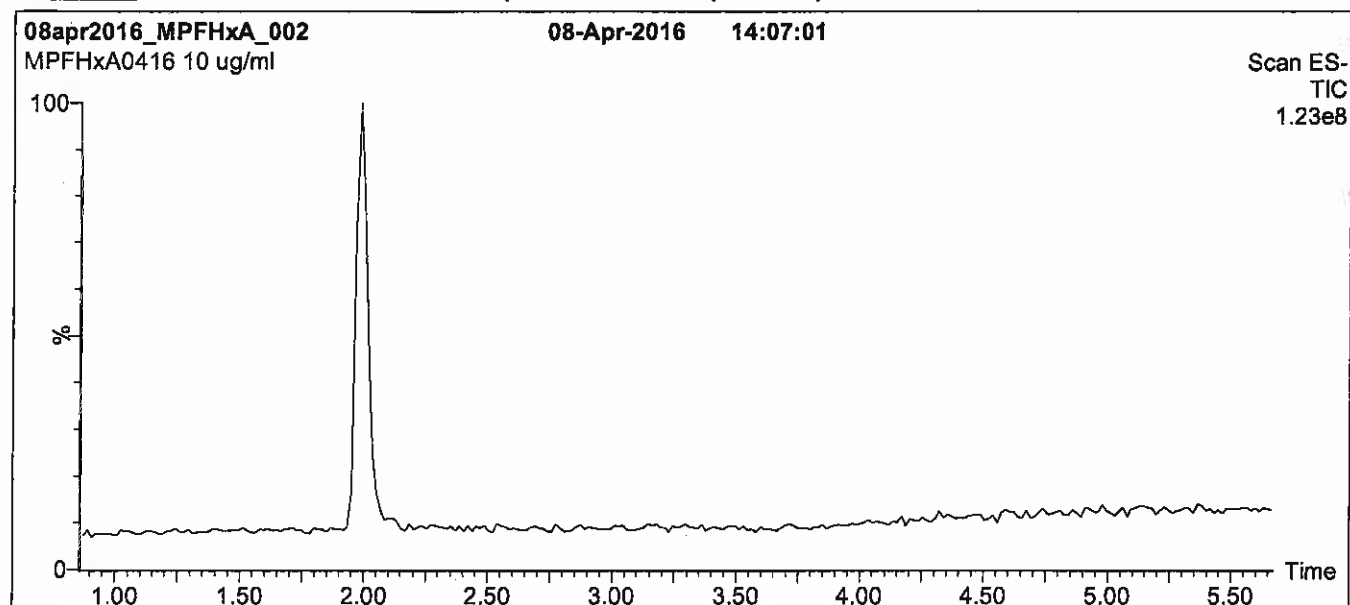
QUALITY MANAGEMENT:

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: 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: 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 over 0.5 min.

Time: 10 min

Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)

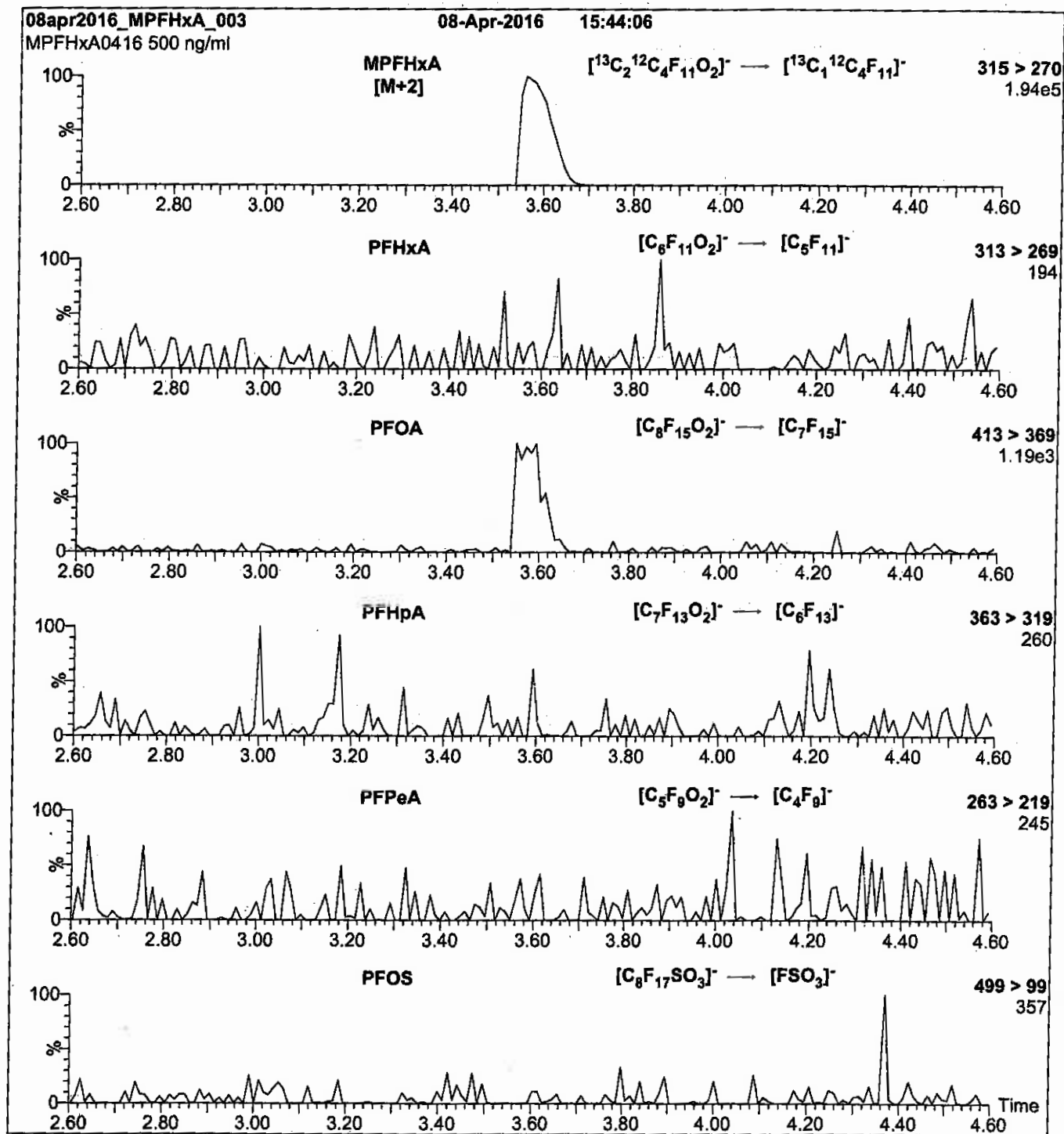
Capillary Voltage (kV) = 2.00

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) = $3.39\text{e-}3$
Collision Energy (eV) = 10

Reagent

LCMPFOS_00019

R: SBC 12/21/16



814253

ID: LCMFOS_00019

Exp: 08/03/21 Pipd: SBC

13C4-Perfluorooctanesulfo

WELLINGTON
LABORATORIESCERTIFICATE OF ANALYSIS
DOCUMENTATION**PRODUCT CODE:**

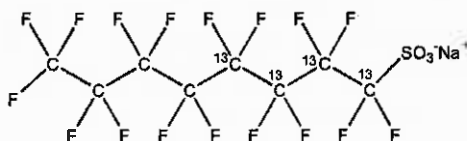
MPFOS

LOT NUMBER:

MPFOS0816

COMPOUND:Sodium perfluoro-1-[1,2,3,4-¹³C₄]octanesulfonate**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₄¹²C₄F₁₇SO₃Na**CONCENTRATION:**

50.0 ± 2.5 µg/ml (Na salt)

47.8 ± 2.4 µg/ml (MPFOS anion)

MOLECULAR WEIGHT:

526.08

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

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

08/03/2016

(1,2,3,4-¹³C₄)**EXPIRY DATE:** (mm/dd/yyyy)

08/03/2021

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.8% Sodium perfluoro-1-[1,2,3-¹³C₃]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 08/05/2016

(mm/dd/yyyy)

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

INTENDED USE:

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HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

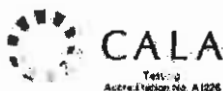
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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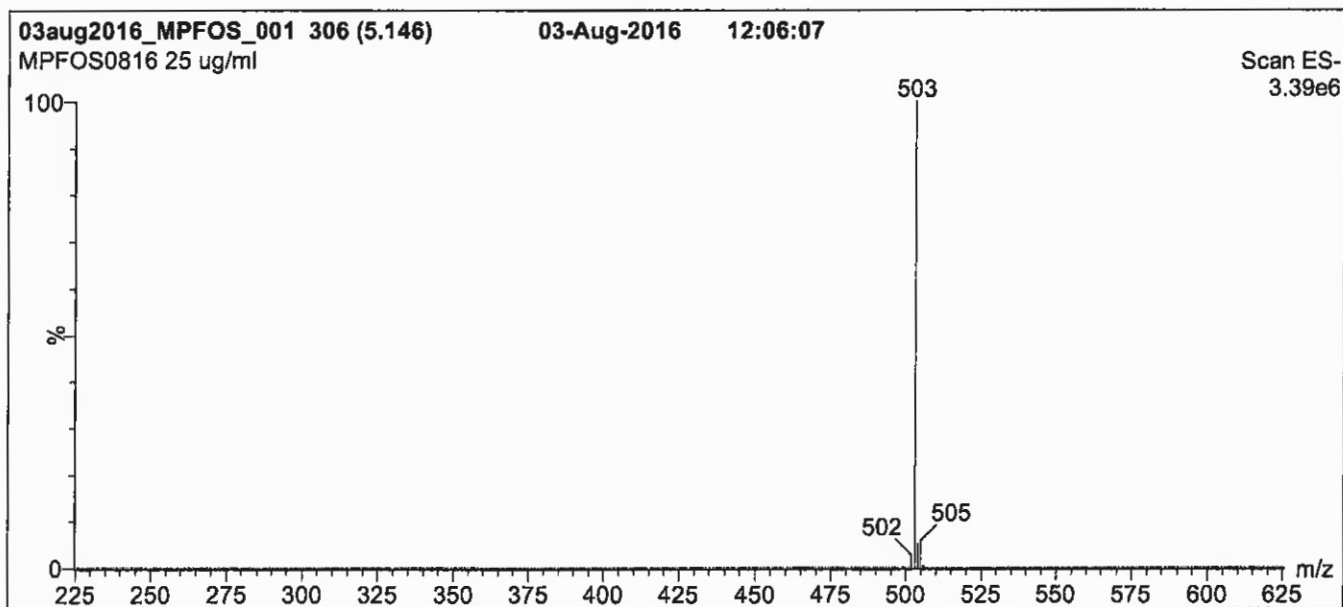
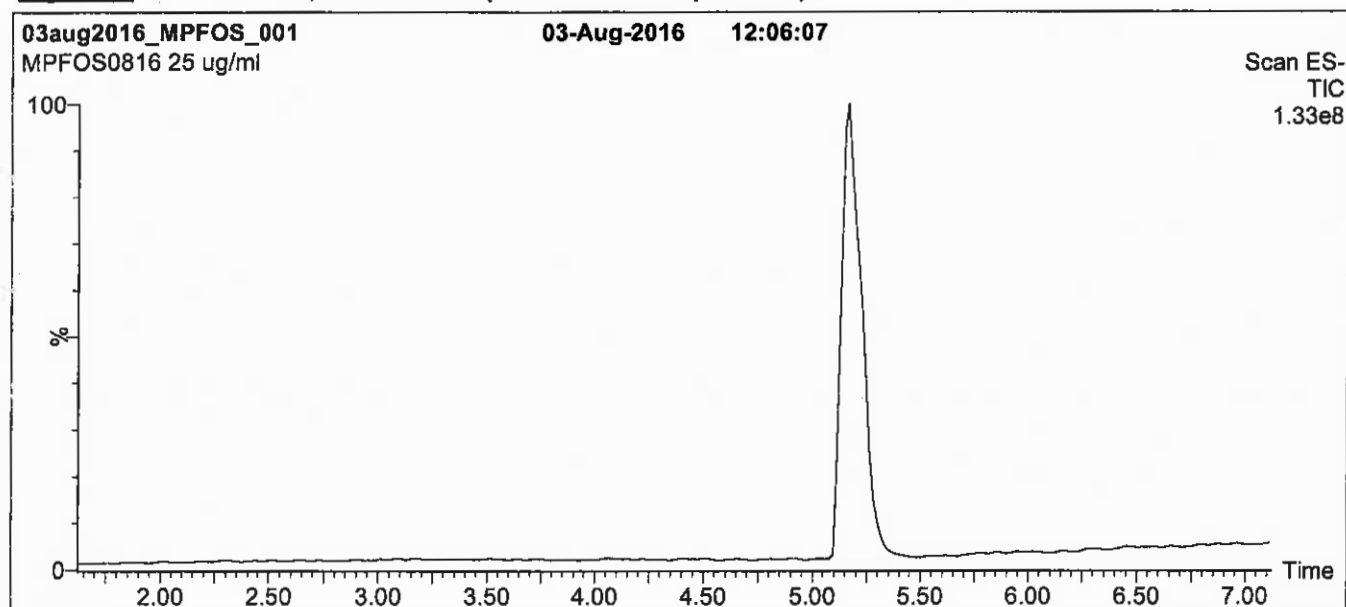
QUALITY MANAGEMENT:

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Figure 1: 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: 45% (80:20 MeOH:ACN) / 55% 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

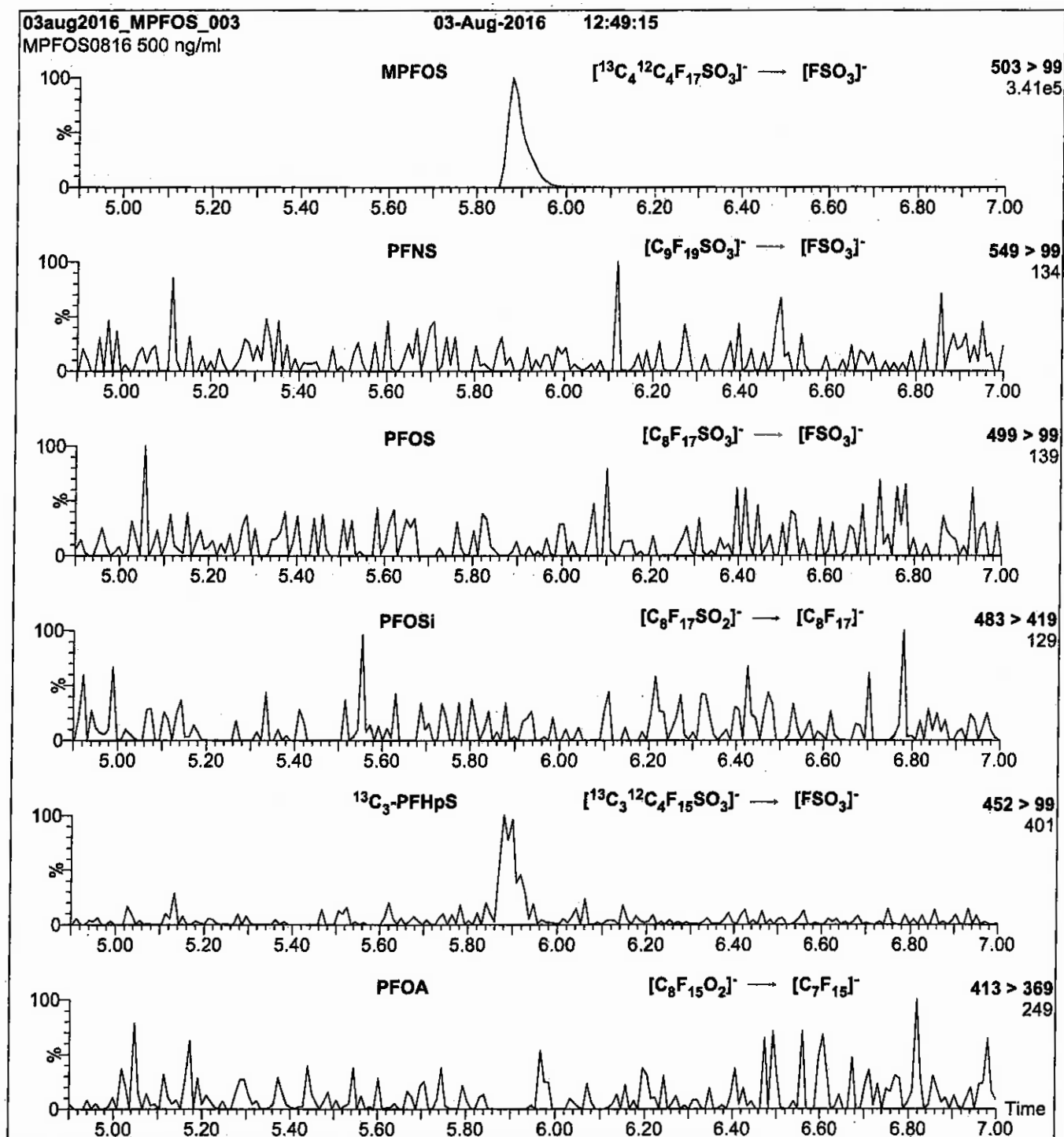
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

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

MS Parameters

Collision Gas (mbar) = 3.46e-3

Collision Energy (eV) = 40

Reagent

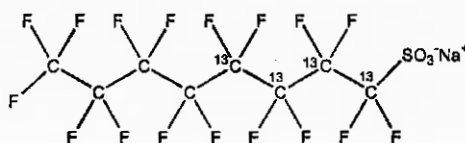
LCMPFOS_00021



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFOS **LOT NUMBER:** MPFOS1216
COMPOUND: Sodium perfluoro-1-[1,2,3,4-¹³C₄]octanesulfonate
STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₄¹²C₄F₁₇SO₃Na **MOLECULAR WEIGHT:** 526.08
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt) **SOLVENT(S):** Methanol
 47.8 ± 2.4 µg/ml (MPFOS anion)
CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥99% ¹³C
LAST TESTED: (mm/dd/yyyy) 12/12/2016 (1,2,3,4-¹³C₄)
EXPIRY DATE: (mm/dd/yyyy) 12/12/2021
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.8% Sodium perfluoro-1-[1,2,3-¹³C₃]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 12/14/2016

(mm/dd/yyyy)

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

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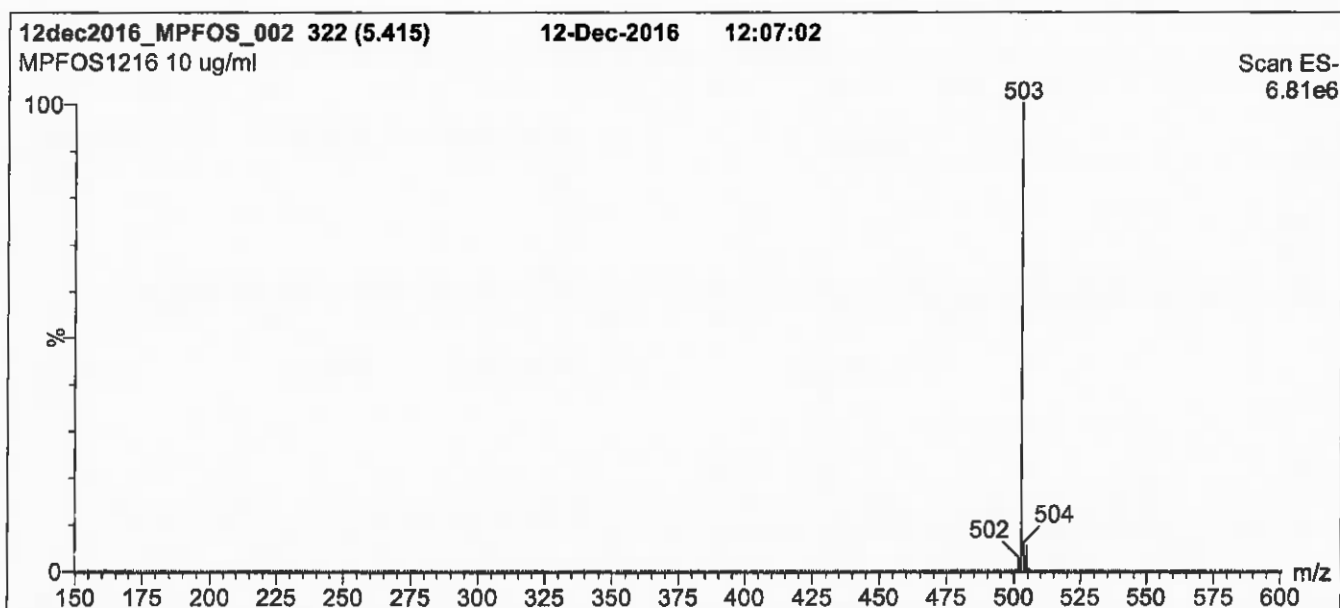
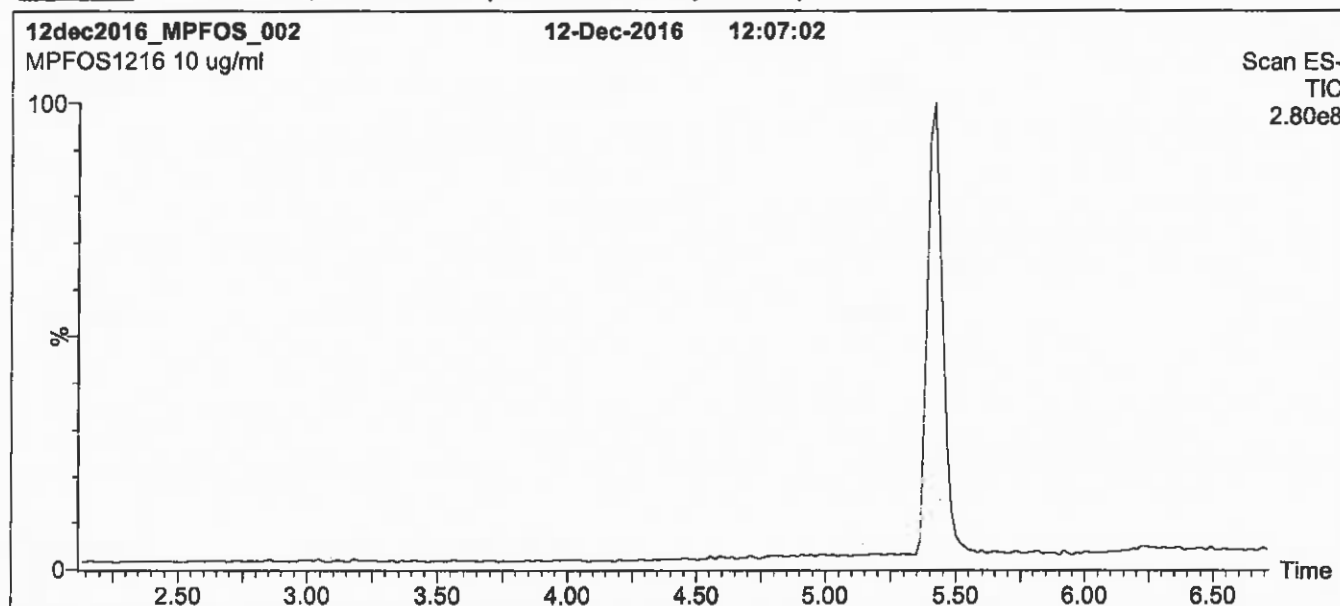
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Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

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

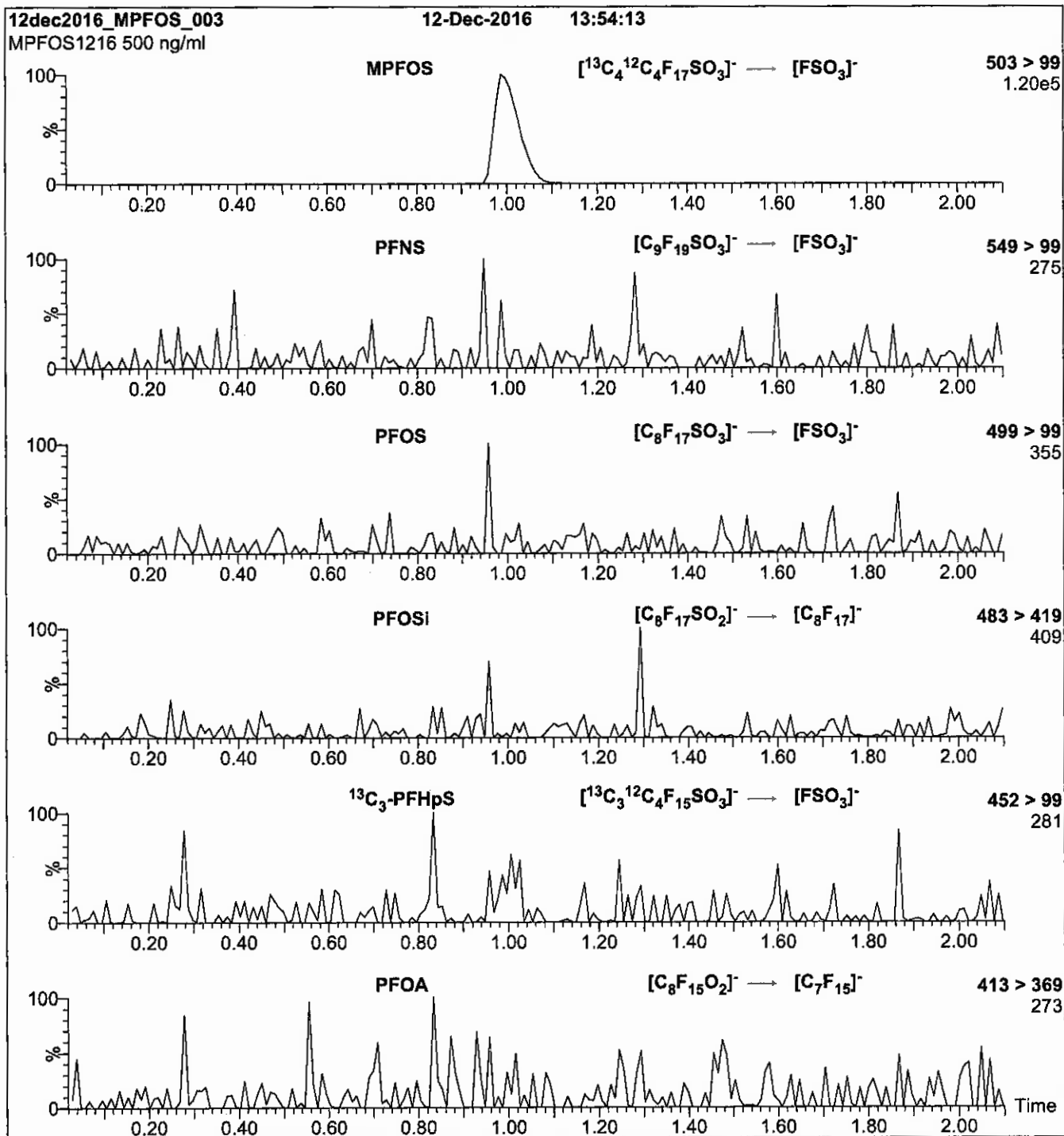
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

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

MS Parameters

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

Method 537 DOD

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

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1

SDG No.: _____

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
WGNA-072517-RW-484 2	320-30136-1	75	125
WGNA-072517-FRB-48 42	320-30136-2	87	113
	MB 320-177417/1-A	98	124
	LCS 320-177417/2-A	94	116
	LCSD 320-177417/3-A	97	132 Q

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.: 320-30136-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 2017.08.14_537B_004.d
 Lab ID: LCS 320-177417/2-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	300	323	108	70-130	E
Perfluorooctanoic acid (PFOA)	150	144	96	70-130	
Perfluorononanoic acid (PFNA)	144	164	113	70-130	E
Perfluorohexanesulfonic acid (PFHxS)	225	201	89	70-130	
Perfluoroheptanoic acid (PFHpA)	74.3	91.6	123	70-130	E
Perfluorobutanesulfonic acid (PFBS)	663	589	89	70-130	

Column to be used to flag recovery and RPD values

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 2017.08.14_537B_005.d
 Lab ID: LCSD 320-177417/3-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LCSD CONCENTRATION (ng/L)	LCSD % REC	% RPD	QC LIMITS		#
					RPD	REC	
Perfluorooctanesulfonic acid (PFOS)	300	315	105	3	30	70-130	
Perfluorooctanoic acid (PFOA)	150	145	97	0	30	70-130	
Perfluorononanoic acid (PFNA)	144	172	119	5	30	70-130	E
Perfluorohexanesulfonic acid (PFHxS)	225	198	88	2	30	70-130	
Perfluoroheptanoic acid (PFHpA)	74.3	89.2	120	3	30	70-130	E
Perfluorobutanesulfonic acid (PFBS)	663	575	87	3	30	70-130	

Column to be used to flag recovery and RPD values

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
SDG No.: _____
Lab File ID: 2017.08.14_537B_003.d Lab Sample ID: MB 320-177417/1-A
Matrix: Water Date Extracted: 08/03/2017 10:02
Instrument ID: A8_N Date Analyzed: 08/14/2017 19:33
Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-177417/2-A	2017.08.14_ 537B 004.d	08/14/2017 19:38
	LCSD 320-177417/3-A	2017.08.14_ 537B 005.d	08/14/2017 19:43
WGNA-072517-RW-4842	320-30136-1	2017.08.16_ 537B 024.d	08/16/2017 12:12
WGNA-072517-FRB-4842	320-30136-2	2017.08.16_ 537B 025.d	08/16/2017 12:17

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Instrument ID: A8_N Calibration Start Date: 08/14/2017 12:48
 GC Column: GeminiC18 3x100 ID: 3 (mm) Calibration End Date: 08/14/2017 13:12
 Calibration ID: 33517

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		2250916	1.95	5850602	2.21		
UPPER LIMIT		3376374	2.45	8775903	2.71		
LOWER LIMIT		1125458	1.45	2925301	1.71		
LAB SAMPLE ID	CLIENT SAMPLE ID						
CCVL 320-179319/9		2177935	1.94	5998180	2.20		
ICV 320-179319/11		1980065	1.94	5824653	2.19		
CCV 320-179510/1 CCVIS		2104942	1.91	5804729	2.17		
MB 320-177417/1-A		2249354	1.92	6501071	2.18		
LCS 320-177417/2-A		2259712	1.92	6216901	2.18		
LCSD 320-177417/3-A		2198507	1.91	6213934	2.17		
CCV 320-179510/13 CCVIS		2051129	1.92	5683418	2.17		
CCV 320-179701/13 CCVIS		2019138	1.95	5703707	2.19		
320-30136-1	WGNA-072517-RW-4842	4123283Q	1.94	10677081Q	2.17		
320-30136-2	WGNA-072517-FRB-4842	4735686Q	1.94	12242111Q	2.17		
CCV 320-179701/23 CCVIS		2060448	1.95	5883312	2.18		

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.: 320-30136-1
 SDG No.: _____
 Sample No.: CCV 320-179510/1 Date Analyzed: 08/14/2017 19:24
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2017.08.14_537B_001 Heated Purge: (Y/N) N
 Calibration ID: 33517

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	2104942	1.91	5804729	2.17		
UPPER LIMIT	2946919	2.41	8126621	2.67		
LOWER LIMIT	1473459	1.41	4063310	1.67		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-177417/1-A		2249354	1.92	6501071	2.18	
LCS 320-177417/2-A		2259712	1.92	6216901	2.18	
LCSD 320-177417/3-A		2198507	1.91	6213934	2.17	

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.: 320-30136-1
 SDG No.: _____
 Sample No.: CCV 320-179510/13 Date Analyzed: 08/14/2017 20:21
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2017.08.14_537B_013 Heated Purge: (Y/N) N
 Calibration ID: 33517

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	2051129	1.92	5683418	2.17		
UPPER LIMIT	2871581	2.42	7956785	2.67		
LOWER LIMIT	1435790	1.42	3978393	1.67		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-177417/1-A		2249354	1.92	6501071	2.18	
LCS 320-177417/2-A		2259712	1.92	6216901	2.18	
LCSD 320-177417/3-A		2198507	1.91	6213934	2.17	

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.: 320-30136-1
 SDG No.: _____
 Sample No.: CCV 320-179701/13 Date Analyzed: 08/16/2017 11:43
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2017.08.16_537B_018 Heated Purge: (Y/N) N
 Calibration ID: 33517

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	2019138	1.95	5703707	2.19		
UPPER LIMIT	2826793	2.45	7985190	2.69		
LOWER LIMIT	1413397	1.45	3992595	1.69		
LAB SAMPLE ID	CLIENT SAMPLE ID					
320-30136-1	WGNA-072517-RW-4842	4123283Q	1.94	10677081Q	2.17	
320-30136-2	WGNA-072517-FRB-4842	4735686Q	1.94	12242111Q	2.17	

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.: 320-30136-1
 SDG No.: _____
 Sample No.: CCV 320-179701/23 Date Analyzed: 08/16/2017 12:31
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2017.08.16_537B_028 Heated Purge: (Y/N) N
 Calibration ID: 33517

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	2060448	1.95	5883312	2.18		
UPPER LIMIT	2884627	2.45	8236637	2.68		
LOWER LIMIT	1442314	1.45	4118318	1.68		
LAB SAMPLE ID	CLIENT SAMPLE ID					
320-30136-1	WGNA-072517-RW-4842	4123283Q	1.94	10677081Q	2.17	
320-30136-2	WGNA-072517-FRB-4842	4735686Q	1.94	12242111Q	2.17	

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.: 320-30136-1
 SDG No.: _____
 Client Sample ID: WGNA-072517-RW-4842 Lab Sample ID: 320-30136-1
 Matrix: Water Lab File ID: 2017.08.16_537B_024.d
 Analysis Method: 537 Date Collected: 07/25/2017 12:50
 Extraction Method: 537 Date Extracted: 08/03/2017 10:02
 Sample wt/vol: 256.1 (mL) Date Analyzed: 08/16/2017 12:12
 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.: 179701 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	11	J	39	16	6.6
335-67-1	Perfluorooctanoic acid (PFOA)	12	J M	20	7.8	2.7
375-95-1	Perfluorononanoic acid (PFNA)	20	U	23	20	7.8
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	29	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.1	J	9.8	3.9	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	88	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	75		70-130
STL00996	13C2 PFDA	125		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\2017.08.16_537B_024.d
 Lims ID: 320-30136-A-1-B
 Client ID: WGNA-072517-RW-4842
 Sample Type: Client
 Inject. Date: 16-Aug-2017 12:12:22 ALS Bottle#: 14 Worklist Smp#: 19
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-30136-a-1-b
 Misc. Info.: Plate: 1 Rack: 3
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 16-Aug-2017 14:31:07 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d
 Column 1 : Det: EXP1
 Process Host: XAWRK009

First Level Reviewer: barnettj

Date: 16-Aug-2017 14:11:30

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.442	1.453	-0.011	1.000	594069	1.42		64.6	
298.90 > 99.00	1.434	1.453	-0.019	0.995	384370		1.55(0.00-0.00)	80.5	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.582	-0.004	1.000	3303758	7.49		6308	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.745	1.742	0.003	1.000	705365	1.27		75.4	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.745	1.742	0.003	1.000	368270	1.04		20.6	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.942	1.955	-0.013	1.000	1164419	3.11		59.8	M
413.00 > 169.00	1.942	1.955	-0.013	1.000	670746		1.74(0.00-0.00)	548	M
* 6 13C2-PFOA									
415.00 > 370.00	1.942	1.955	-0.013		4123283	10.0		8319	S
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.170	2.177	-0.007	1.000	985861	2.87		226	
499.00 > 99.00	2.170	2.177	-0.007	1.000	161914		6.09(0.00-0.00)	115	
* 7 13C4 PFOS									
503.00 > 80.00	2.170	2.205	-0.035		10677081	28.7		4310	S
9 Perfluorononanoic acid									
463.00 > 419.00	2.177	2.213	-0.036	1.000	137321	0.5879		5.4	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.322	2.354	-0.032	1.000	3027682	12.5		8551	

QC Flag Legend

Processing Flags

s - Failed ISTD Recovery Test

Review Flags

M - Manually Integrated

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\2017.08.16_537B_024.d

Injection Date: 16-Aug-2017 12:12:22

Instrument ID: A8_N

Lims ID: 320-30136-A-1-B

Lab Sample ID: 320-30136-1

Client ID: WGNA-072517-RW-4842

Operator ID: SACINSTLCMS01

ALS Bottle#: 14

Worklist Smp#: 19

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

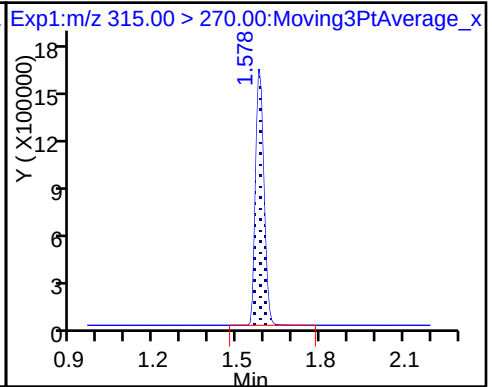
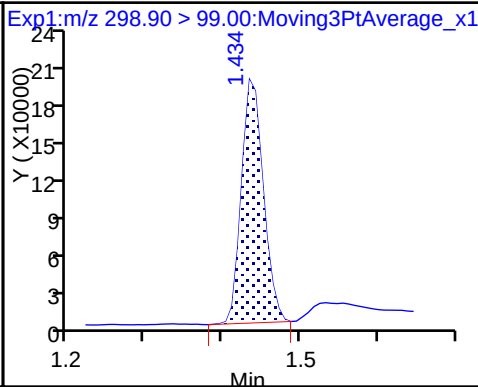
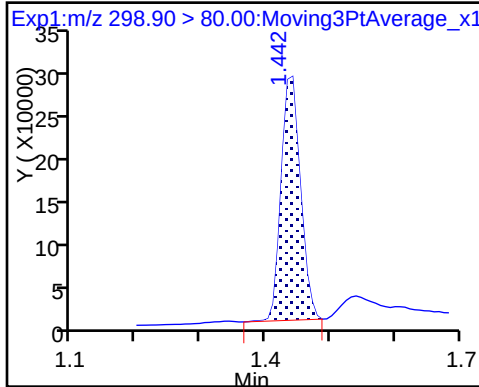
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

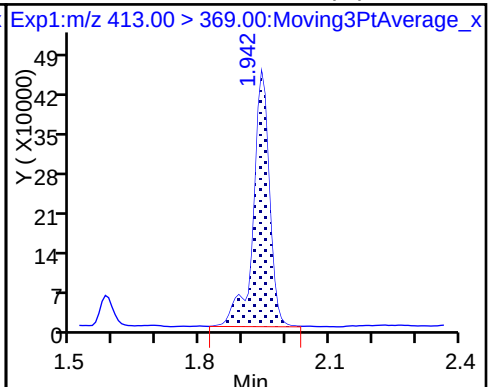
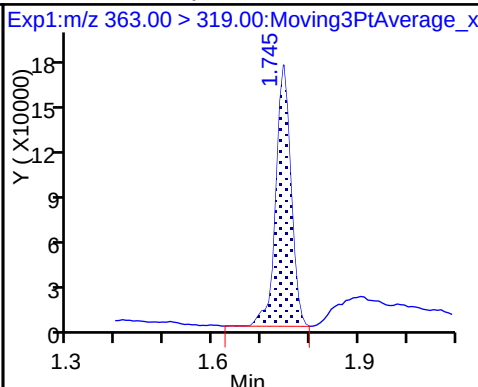
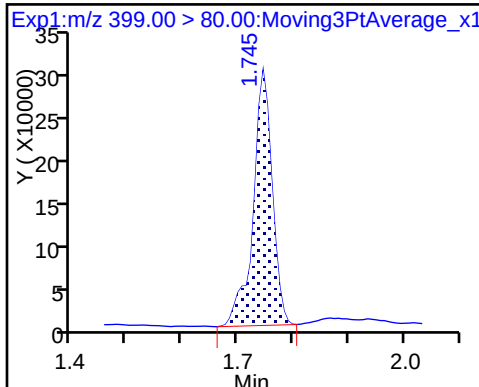
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

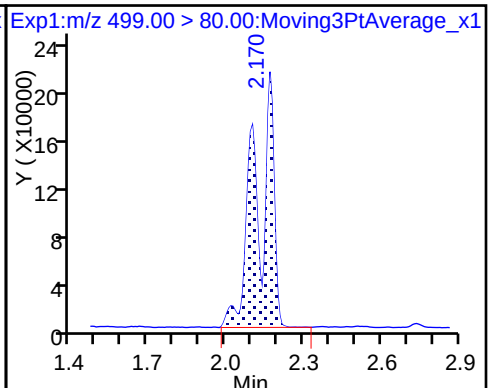
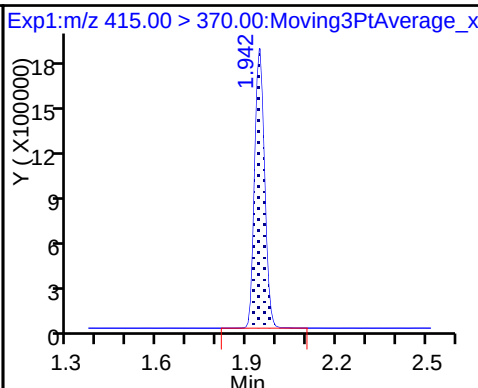
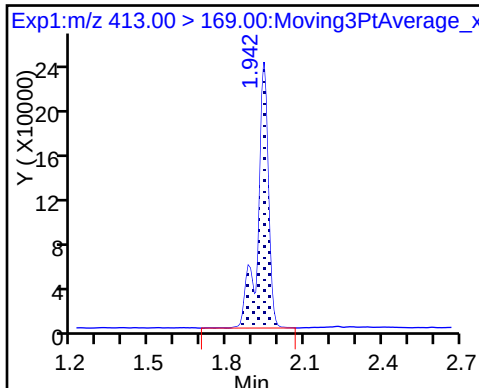
5 Perfluorooctanoic acid (M)



5 Perfluorooctanoic acid

* 6 13C2-PFOA

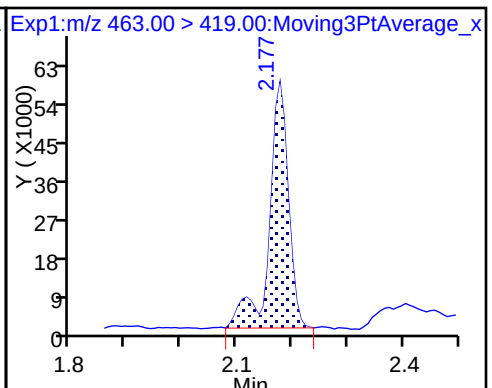
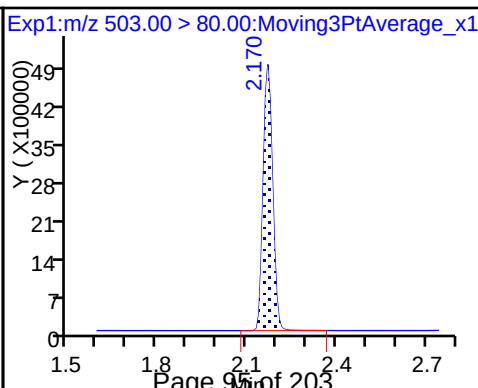
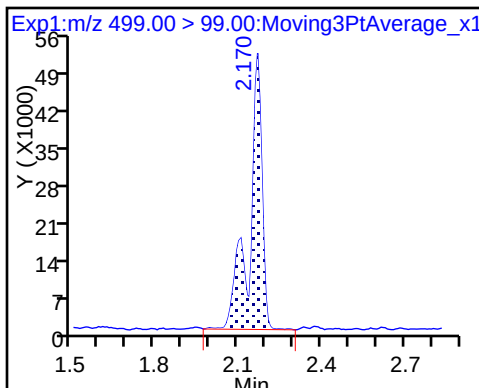
8 Perfluorooctane sulfonic acid



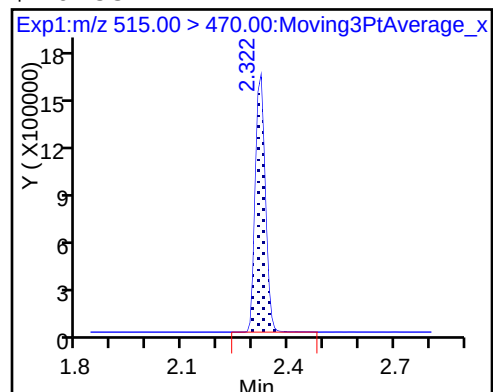
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\2017.08.16_537B_024.d
Lims ID: 320-30136-A-1-B
Client ID: WGNA-072517-RW-4842
Sample Type: Client
Inject. Date: 16-Aug-2017 12:12:22 ALS Bottle#: 14 Worklist Smp#: 19
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-30136-a-1-b
Misc. Info.: Plate: 1 Rack: 3
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Method: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 16-Aug-2017 14:31:07 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d
Column 1 : Det: EXP1
Process Host: XAWRK009

First Level Reviewer: barnettj

Date: 16-Aug-2017 14:11:30

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	7.49	74.93
\$ 10 13C2 PFDA	10.0	12.5	124.95

TestAmerica Sacramento

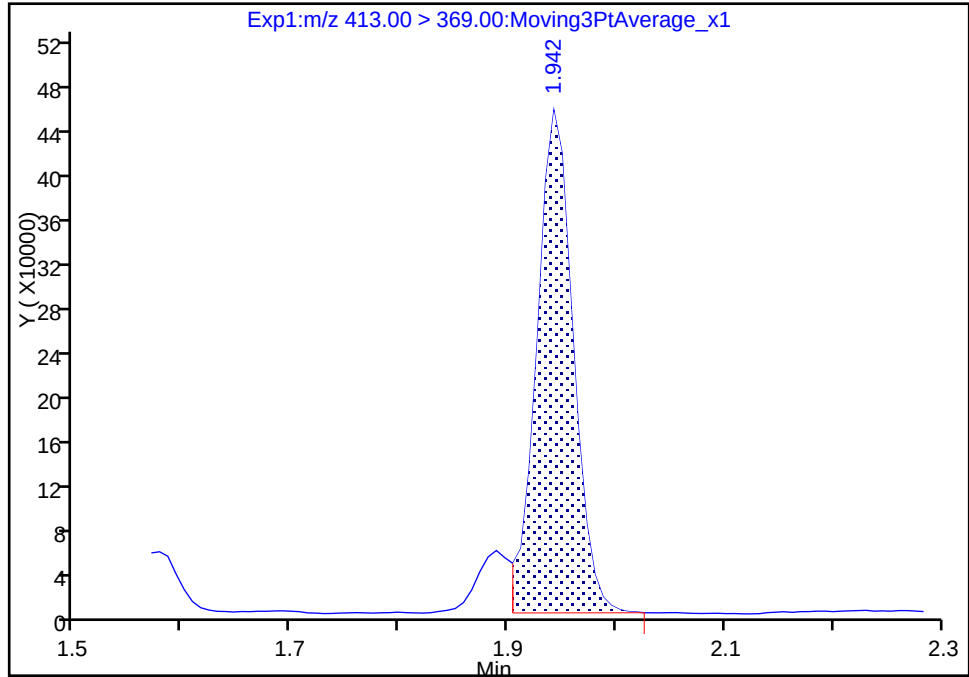
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\2017.08.16_537B_024.d				
Injection Date:	16-Aug-2017 12:12:22	Instrument ID:	A8_N		
Lims ID:	320-30136-A-1-B	Lab Sample ID:	320-30136-1		
Client ID:	WGNA-072517-RW-4842				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	14	Worklist Smp#:	19
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	537_A8_N	Limit Group:	LC 537 ICAL		
Column:		Detector:	EXP1		

5 Perfluorooctanoic acid, CAS: 335-67-1

Signal: 1

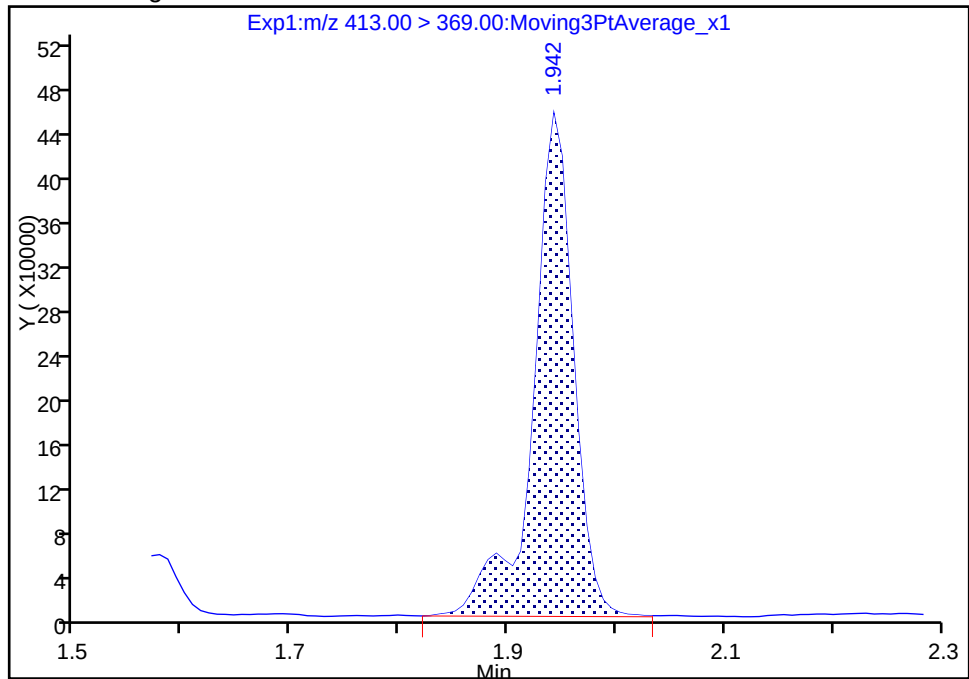
RT: 1.94
Area: 1042707
Amount: 2.788623
Amount Units: ng/ml

Processing Integration Results



RT: 1.94
Area: 1164419
Amount: 3.114131
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 16-Aug-2017 14:12:56
Audit Action: Manually Integrated

Audit Reason: Isomers

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-30136-1</u>
SDG No.: _____	
Client Sample ID: <u>WGNA-072517-FRB-4842</u>	Lab Sample ID: <u>320-30136-2</u>
Matrix: <u>Water</u>	Lab File ID: <u>2017.08.16_537B_025.d</u>
Analysis Method: <u>537</u>	Date Collected: <u>07/25/2017 12:45</u>
Extraction Method: <u>537</u>	Date Extracted: <u>08/03/2017 10:02</u>
Sample wt/vol: <u>258.6(mL)</u>	Date Analyzed: <u>08/16/2017 12:17</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>179701</u>	Units: <u>ng/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	39	15	6.6
335-67-1	Perfluorooctanoic acid (PFOA)	7.7	U	19	7.7	2.7
375-95-1	Perfluorononanoic acid (PFNA)	19	U	23	19	7.7
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	29	12	5.3
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.9	U	9.7	3.9	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	87	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	87		70-130
STL00996	13C2 PFDA	113		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\2017.08.16_537B_025.d
 Lims ID: 320-30136-A-2-B
 Client ID: WGNA-072517-FRB-4842
 Sample Type: Client
 Inject. Date: 16-Aug-2017 12:17:06 ALS Bottle#: 15 Worklist Smp#: 20
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-30136-a-2-b
 Misc. Info.: Plate: 1 Rack: 3
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 16-Aug-2017 14:31:07 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK009

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.586	1.582	0.004	1.000	4390841	8.67		7813	
* 6 13C2-PFOA									s
415.00 > 370.00	1.942	1.955	-0.013		4735686	10.0		8264	
* 7 13C4 PFOS									s
503.00 > 80.00	2.170	2.205	-0.035		12242111	28.7		6627	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.322	2.354	-0.032	1.000	3145270	11.3		8099	

QC Flag Legend

Processing Flags

s - Failed ISTD Recovery Test

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\2017.08.16_537B_025.d

Injection Date: 16-Aug-2017 12:17:06

Instrument ID: A8_N

Lims ID: 320-30136-A-2-B

Lab Sample ID: 320-30136-2

Client ID: WGNA-072517-FRB-4842

Operator ID: SACINSTLCMS01

ALS Bottle#: 15

Worklist Smp#: 20

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

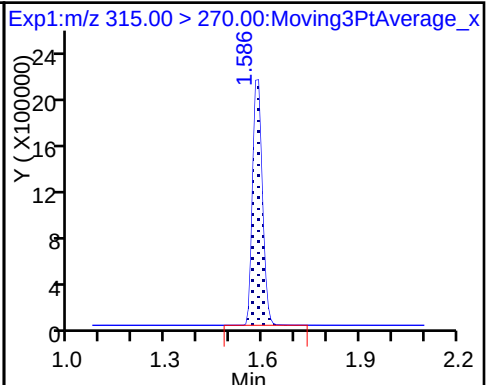
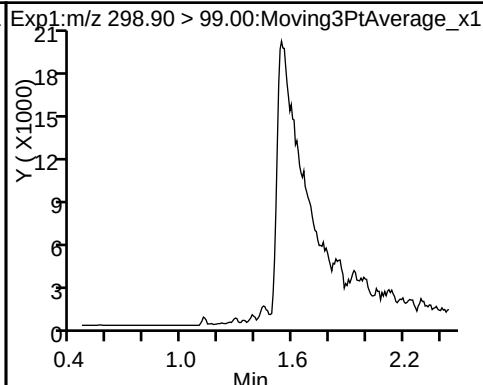
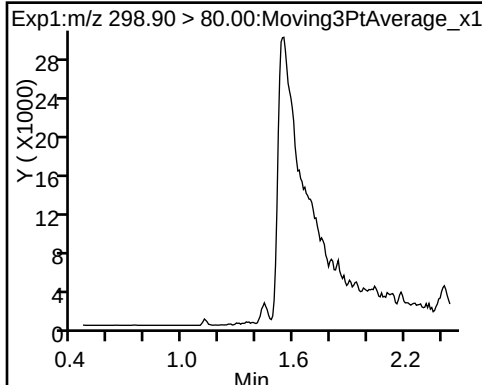
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid (ND)

1 Perfluorobutanesulfonic acid (ND)

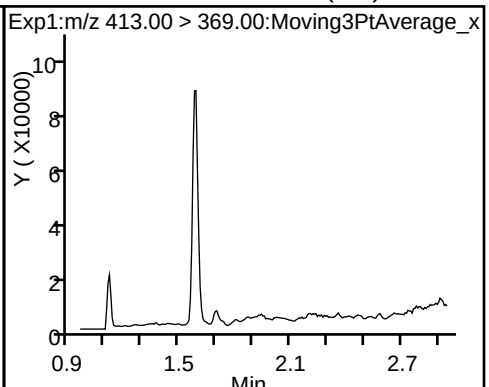
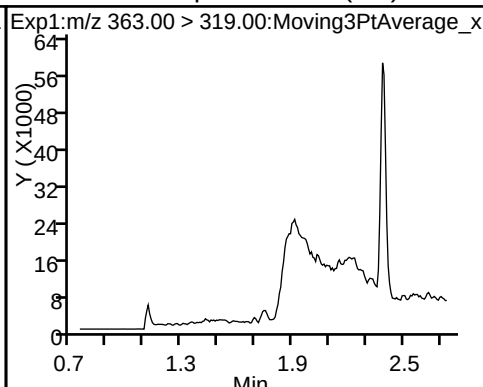
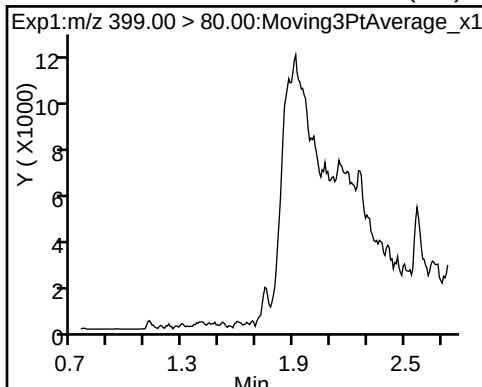
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid (ND)

4 Perfluoroheptanoic acid (ND)

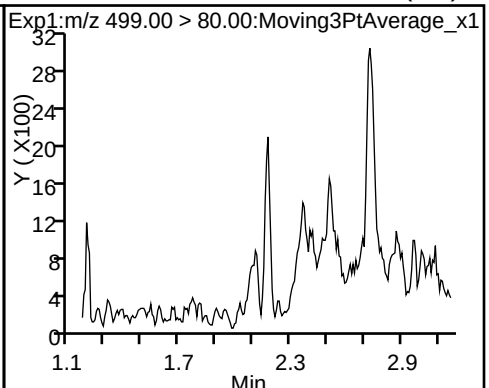
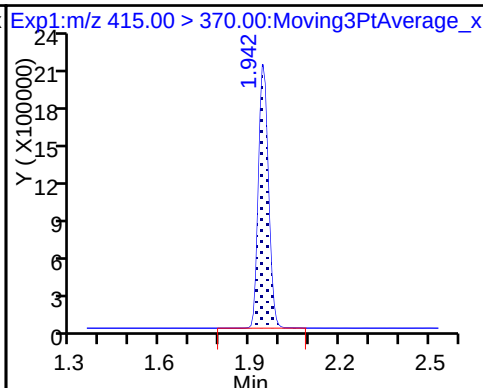
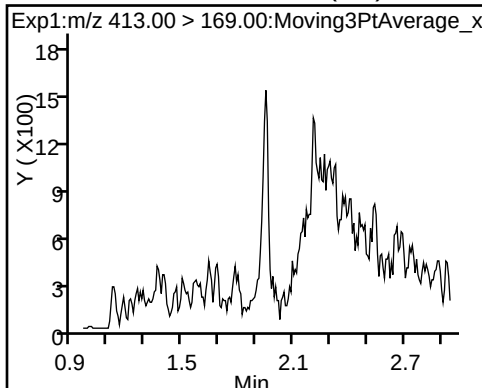
5 Perfluorooctanoic acid (ND)



5 Perfluorooctanoic acid (ND)

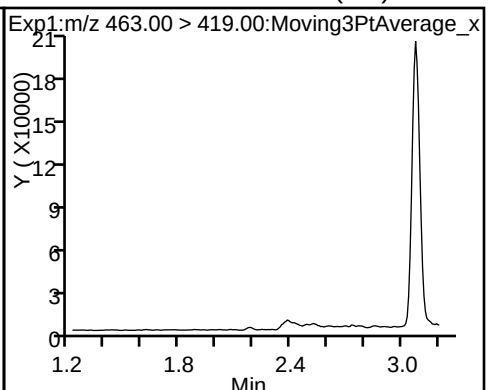
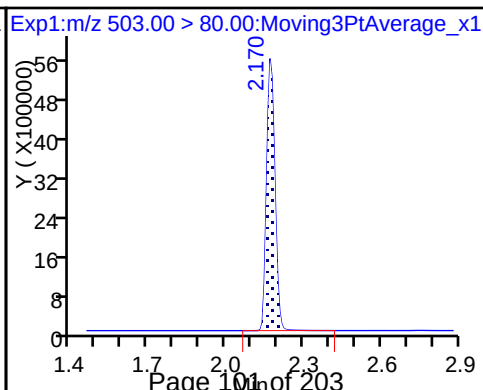
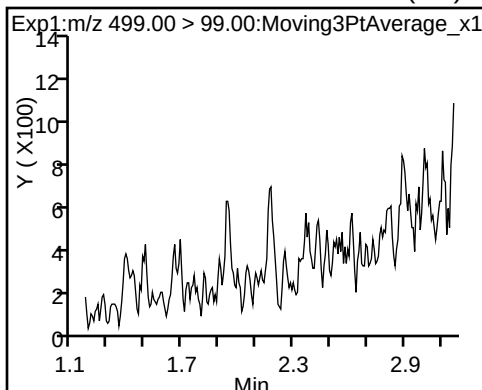
* 6 13C2-PFOA

8 Perfluorooctane sulfonic acid (ND)

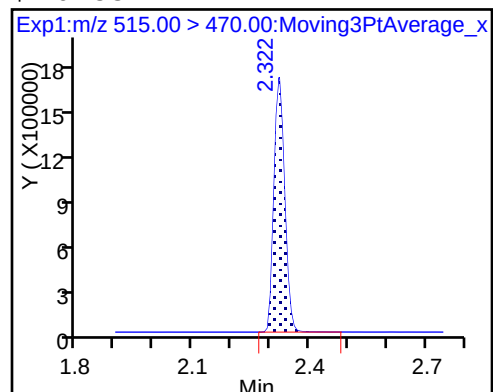


8 Perfluorooctane sulfonic acid (ND) * 7 13C4 PFOS

9 Perfluorononanoic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\2017.08.16_537B_025.d
Lims ID: 320-30136-A-2-B
Client ID: WGNA-072517-FRB-4842
Sample Type: Client
Inject. Date: 16-Aug-2017 12:17:06 ALS Bottle#: 15 Worklist Smp#: 20
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-30136-a-2-b
Misc. Info.: Plate: 1 Rack: 3
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Method: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 16-Aug-2017 14:31:07 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK009

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	8.67	86.71
\$ 10 13C2 PFDA	10.0	11.3	113.02

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

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1 Analy Batch No.: 179319

SDG No.: _____

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

Calibration Start Date: 08/14/2017 12:48 Calibration End Date: 08/14/2017 13:12 Calibration ID: 33517

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-179319/2	2017.08.14_537ICAL_002.d
Level 2	IC 320-179319/3	2017.08.14_537ICAL_003.d
Level 3	IC 320-179319/4	2017.08.14_537ICAL_004.d
Level 4	IC 320-179319/5	2017.08.14_537ICAL_005.d
Level 5	IC 320-179319/6	2017.08.14_537ICAL_006.d
Level 6	IC 320-179319/7	2017.08.14_537ICAL_007.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)	1.1417 0.7313	1.1495	1.0943	0.9210	0.7959	QuaF		1.1266	-0.002254						0.9980		0.9600
Perfluoroheptanoic acid (PFHpA)	0.8346 0.8325	0.8724	0.8737	0.8715	0.8517	Ave		0.8560				2.2		30.0			
Perfluorohexanesulfonic acid (PFHxS)	1.4757 1.3970	1.5378	1.5080	1.5703	1.4756	Ave		1.4941				4.0		30.0			
Perfluorooctanoic acid (PFOA)	0.8851 0.9102	0.8837	0.8984	0.9375	0.9261	Ave		0.9068				2.4		30.0			
Perfluorooctanesulfonic acid (PFOS)	0.8922 0.9252	0.9148	0.9148	0.9461	0.9486	Ave		0.9236				2.3		30.0			
Perfluorononanoic acid (PFNA)	0.5491 0.5714	0.5670	0.5764	0.5665	0.5686	Ave		0.5665				1.6		30.0			
13C2 PFHxA	1.0141 1.0999	1.0032	1.0998	1.0933	1.1053	Ave		1.0693				4.4		30.0			
13C2 PFDA	0.5512 0.6012	0.5785	0.5919	0.5906	0.6127	Ave		0.5877				3.6		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.: 320-30136-1 Analy Batch No.: 179319

SDG No.: _____

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

Calibration Start Date: 08/14/2017 12:48 Calibration End Date: 08/14/2017 13:12 Calibration ID: 33517

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-179319/2	2017.08.14_537ICAL_002.d
Level 2	IC 320-179319/3	2017.08.14_537ICAL_003.d
Level 3	IC 320-179319/4	2017.08.14_537ICAL_004.d
Level 4	IC 320-179319/5	2017.08.14_537ICAL_005.d
Level 5	IC 320-179319/6	2017.08.14_537ICAL_006.d
Level 6	IC 320-179319/7	2017.08.14_537ICAL_007.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	QuaF	2176776 26040065	4858409	10071471	16707104	21165476	9.00 180	20.0	45.0	90.0	135
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	198176 3589599	455479	965342	1966143	2763295	1.00 20.0	2.22	5.00	10.0	15.0
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	938005 16584369	2166866	4626981	9496666	13083092	3.00 60.0	6.67	15.0	30.0	45.0
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	420599 7854398	923370	1986507	4232647	6012905	2.00 40.0	4.45	10.0	20.0	30.0
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	756213 14645432	1718775	3742396	7629588	11213929	4.00 80.0	8.89	20.0	40.0	60.0
Perfluorononanoic acid (PFNA)	13PF OA	Ave	260762 4927051	592024	1273686	2556105	3689416	2.00 40.0	4.45	10.0	20.0	30.0
13C2 PFHxA	13PF OA	Ave	2407096 2370885	2356458	2429839	2465941	2390227	10.0 10.0	10.0	10.0	10.0	10.0
13C2 PFDA	13PF OA	Ave	1308306 1295768	1358920	1307668	1332089	1324957	10.0 10.0	10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD
QuaF = Quadratic ISTD forced zero

FORM VI
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1 Analy Batch No.: 179319

SDG No.: _____

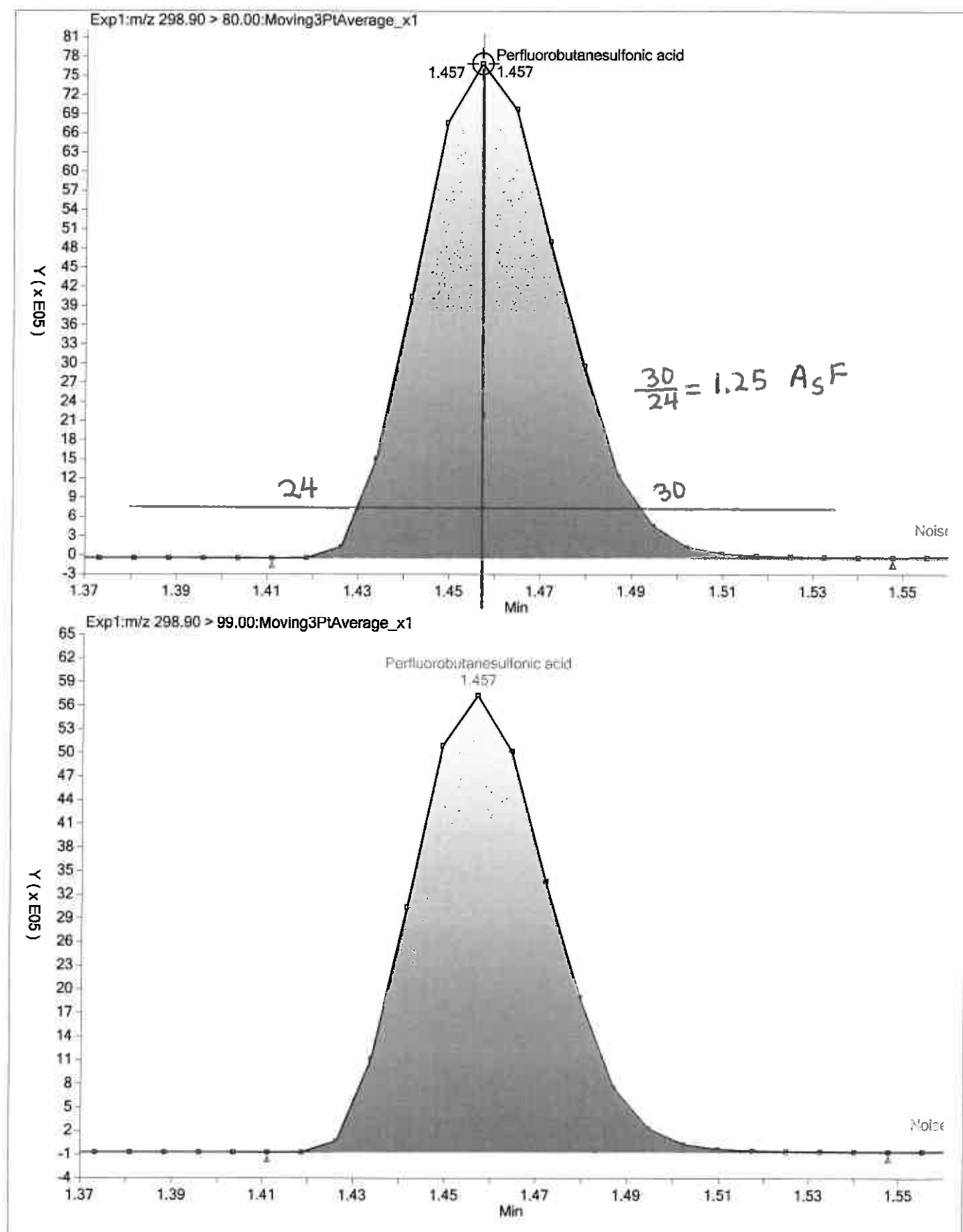
Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

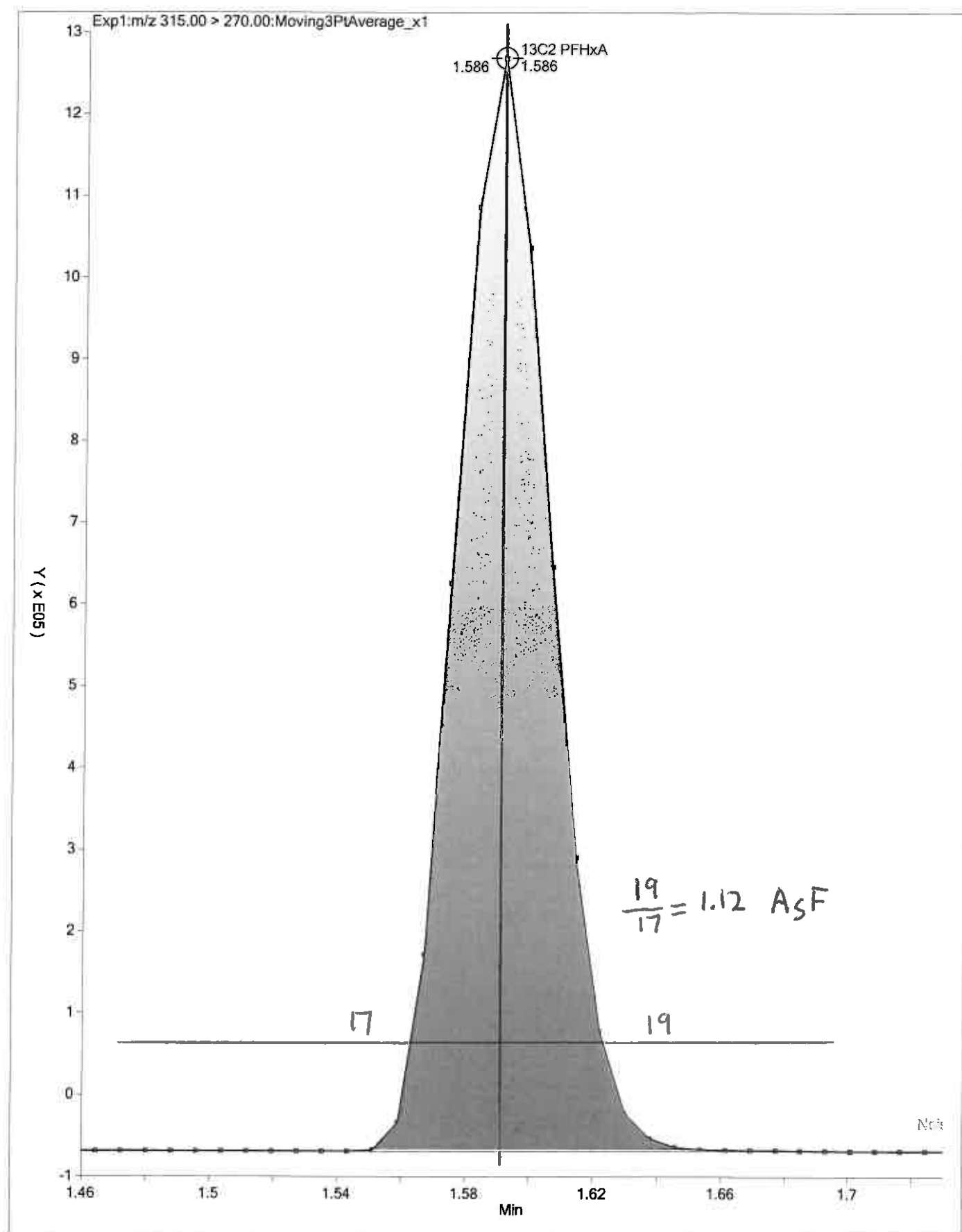
Calibration Start Date: 08/14/2017 12:48 Calibration End Date: 08/14/2017 13:12 Calibration ID: 33517

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-179319/2	2017.08.14_537ICAL_002.d
Level 2	IC 320-179319/3	2017.08.14_537ICAL_003.d
Level 3	IC 320-179319/4	2017.08.14_537ICAL_004.d
Level 4	IC 320-179319/5	2017.08.14_537ICAL_005.d
Level 5	IC 320-179319/6	2017.08.14_537ICAL_006.d
Level 6	IC 320-179319/7	2017.08.14_537ICAL_007.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)	3.3	6.6	7.5	-0.4	-5.0	3.4	50	50	50	50	50	50
Perfluoroheptanoic acid (PFHpA)	-2.5	1.9	2.1	1.8	-0.5	-2.8	50	50	50	50	50	50
Perfluorohexanesulfonic acid (PFHxS)	-1.2	2.9	0.9	5.1	-1.2	-6.5	50	50	50	50	50	50
Perfluorooctanoic acid (PFOA)	-2.4	-2.5	-0.9	3.4	2.1	0.4	50	50	50	50	50	50
Perfluorooctanesulfonic acid (PFOS)	-3.4	-1.0	-1.0	2.4	2.7	0.2	50	50	50	50	50	50
Perfluorononanoic acid (PFNA)	-3.1	0.1	1.7	0.0	0.4	0.9	50	50	50	50	50	50
13C2 PFHxA	-5.2	-6.2	2.9	2.2	3.4	2.9	30	30	30	30	30	30
13C2 PFDA	-6.2	-1.6	0.7	0.5	4.3	2.3	30	30	30	30	30	30





TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_002.d
 Lims ID: IC L1
 Client ID:
 Sample Type: IC Calib Level: 1
 Inject. Date: 14-Aug-2017 12:48:56 ALS Bottle#: 1 Worklist Smp#: 2
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: L1_537
 Misc. Info.: Plate: 1 Rack: 1
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Sublist: chrom-537_A8_N*sub1
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 14-Aug-2017 14:36:02 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK023

First Level Reviewer: phomsophat

Date: 14-Aug-2017 14:08:06

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.449	1.453	-0.004	1.000	2176776	9.30		309	
298.90 > 99.00	1.449	1.453	-0.004	1.000	1426588		1.53(0.00-0.00)	311	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.582	-0.004	1.000	2407096	9.48		6502	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.745	1.742	0.003	1.000	198176	0.9753		16.5	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.745	1.742	0.003	1.000	938005	2.96		150	
* 6 13C2-PFOA									
415.00 > 370.00	1.957	1.955	0.002		2373611	10.0		11876	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.957	1.955	0.002	1.000	420599	1.95		27.8	
413.00 > 169.00	1.957	1.955	0.002	1.000	229992		1.83(0.00-0.00)	416	
* 7 13C4 PFOS									
503.00 > 80.00	2.208	2.205	0.003		6074703	28.7		6398	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.215	2.208	0.007	1.000	756213	3.87		746	
499.00 > 99.00	2.208	2.208	0.0	0.997	158187		4.78(0.00-0.00)	215	
9 Perfluorononanoic acid									
463.00 > 419.00	2.215	2.213	0.002	1.000	260762	1.94		63.7	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.360	2.354	0.006	1.000	1308306	9.38		6900	

Reagents:

LC537-L1_00020

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_002.d

Injection Date: 14-Aug-2017 12:48:56

Instrument ID: A8_N

Lims ID: IC L1

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 1

Worklist Smp#: 2

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

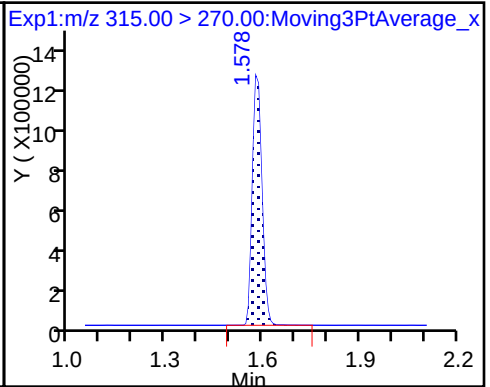
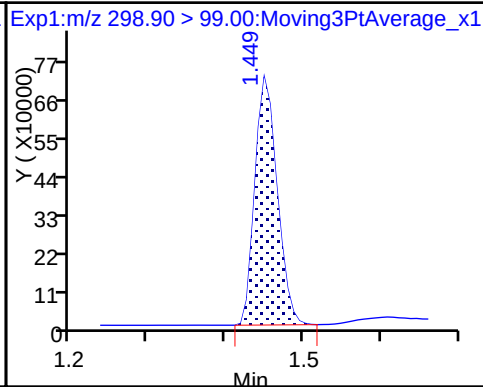
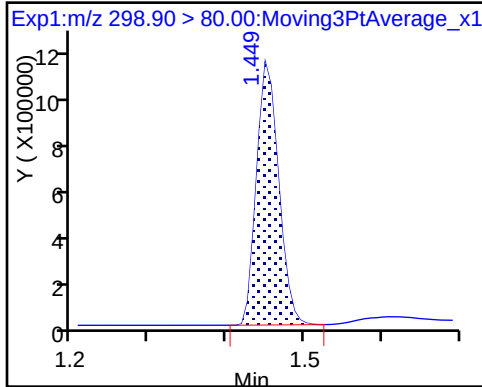
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

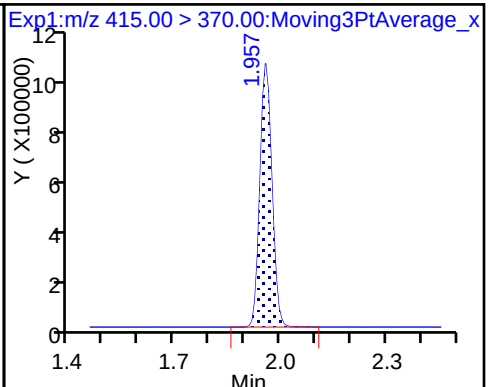
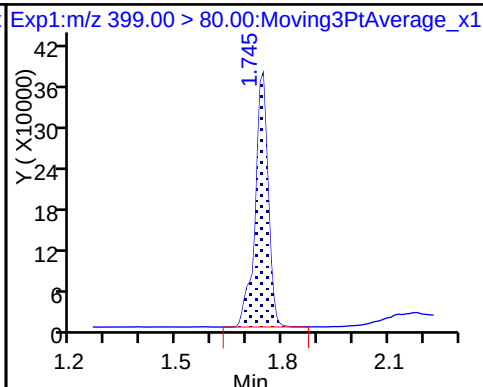
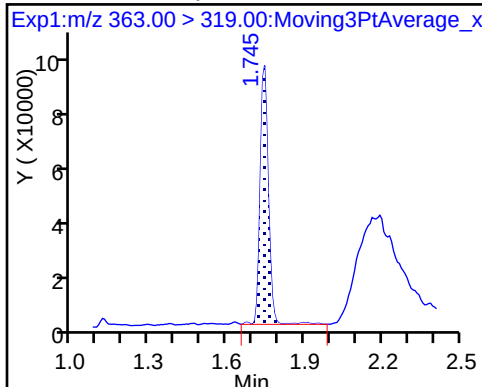
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

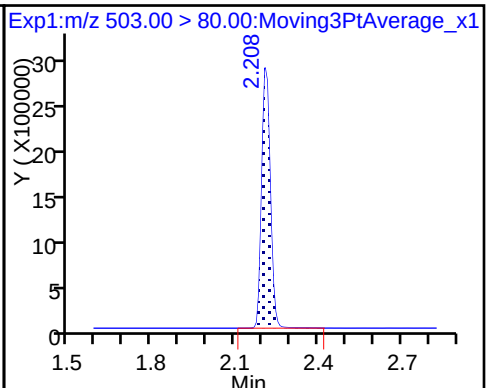
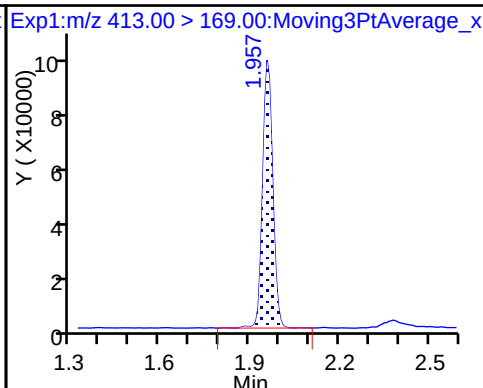
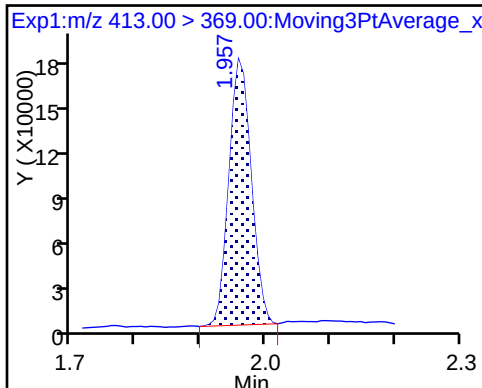
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

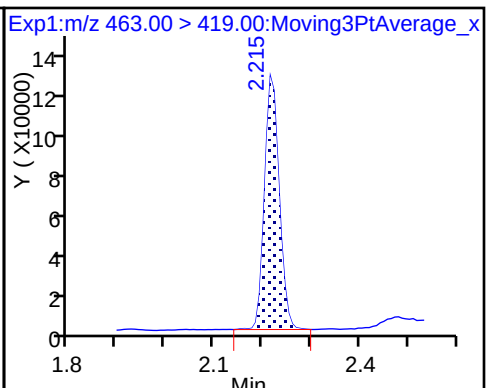
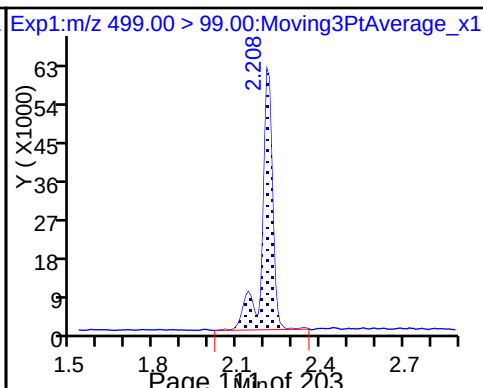
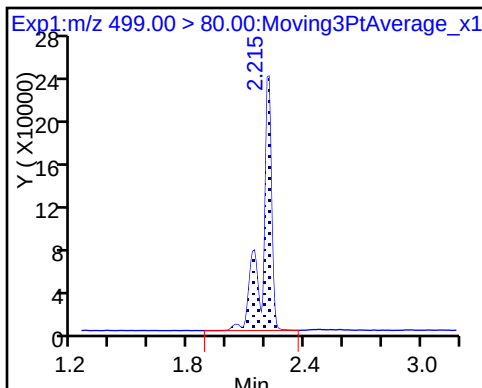
* 7 13C4 PFOS



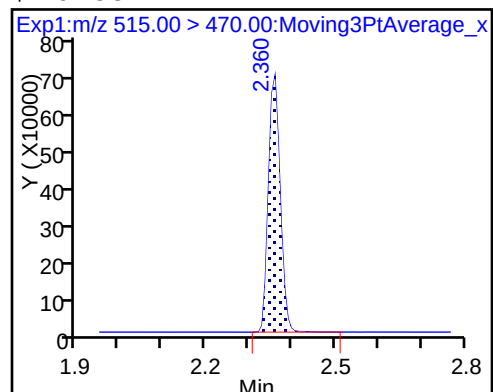
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_003.d
 Lims ID: IC L2
 Client ID:
 Sample Type: IC Calib Level: 2
 Inject. Date: 14-Aug-2017 12:53:41 ALS Bottle#: 2 Worklist Smp#: 3
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: L2_537
 Misc. Info.: Plate: 1 Rack: 1
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Sublist: chrom-537_A8_N*sub1
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 14-Aug-2017 14:36:03 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK023

First Level Reviewer: phomsophat

Date: 14-Aug-2017 14:08:26

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.457	1.453	0.004	1.000	4858409	21.3		661	
298.90 > 99.00	1.457	1.453	0.004	1.000	3160338		1.54(0.00-0.00)	670	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.586	1.582	0.004	1.000	2356458	9.38		6407	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.745	1.742	0.003	1.000	2166866	6.86		343	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.745	1.742	0.003	1.000	455479	2.27		38.5	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.957	1.955	0.002	1.000	923370	4.33		60.6	
413.00 > 169.00	1.957	1.955	0.002	1.000	484643		1.91(0.00-0.00)	845	
* 6 13C2-PFOA									
415.00 > 370.00	1.957	1.955	0.002		2348990	10.0		11507	
* 7 13C4 PFOS									
503.00 > 80.00	2.208	2.205	0.003		6060332	28.7		6159	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.215	2.208	0.007	1.000	1718775	8.81		1524	
499.00 > 99.00	2.215	2.208	0.007	1.000	367461		4.68(0.00-0.00)	477	
9 Perfluorononanoic acid									
463.00 > 419.00	2.215	2.213	0.002	1.000	592024	4.45		150	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.360	2.354	0.006	1.000	1358920	9.84		7130	

Reagents:

LC537-L2_00020

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_003.d

Injection Date: 14-Aug-2017 12:53:41

Instrument ID: A8_N

Lims ID: IC L2

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 3

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

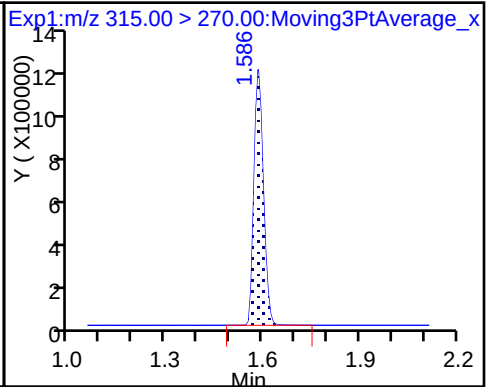
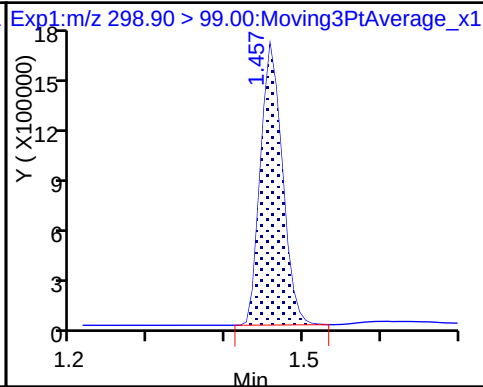
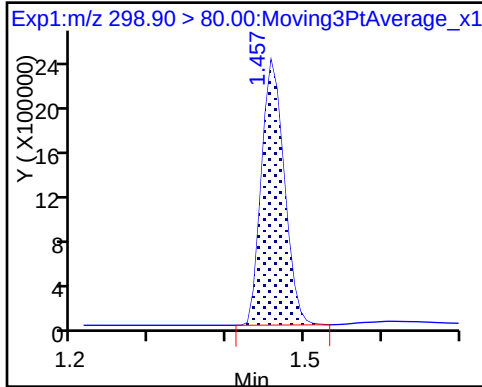
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

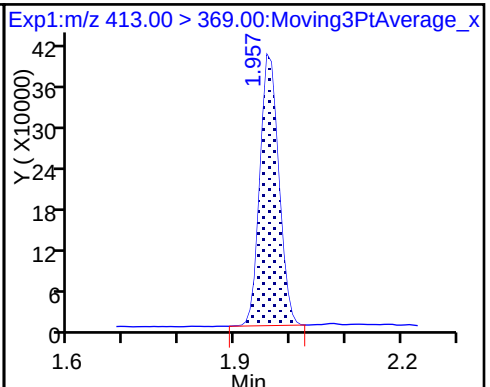
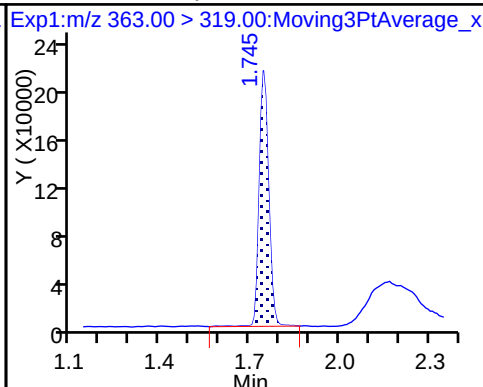
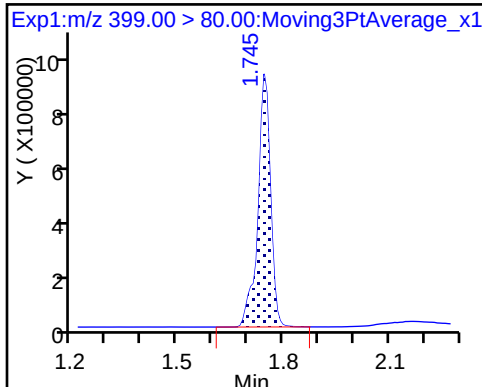
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

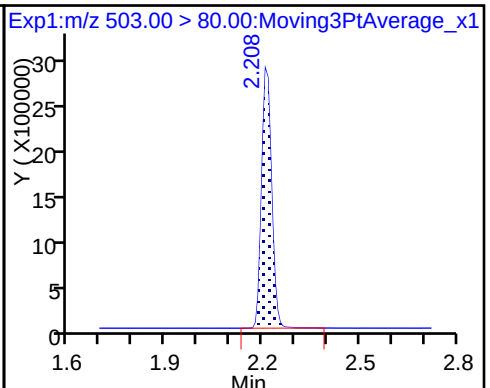
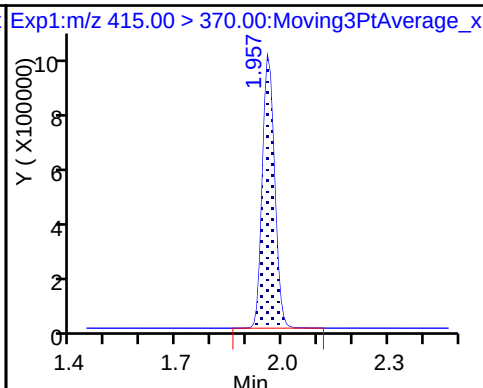
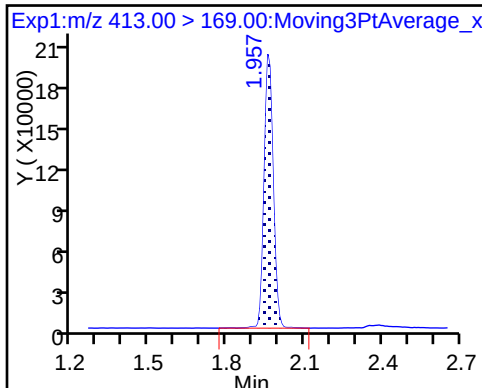
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

* 6 13C2-PFOA

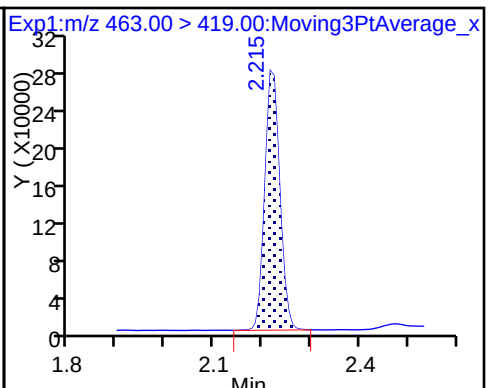
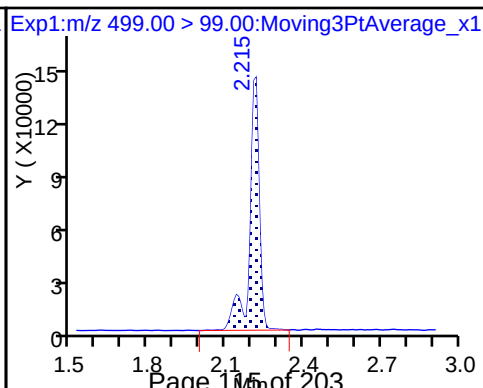
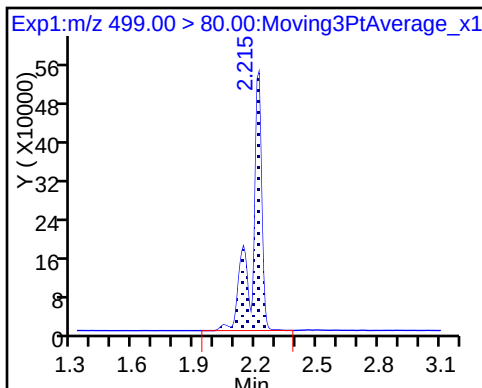
* 7 13C4 PFOS



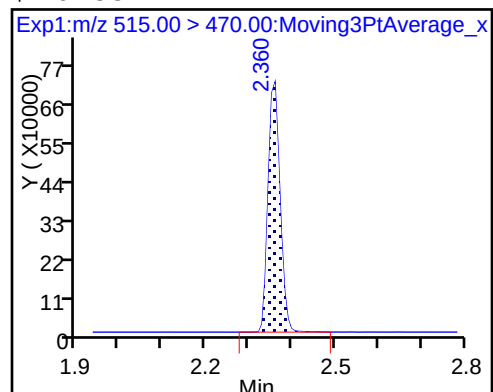
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_004.d
 Lims ID: IC L3
 Client ID:
 Sample Type: IC Calib Level: 3
 Inject. Date: 14-Aug-2017 12:58:26 ALS Bottle#: 3 Worklist Smp#: 4
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: L3_537
 Misc. Info.: Plate: 1 Rack: 1
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Sublist: chrom-537_A8_N*sub1
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 14-Aug-2017 14:36:04 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK023

First Level Reviewer: phomsophat

Date: 14-Aug-2017 14:08:41

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.457	1.453	0.004	1.000	10071471	48.4		1362	
298.90 > 99.00	1.457	1.453	0.004	1.000	6755881		1.49(0.00-0.00)	1317	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.586	1.582	0.004	1.000	2429839	10.3		6722	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.745	1.742	0.003	1.000	965342	5.10		85.2	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.745	1.742	0.003	1.000	4626981	15.1		718	
* 6 13C2-PFOA									
415.00 > 370.00	1.957	1.955	0.002		2209361	10.0		11698	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.957	1.955	0.002	1.000	1986507	9.92		125	
413.00 > 169.00	1.957	1.955	0.002	1.000	1014880		1.96(0.00-0.00)	1650	
* 7 13C4 PFOS									
503.00 > 80.00	2.208	2.205	0.003		5865253	28.7		6014	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.208	2.208	0.0	1.000	3742396	19.8		2971	
499.00 > 99.00	2.208	2.208	0.0	1.000	760295		4.92(0.00-0.00)	903	
9 Perfluorononanoic acid									
463.00 > 419.00	2.215	2.213	0.002	1.000	1273686	10.2		298	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.352	2.354	-0.002	1.000	1307668	10.1		7842	

Reagents:

LC537-L3_00023

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_004.d

Injection Date: 14-Aug-2017 12:58:26

Instrument ID: A8_N

Lims ID: IC L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 4

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

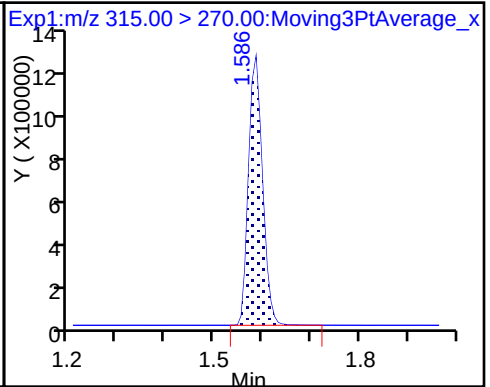
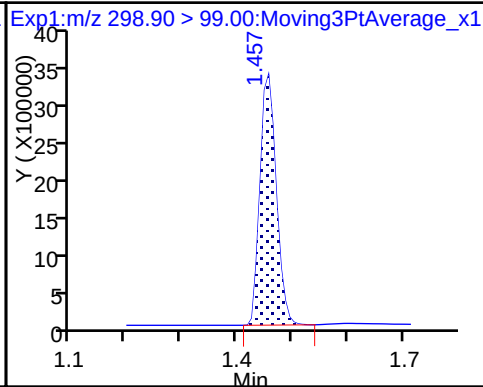
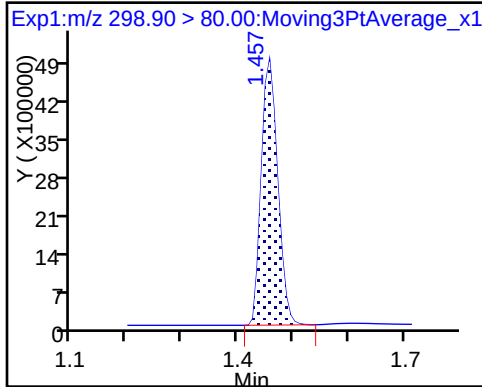
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

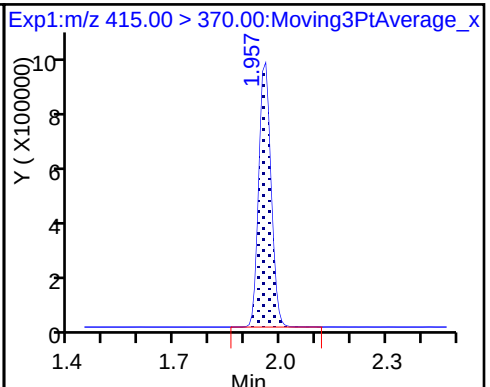
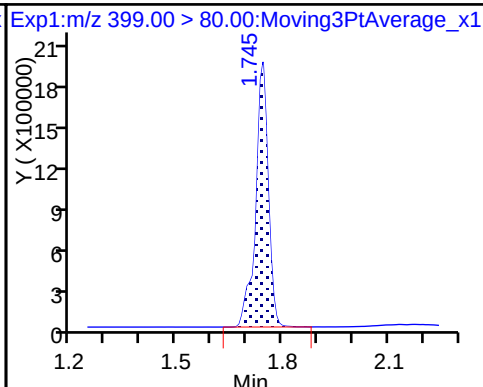
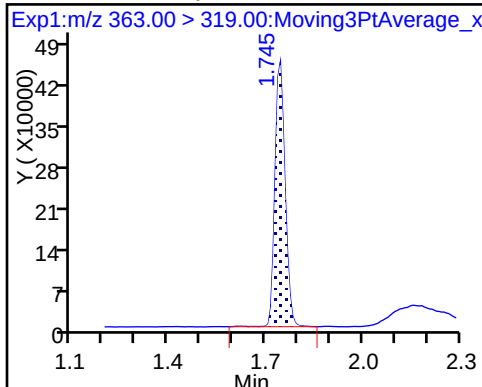
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

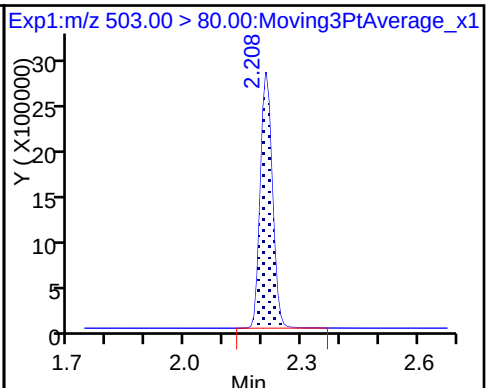
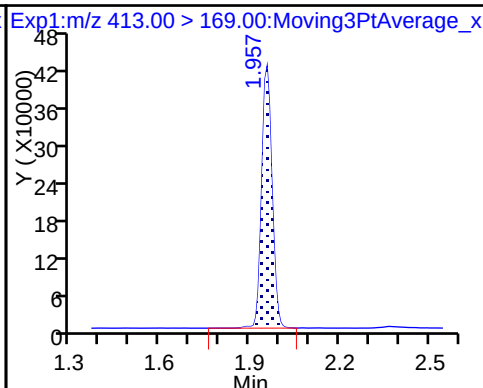
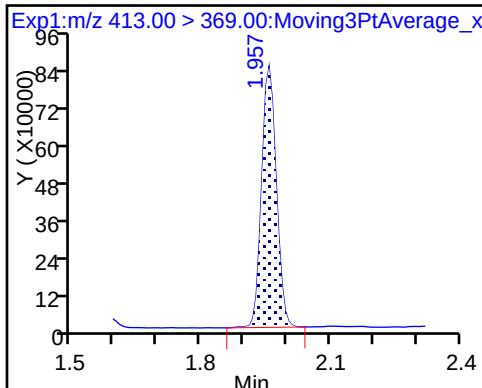
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

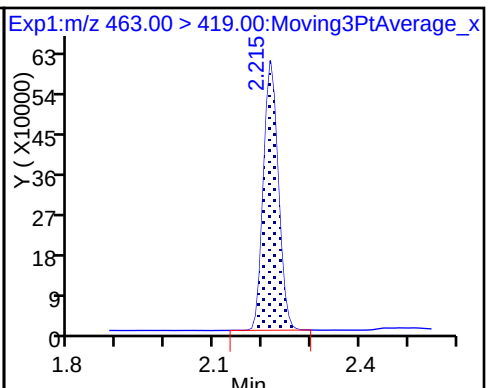
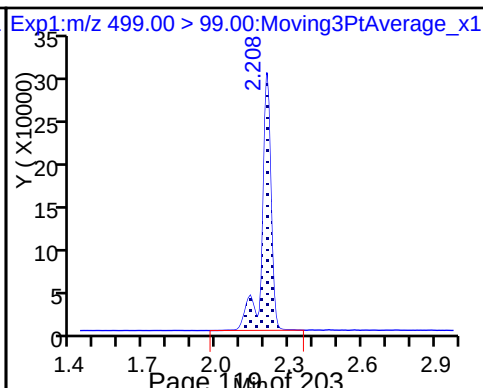
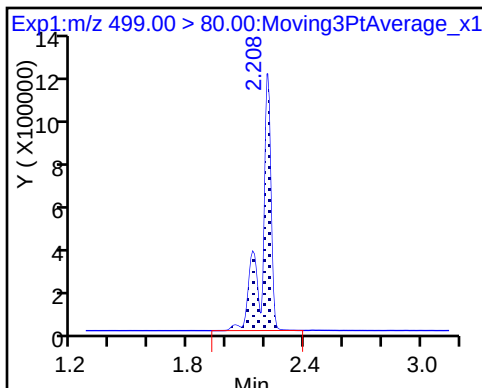
* 7 13C4 PFOS



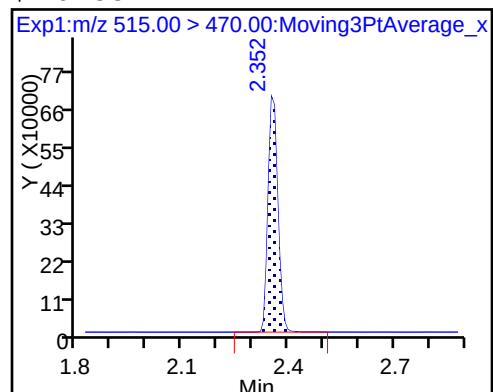
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_005.d
 Lims ID: IC L4
 Client ID:
 Sample Type: ICISAV Calib Level: 4
 Inject. Date: 14-Aug-2017 13:03:11 ALS Bottle#: 4 Worklist Smp#: 5
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: L4_537
 Misc. Info.: Plate: 1 Rack: 1
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Sublist: chrom-537_A8_N*sub1
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 14-Aug-2017 14:36:04 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK023

First Level Reviewer: phomsophat

Date: 14-Aug-2017 14:08:55

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.457	1.453	0.004	1.000	16707104	89.7		1918	
298.90 > 99.00	1.457	1.453	0.004	1.000	12133728		1.38(0.00-0.00)	2117	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.586	1.582	0.004	1.000	2465941	10.2		6561	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.745	1.742	0.003	1.000	9496666	31.5		1386	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.745	1.742	0.003	1.000	1966143	10.2		175	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.957	1.955	0.002	1.000	4232647	20.7		258	
413.00 > 169.00	1.957	1.955	0.002	1.000	2149139		1.97(0.00-0.00)	3387	
* 6 13C2-PFOA									
415.00 > 370.00	1.957	1.955	0.002		2255521	10.0		11927	
* 7 13C4 PFOS									
503.00 > 80.00	2.208	2.205	0.003		5780409	28.7		6098	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.208	2.208	0.0	1.000	7629588	41.0		6465	
499.00 > 99.00	2.208	2.208	0.0	1.000	1600291		4.77(0.00-0.00)	1799	
9 Perfluorononanoic acid									
463.00 > 419.00	2.215	2.213	0.002	1.000	2556105	20.0		585	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.352	2.354	-0.002	1.000	1332089	10.0		7263	

Reagents:

LC537-L4_00020

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_005.d

Injection Date: 14-Aug-2017 13:03:11

Instrument ID: A8_N

Lims ID: IC L4

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 4

Worklist Smp#: 5

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

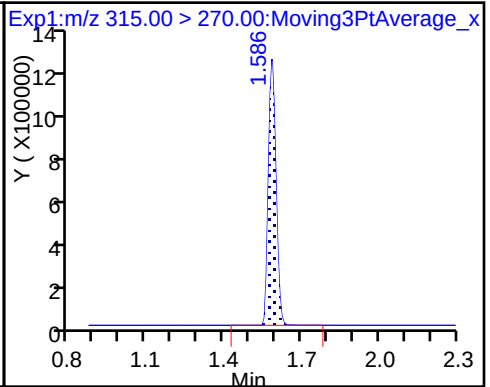
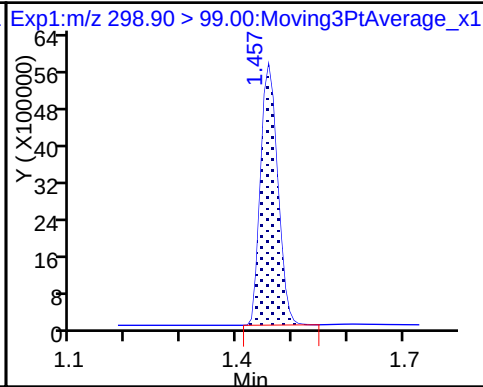
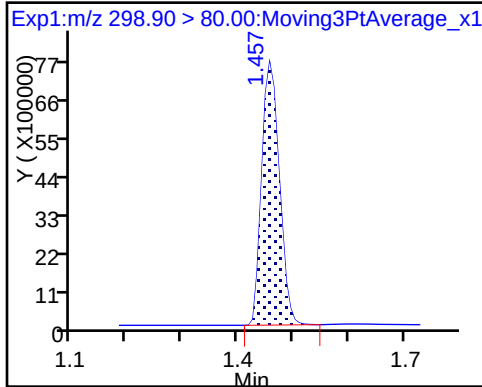
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

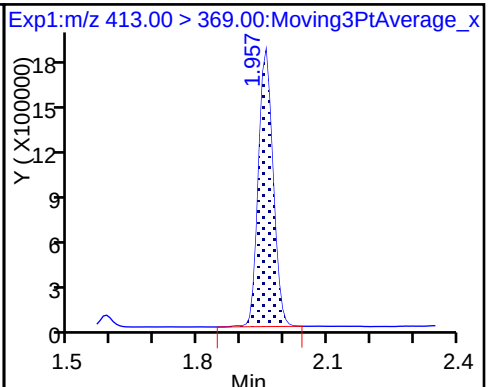
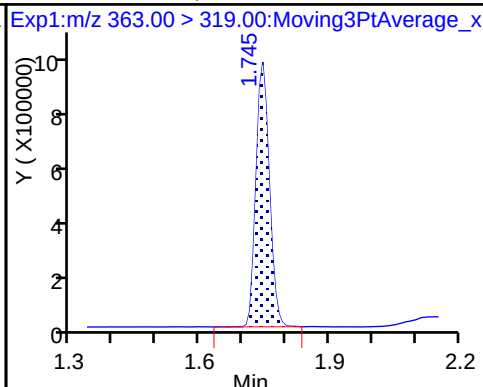
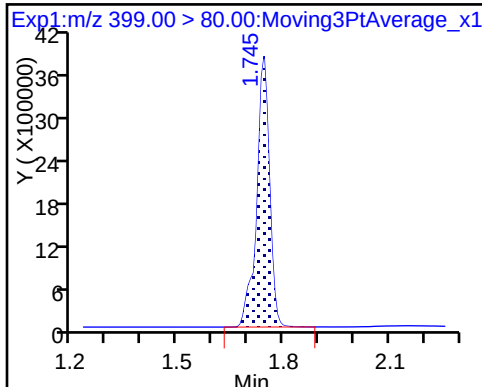
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

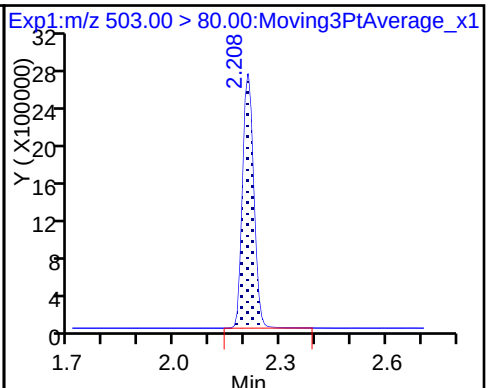
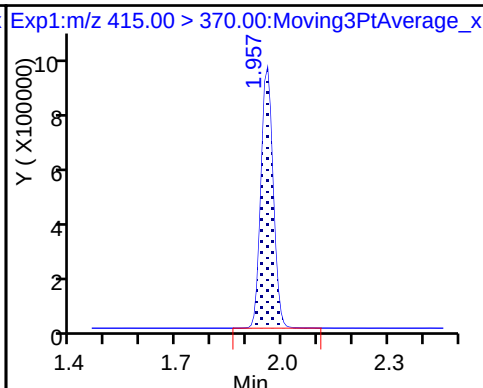
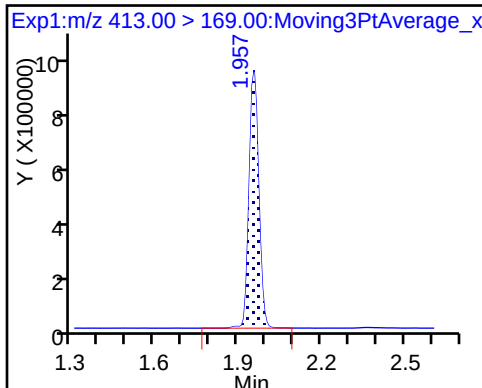
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

* 6 13C2-PFOA

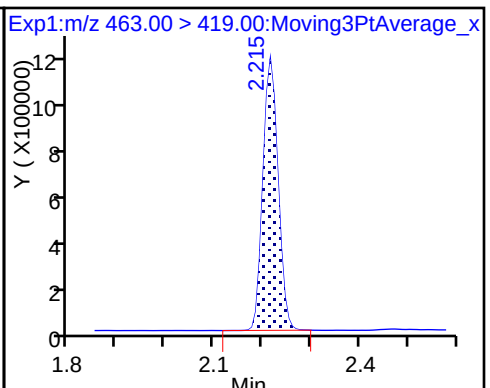
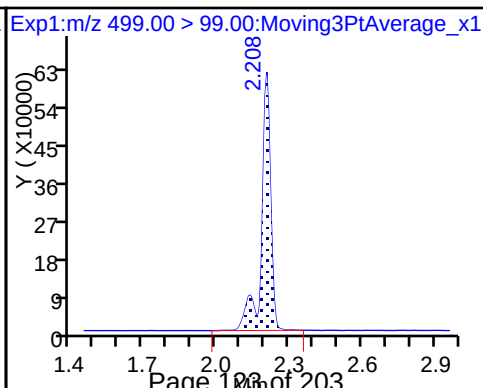
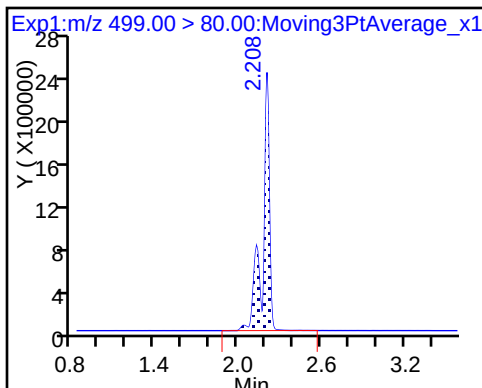
* 7 13C4 PFOS



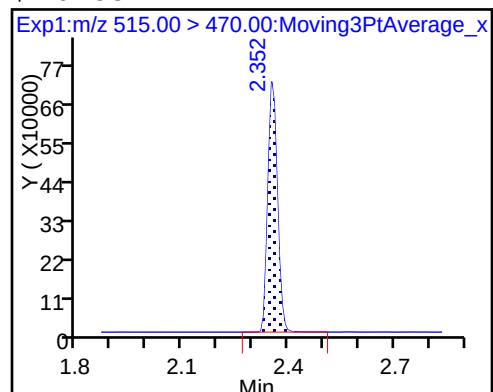
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_006.d
 Lims ID: IC L5
 Client ID:
 Sample Type: IC Calib Level: 5
 Inject. Date: 14-Aug-2017 13:07:55 ALS Bottle#: 5 Worklist Smp#: 6
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: L5_537
 Misc. Info.: Plate: 1 Rack: 1
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Sublist: chrom-537_A8_N*sub1
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 14-Aug-2017 14:36:05 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK023

First Level Reviewer: phomsophat

Date: 14-Aug-2017 14:09:10

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.449	1.453	-0.004	1.000	21165476	128.3		1973	
298.90 > 99.00	1.449	1.453	-0.004	1.000	15381000		1.38(0.00-0.00)	2392	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.582	-0.004	1.000	2390227	10.3		7171	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.737	1.742	-0.005	1.000	2763295	14.9		247	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.737	1.742	-0.005	1.000	13083092	44.5		1759	
* 6 13C2-PFOA									
415.00 > 370.00	1.950	1.955	-0.005		2162548	10.0		10597	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.950	1.955	-0.005	1.000	6012905	30.7		331	
413.00 > 169.00	1.950	1.955	-0.005	1.000	3169462		1.90(0.00-0.00)	4885	
* 7 13C4 PFOS									
503.00 > 80.00	2.200	2.205	-0.005		5649456	28.7		5877	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.208	2.208	0.0	1.000	11213929	61.6		7515	
499.00 > 99.00	2.200	2.208	-0.008	0.997	2357369		4.76(0.00-0.00)	2390	
9 Perfluorononanoic acid									
463.00 > 419.00	2.208	2.213	-0.005	1.000	3689416	30.1		869	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.352	2.354	-0.002	1.000	1324957	10.4		7073	

Reagents:

LC537-L5_00024

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_006.d

Injection Date: 14-Aug-2017 13:07:55

Instrument ID: A8_N

Lims ID: IC L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 6

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

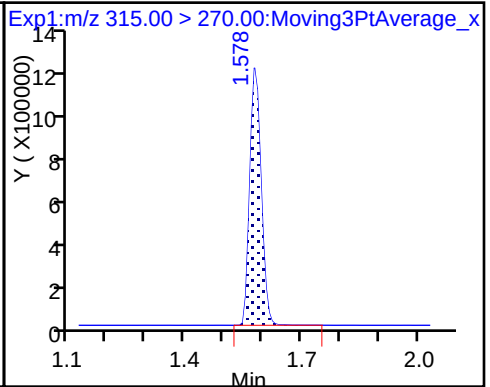
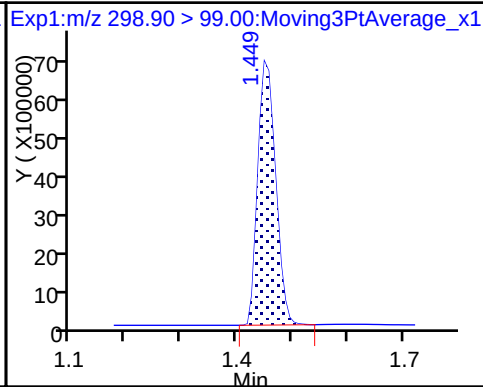
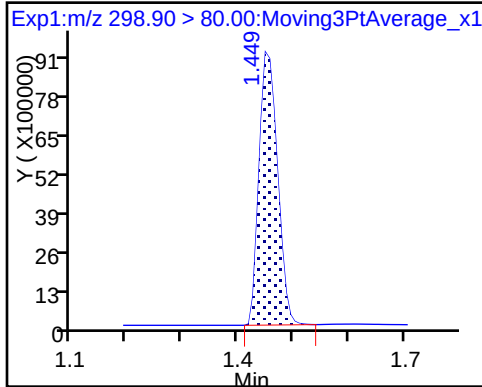
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

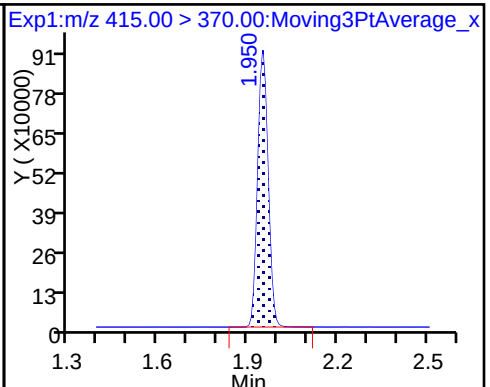
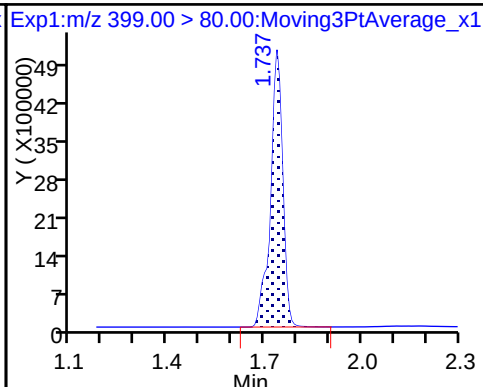
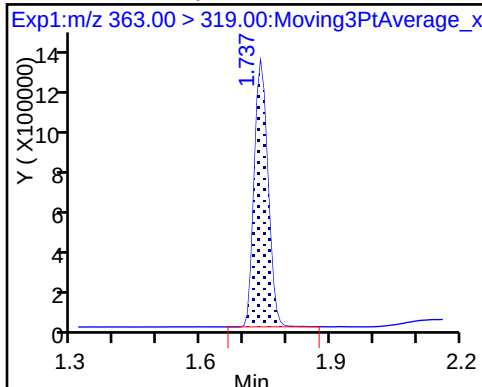
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

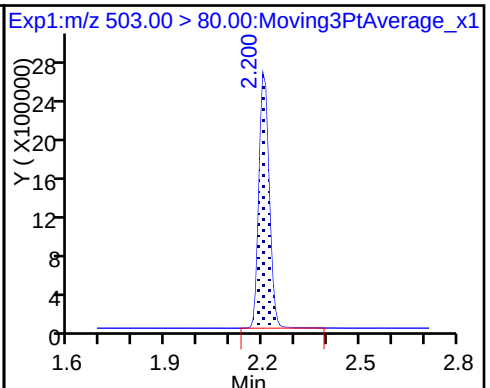
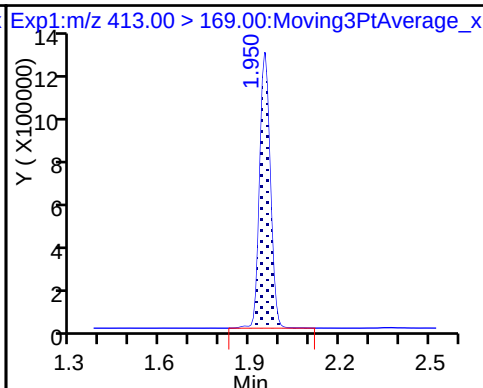
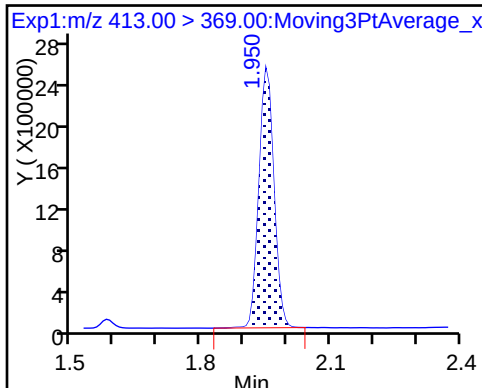
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

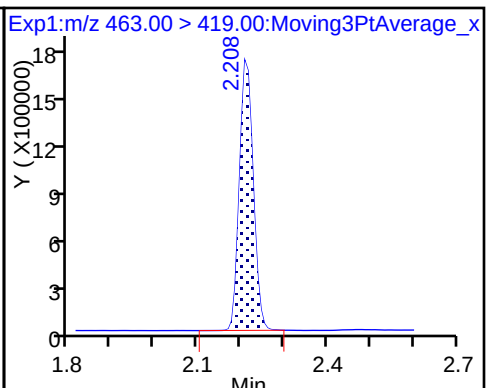
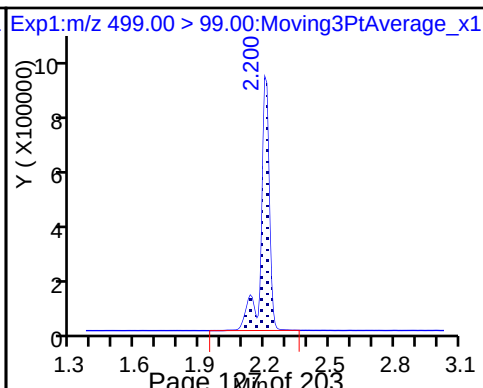
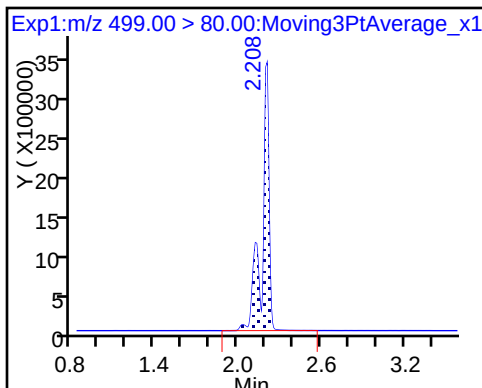
* 7 13C4 PFOS



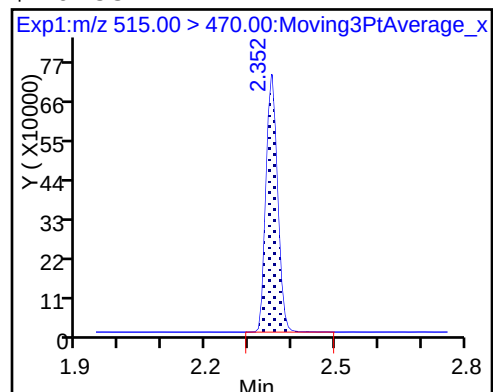
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d
 Lims ID: IC L6
 Client ID:
 Sample Type: IC Calib Level: 6
 Inject. Date: 14-Aug-2017 13:12:40 ALS Bottle#: 6 Worklist Smp#: 7
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: L6_537
 Misc. Info.: Plate: 1 Rack: 1
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Sublist: chrom-537_A8_N*sub1
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 14-Aug-2017 14:36:07 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK023

First Level Reviewer: phomsophat

Date: 14-Aug-2017 14:09:40

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.449	1.453	-0.004	1.000	26040065	186.2		2319	
298.90 > 99.00	1.449	1.453	-0.004	1.000	19002053		1.37(0.00-0.00)	2644	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.582	-0.004	1.000	2370885	10.3		6962	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.737	1.742	-0.005	1.000	16584369	56.1		1968	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.737	1.742	-0.005	1.000	3589599	19.5		307	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.950	1.955	-0.005	1.000	7854398	40.2		429	
413.00 > 169.00	1.950	1.955	-0.005	1.000	4254502		1.85(0.00-0.00)	6275	
* 6 13C2-PFOA									
415.00 > 370.00	1.950	1.955	-0.005		2155463	10.0		11567	
* 7 13C4 PFOS									
503.00 > 80.00	2.200	2.205	-0.005		5673459	28.7		5607	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.208	2.208	0.0	1.000	14645432	80.2		8157	
499.00 > 99.00	2.200	2.208	-0.008	0.997	3183566		4.60(0.00-0.00)	2767	
9 Perfluorononanoic acid									
463.00 > 419.00	2.208	2.213	-0.005	1.000	4927051	40.4		1112	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.352	2.354	-0.002	1.000	1295768	10.2		7545	

Reagents:

LC537-L6_00020

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Injection Date: 14-Aug-2017 13:12:40

Instrument ID: A8_N

Lims ID: IC L6

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 6

Worklist Smp#: 7

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

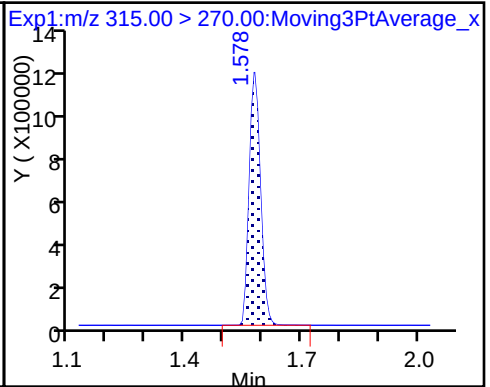
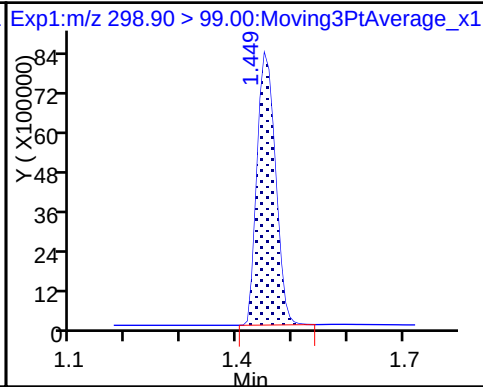
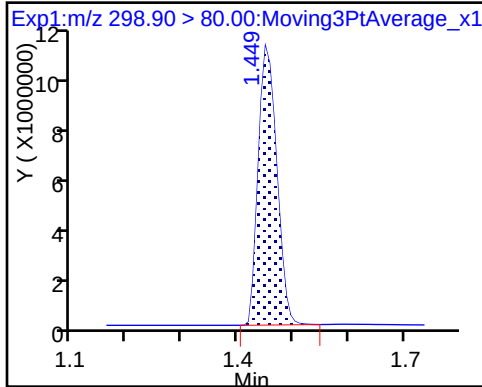
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

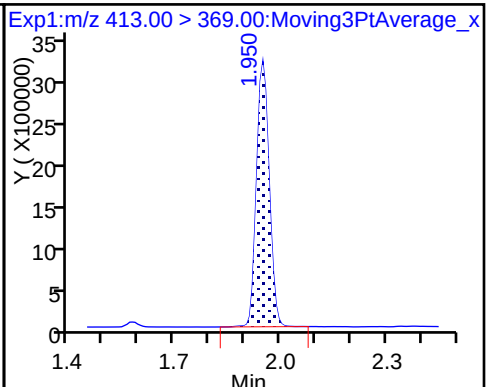
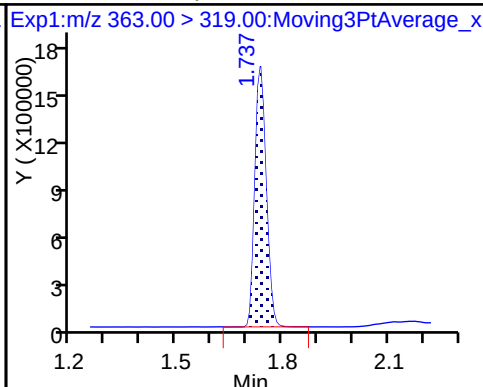
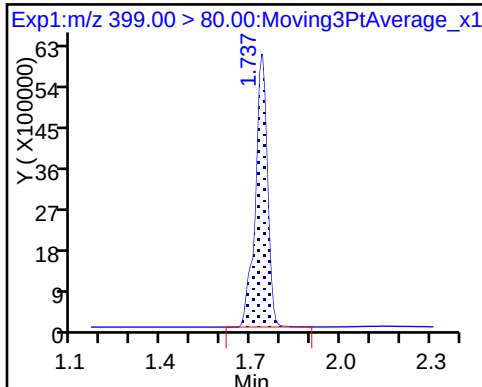
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

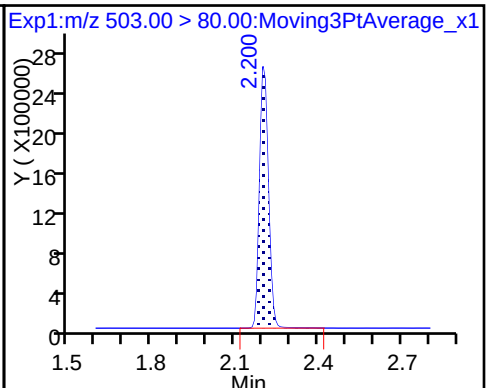
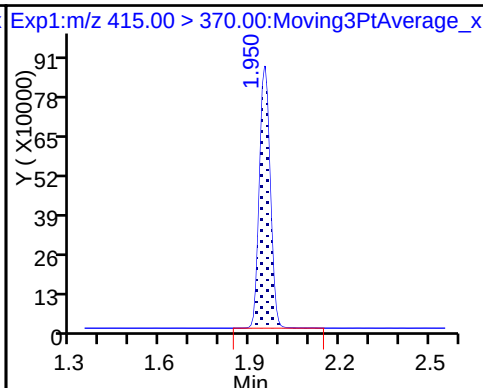
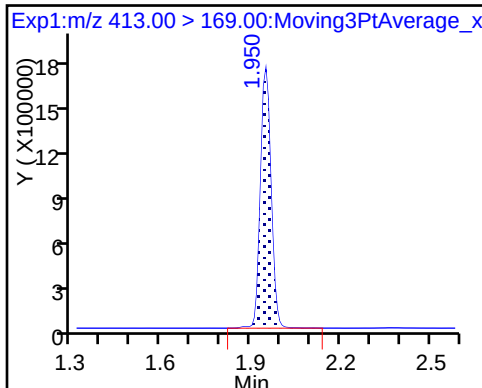
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

* 6 13C2-PFOA

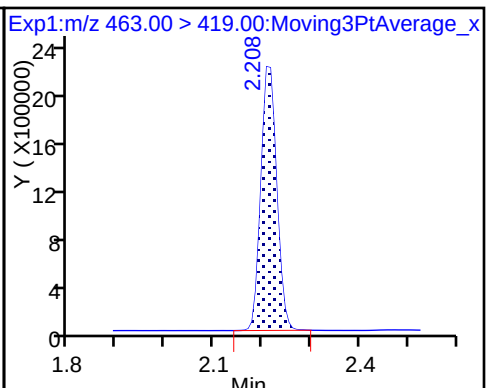
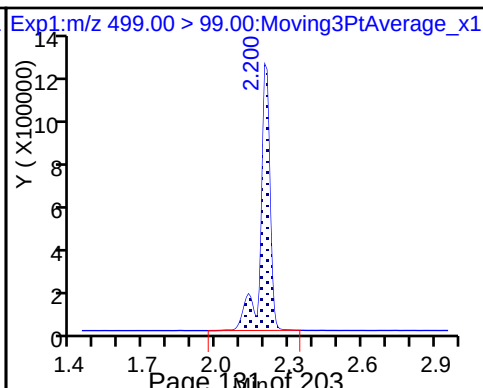
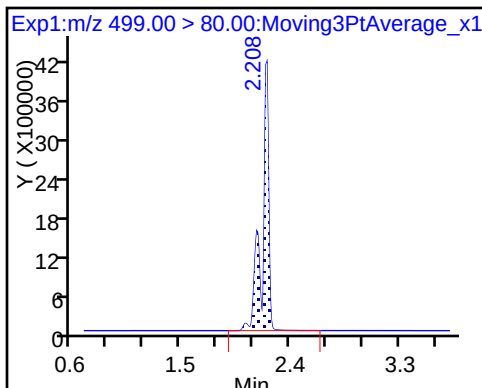
* 7 13C4 PFOS



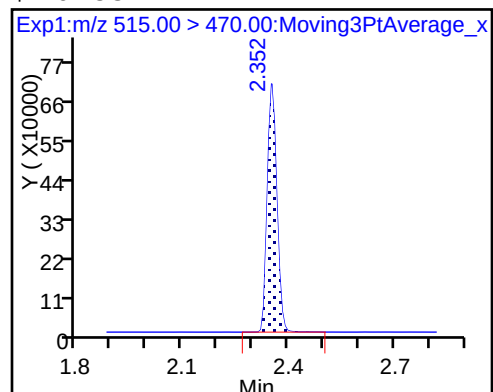
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Lab Sample ID: CCVL 320-179319/9 Calibration Date: 08/14/2017 13:22
 Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/14/2017 13:12
 Lab File ID: 2017.08.14_537ICAL_009.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		1.212		22.5	20.0	12.7	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.8560	0.9386		2.44	2.22	9.6	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.494	1.568		7.00	6.67	4.9	50.0
Perfluorooctanoic acid (PFOA)	Ave	0.9068	0.9308		4.57	4.45	2.6	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9236	0.9255		8.91	8.89	0.2	50.0
Perfluorononanoic acid (PFNA)	Ave	0.5665	0.6283		4.93	4.45	10.9	50.0
13C2 PFHxA	Ave	1.069	1.128		10.5	10.0	5.5	30.0
13C2 PFDA	Ave	0.5877	0.6289		10.7	10.0	7.0	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_009.d
 Lims ID: CCVL
 Client ID:
 Sample Type: CCVL
 Inject. Date: 14-Aug-2017 13:22:09 ALS Bottle#: 2 Worklist Smp#: 9
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: CCV L2
 Misc. Info.: Plate: 1 Rack: 1
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Sublist: chrom-537_A8_N*sub1
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 14-Aug-2017 14:36:08 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK023

First Level Reviewer: phomsophat

Date: 14-Aug-2017 14:17:21

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.449	1.453	-0.004	1.000	5069955	22.5		689	
298.90 > 99.00	1.449	1.453	-0.004	1.000	3233517		1.57(0.00-0.00)	644	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.582	-0.004	1.000	2456705	10.5		7072	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.737	1.742	-0.005	1.000	454396	2.44		40.4	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.737	1.742	-0.005	1.000	2186681	7.00		343	
* 6 13C2-PFOA									
415.00 > 370.00	1.942	1.955	-0.013		2177935	10.0		9587	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.942	1.955	-0.013	1.000	901705	4.57		50.1	
413.00 > 169.00	1.942	1.955	-0.013	1.000	476593		1.89(0.00-0.00)	869	
* 7 13C4 PFOS									
503.00 > 80.00	2.200	2.205	-0.005		5998180	28.7		5754	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.200	2.208	-0.008	1.000	1720862	8.91		1437	
499.00 > 99.00	2.200	2.208	-0.008	1.000	364893		4.72(0.00-0.00)	416	
9 Perfluorononanoic acid									
463.00 > 419.00	2.208	2.213	-0.005	1.000	608257	4.93		144	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.352	2.354	-0.002	1.000	1369753	10.7		8253	

Reagents:

LC537-L2_00020

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_009.d

Injection Date: 14-Aug-2017 13:22:09

Instrument ID: A8_N

Lims ID: CCVL

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 9

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

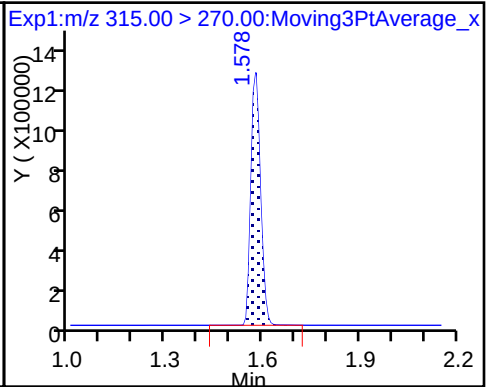
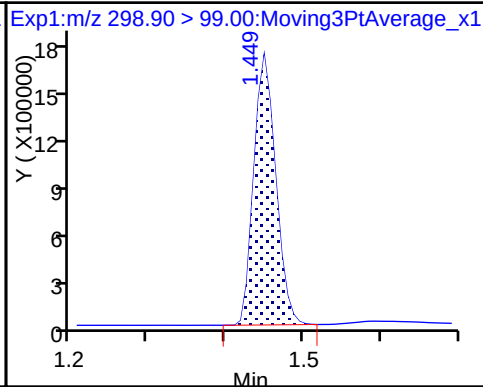
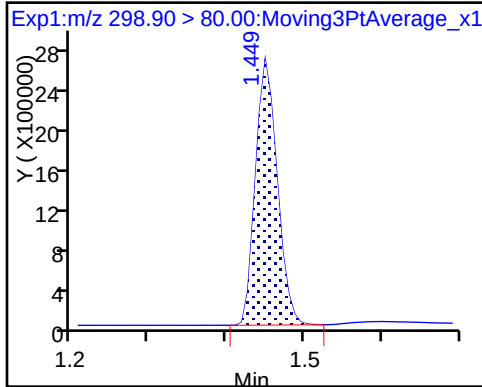
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

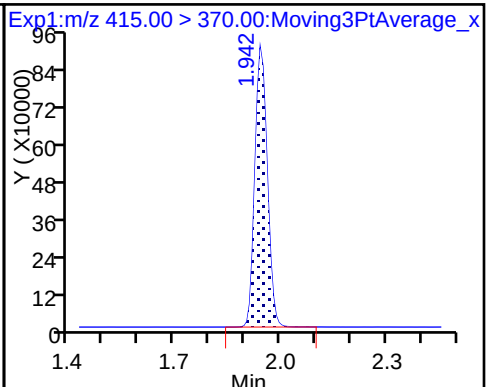
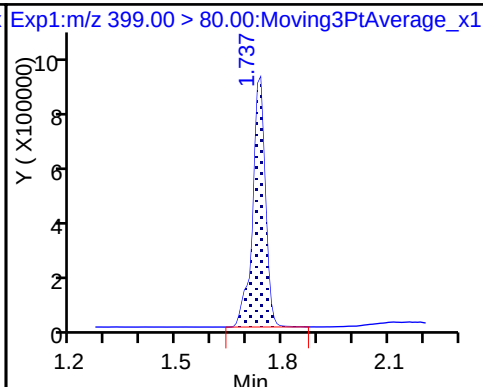
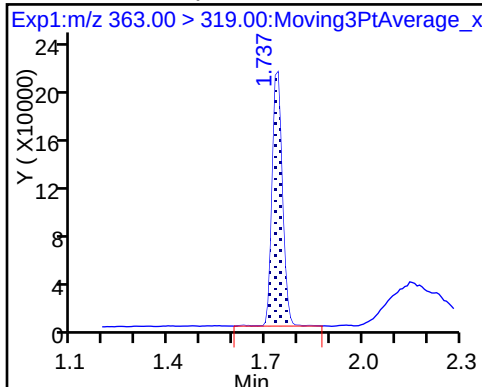
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

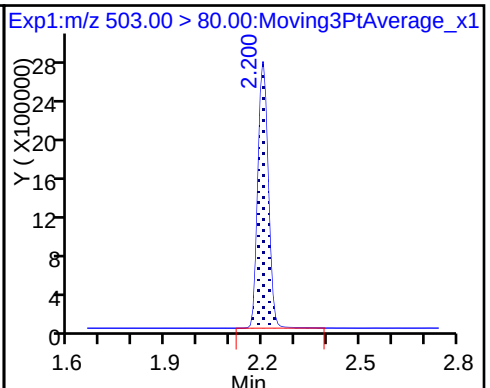
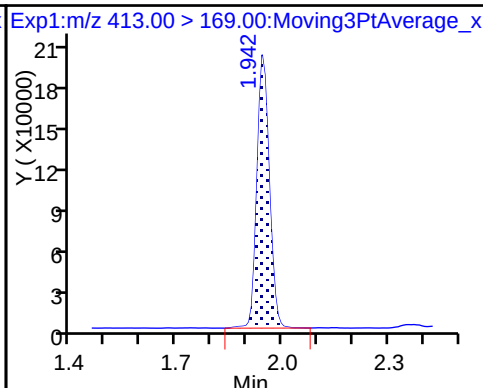
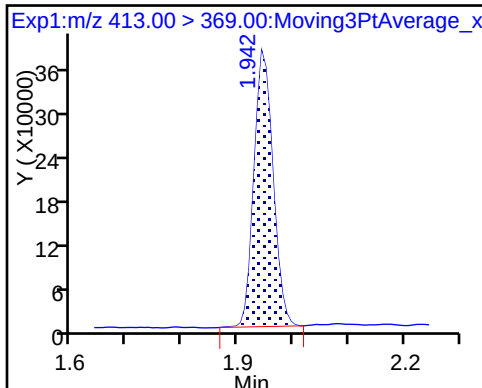
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

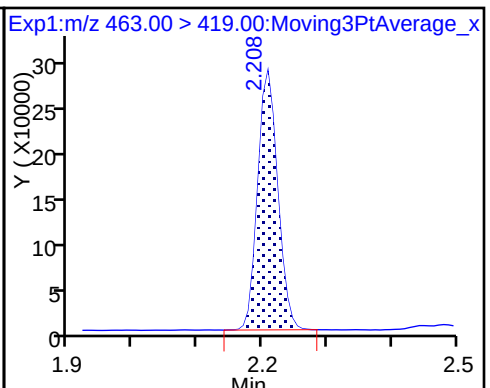
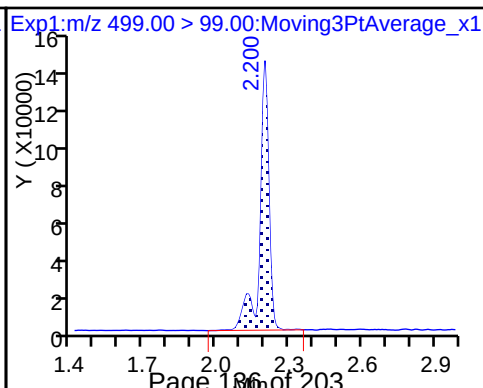
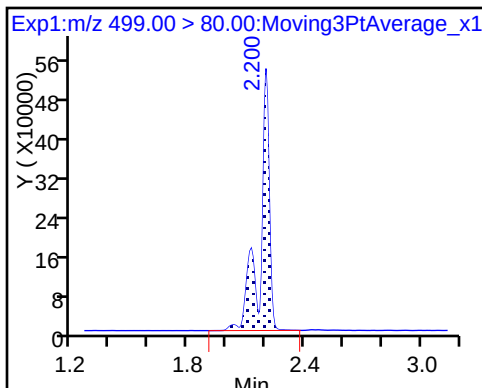
* 7 13C4 PFOS



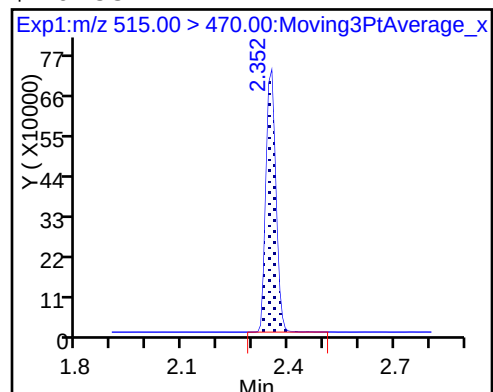
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Lab Sample ID: ICV 320-179319/11 Calibration Date: 08/14/2017 13:31
 Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/14/2017 13:12
 Lab File ID: 2017.08.14_537ICAL_011.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		0.9251		104	100	3.6	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.8560	0.9672		11.3	10.0	13.0	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.494	1.761		23.7	20.1	17.9	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9068	0.9396		21.2	20.5	3.6	30.0
Perfluorononanoic acid (PFNA)	Ave	0.5665	0.7333		26.1	20.1	29.4	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9236	1.121		23.9	19.7	21.3	30.0
13C2 PFHxA	Ave	1.069	1.124		10.5	10.0	5.1	30.0
13C2 PFDA	Ave	0.5877	0.6385		10.9	10.0	8.7	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_011.d
 Lims ID: ICV
 Client ID:
 Sample Type: ICV
 Inject. Date: 14-Aug-2017 13:31:37 ALS Bottle#: 7 Worklist Smp#: 11
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: ICV
 Misc. Info.: Plate: 1 Rack: 1
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Sublist:
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 14-Aug-2017 14:36:10 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK023

First Level Reviewer: phomsophat

Date: 14-Aug-2017 14:18:36

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.449	1.453	-0.004	1.000	18809532	103.7		1920	
298.90 > 99.00	1.449	1.453	-0.004	1.000	13567533		1.39(0.00-0.00)	2047	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.582	-0.004	1.000	2224871	10.5		6402	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.730	1.742	-0.012	1.000	1914446	11.3		166	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.730	1.742	-0.012	1.000	7180754	23.7		1082	
* 6 13C2-PFOA									
415.00 > 370.00	1.942	1.955	-0.013		1980065	10.0		9656	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.942	1.955	-0.013	1.000	3810943	21.2		220	
413.00 > 169.00	1.942	1.955	-0.013	1.000	2037831		1.87(0.00-0.00)	3256	
* 7 13C4 PFOS									
503.00 > 80.00	2.193	2.205	-0.012		5824653	28.7		5480	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.200	2.208	-0.008	1.000	4482668	23.9		3801	
499.00 > 99.00	2.200	2.208	-0.008	1.000	847951		5.29(0.00-0.00)	940	
9 Perfluorononanoic acid									
463.00 > 419.00	2.200	2.213	-0.013	1.000	2922223	26.1		737	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.344	2.354	-0.010	1.000	1264298	10.9		7686	

Reagents:

LC537-ICV_00028

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_011.d

Injection Date: 14-Aug-2017 13:31:37

Instrument ID: A8_N

Lims ID: ICV

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 7

Worklist Smp#: 11

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

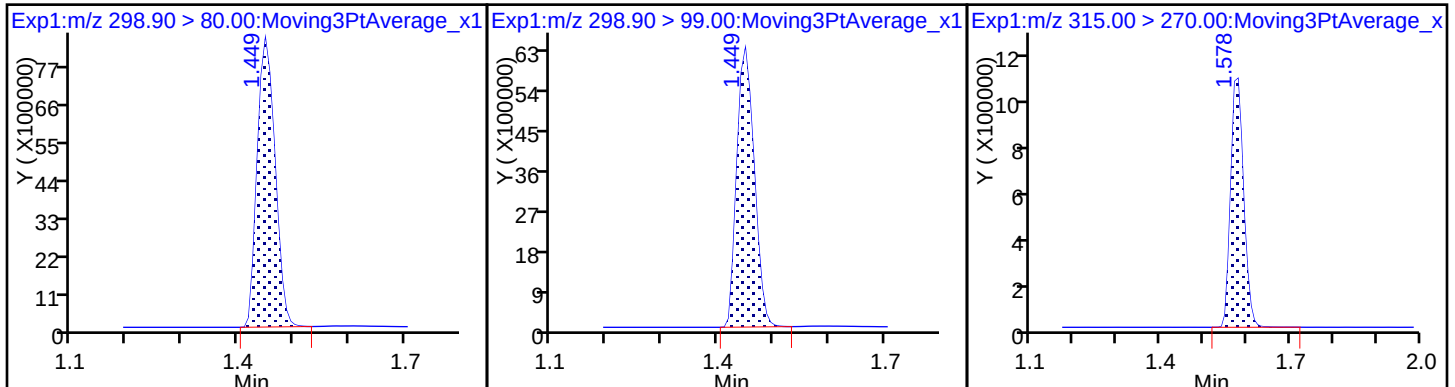
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

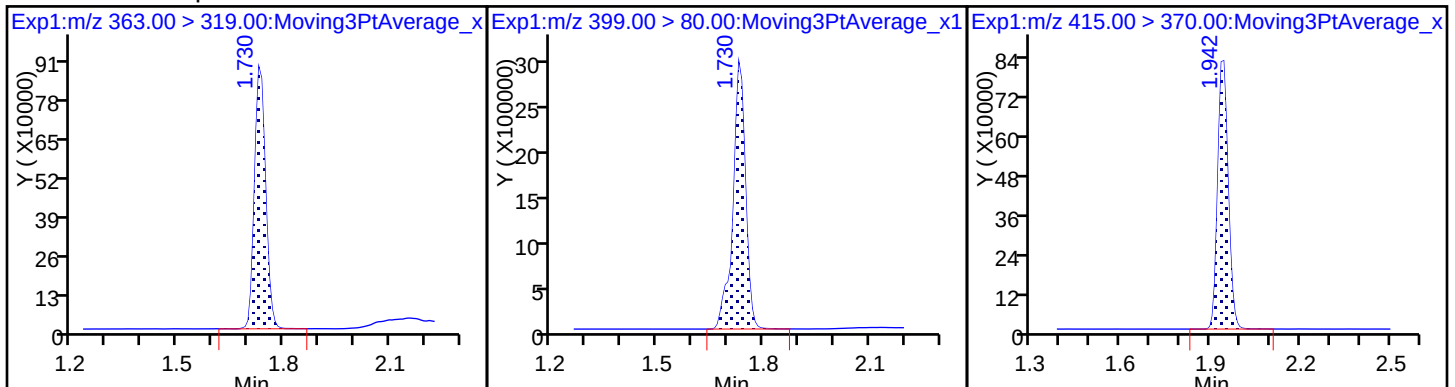
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

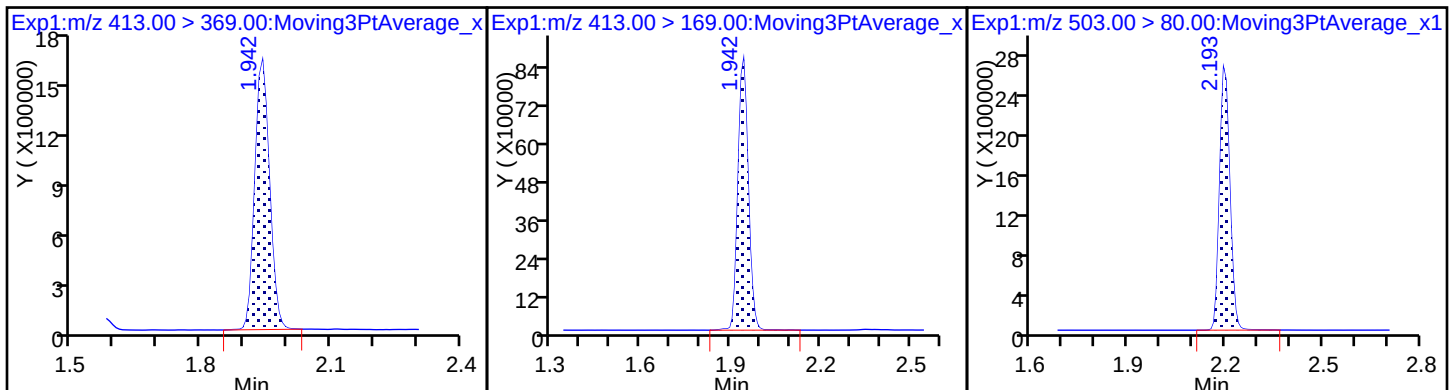
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

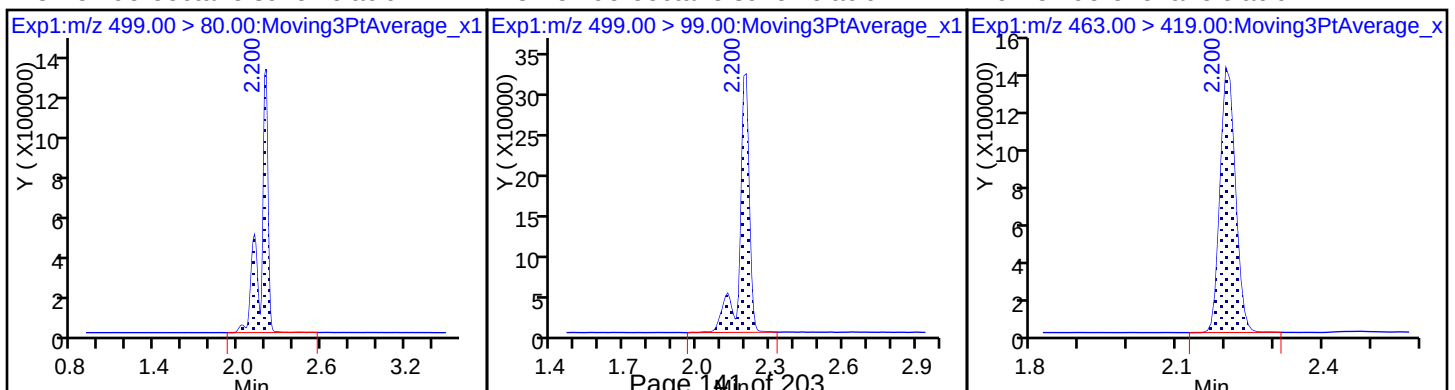
* 7 13C4 PFOS



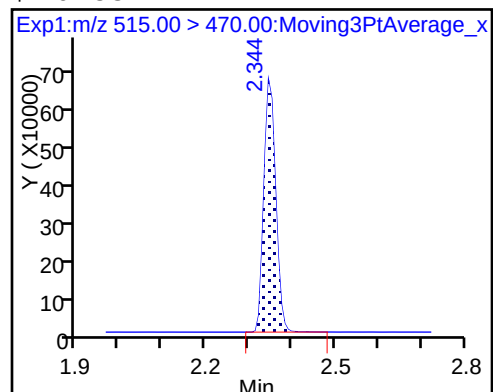
8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Lab Sample ID: CCV 320-179510/1 Calibration Date: 08/14/2017 19:24
 Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/14/2017 13:12
 Lab File ID: 2017.08.14_537B_001.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		1.087		48.0	45.0	6.7	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.8560	0.9611		5.61	5.00	12.3	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.494	1.657		16.6	15.0	10.9	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9068	0.9103		10.0	10.0	0.4	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9236	0.9052		19.6	20.0	-2.0	30.0
Perfluorononanoic acid (PFNA)	Ave	0.5665	0.6404		11.3	10.0	13.0	30.0
13C2 PFHxA	Ave	1.069	1.167		10.9	10.0	9.1	30.0
13C2 PFDA	Ave	0.5877	0.6255		10.6	10.0	6.4	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_001.d
 Lims ID: CCV L3
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 14-Aug-2017 19:24:06 ALS Bottle#: 3 Worklist Smp#: 1
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: CCV L3
 Misc. Info.: Plate: 1 Rack: 1
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Sublist: chrom-537_A8_N*sub1
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 16-Aug-2017 14:14:15 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK009

First Level Reviewer: barnettj

Date: 15-Aug-2017 13:57:36

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.442	1.453	-0.011	1.000	9898491	48.0		1225	
298.90 > 99.00	1.442	1.453	-0.011	1.000	7059770		1.40(0.00-0.00)	1378	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.563	1.582	-0.019	1.000	2455545	10.9		10284	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.715	1.742	-0.027	1.000	5030742	16.6		811	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.715	1.742	-0.027	1.000	1011757	5.61		86.1	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.912	1.955	-0.043	1.000	1917804	10.0		97.9	
413.00 > 169.00	1.912	1.955	-0.043	1.000	999463		1.92(0.00-0.00)	1700	
* 6 13C2-PFOA									
415.00 > 370.00	1.912	1.955	-0.043		2104942	10.0		8620	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.170	2.170	0.0	1.000	3665050	19.6		3792	M
499.00 > 99.00	2.170	2.170	0.0	1.000	759268		4.83(0.00-0.00)	725	M
* 7 13C4 PFOS									
503.00 > 80.00	2.170	2.205	-0.035		5804729	28.7		5399	
9 Perfluorononanoic acid									
463.00 > 419.00	2.177	2.213	-0.036	1.000	1348237	11.3		273	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.329	2.354	-0.025	1.000	1316550	10.6		9514	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LC537-L3_00023

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_001.d

Injection Date: 14-Aug-2017 19:24:06

Instrument ID: A8_N

Lims ID: CCV L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 1

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

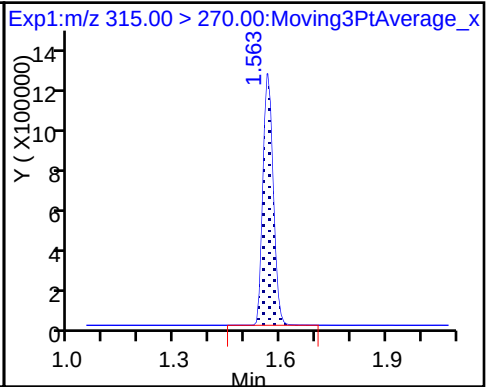
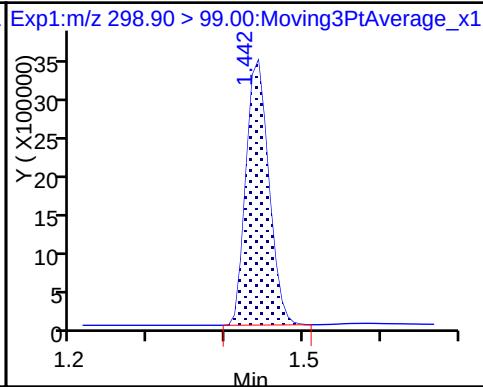
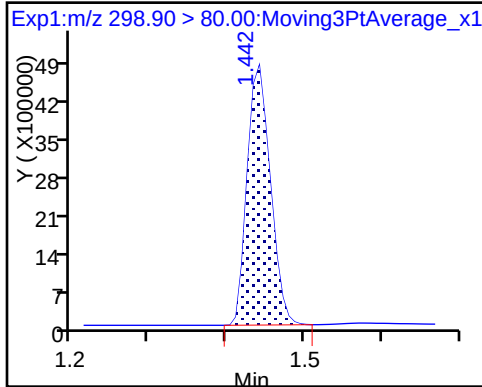
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

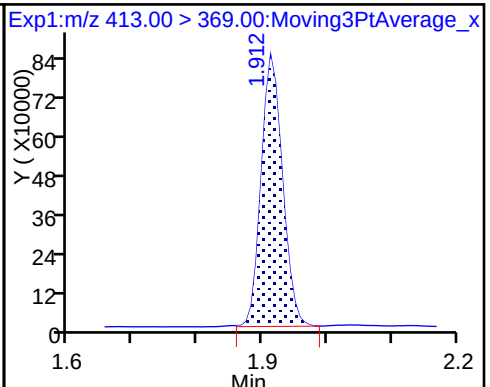
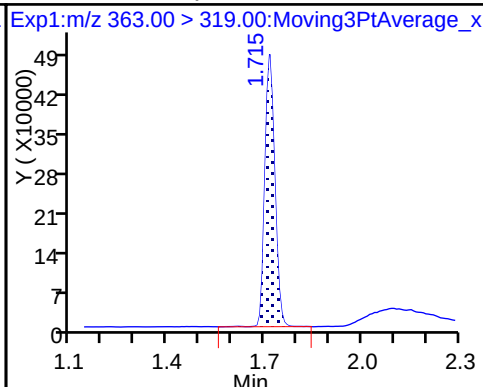
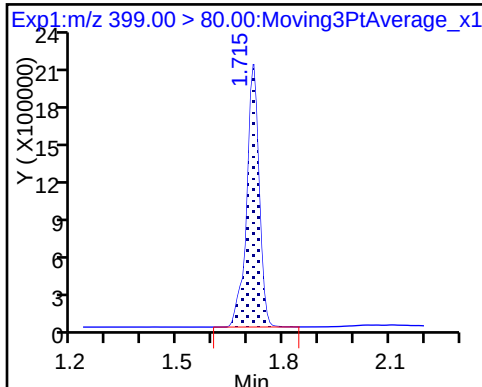
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

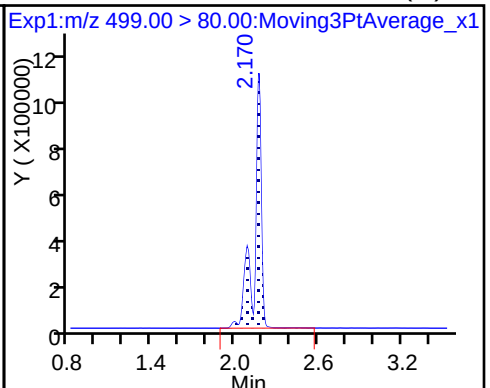
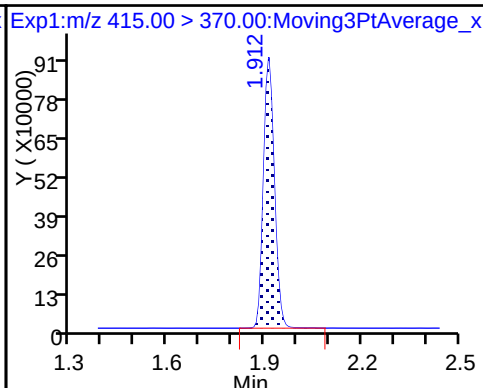
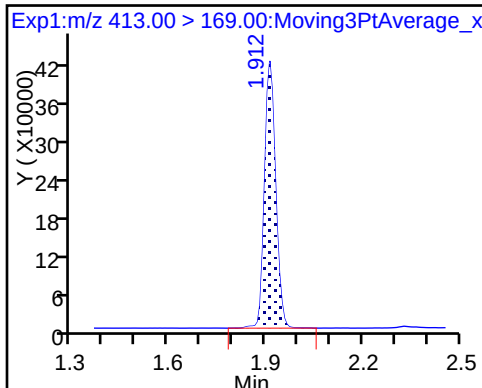
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

* 6 13C2-PFOA

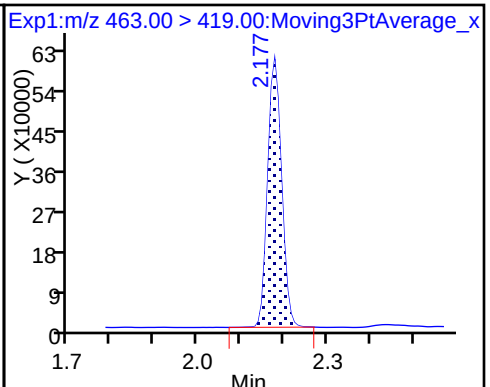
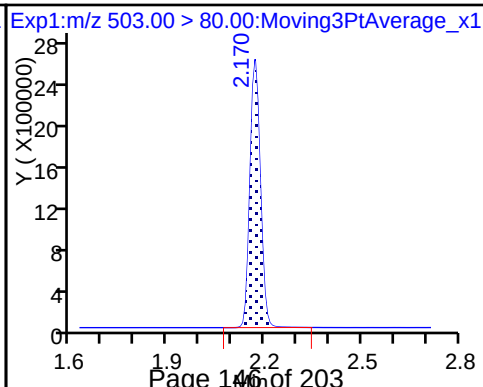
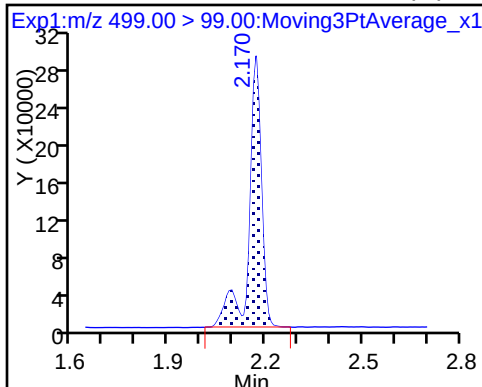
8 Perfluorooctane sulfonic acid (M)



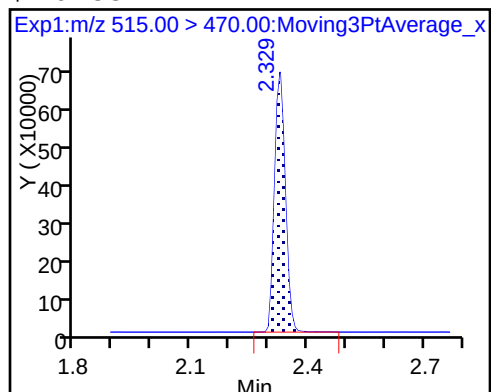
8 Perfluorooctane sulfonic acid (M)

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

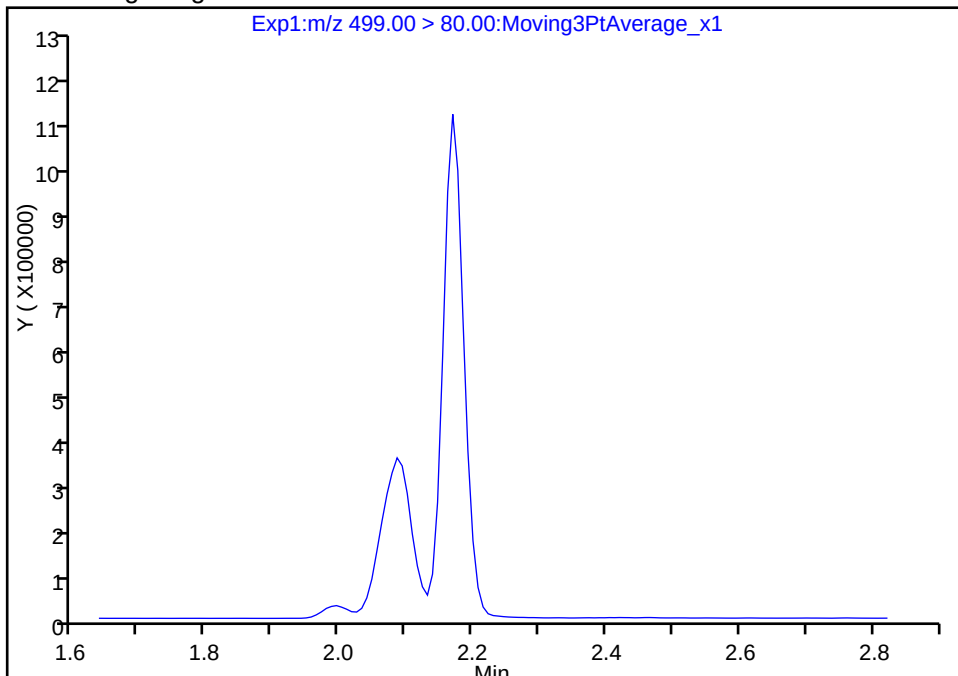
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_001.d
Injection Date: 14-Aug-2017 19:24:06 Instrument ID: A8_N
Lims ID: CCV L3
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 1
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

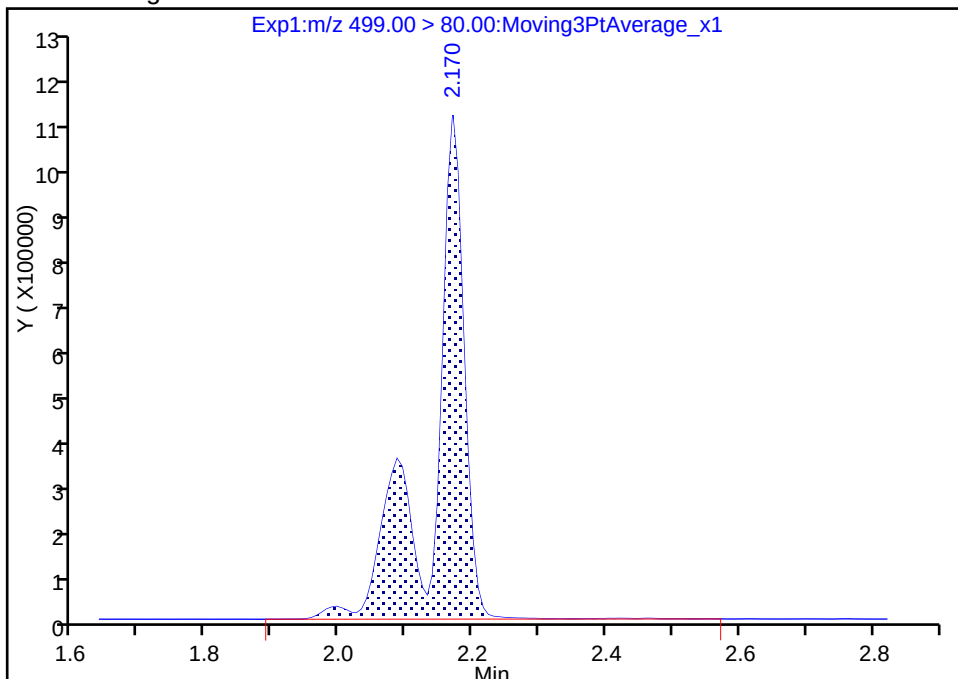
Signal: 1

Not Detected
Expected RT: 2.17

Processing Integration Results



Manual Integration Results



RT: 2.17
Area: 3665050
Amount: 19.605605
Amount Units: ng/ml

Reviewer: barnettj, 15-Aug-2017 13:56:44

Audit Action: Assigned Compound ID

Audit Reason: Missed Peak

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_001.d

Injection Date: 14-Aug-2017 19:24:06

Instrument ID: A8_N

Lims ID: CCV L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 1

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

Method: 537_A8_N

Limit Group: LC 537 ICAL

Column:

Detector EXP1

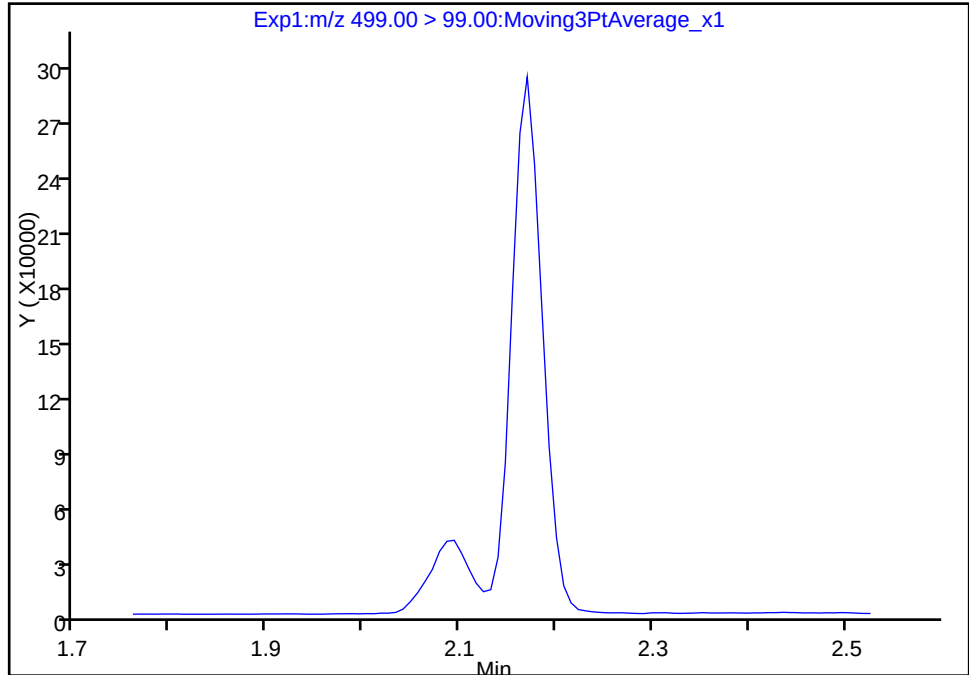
8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 2

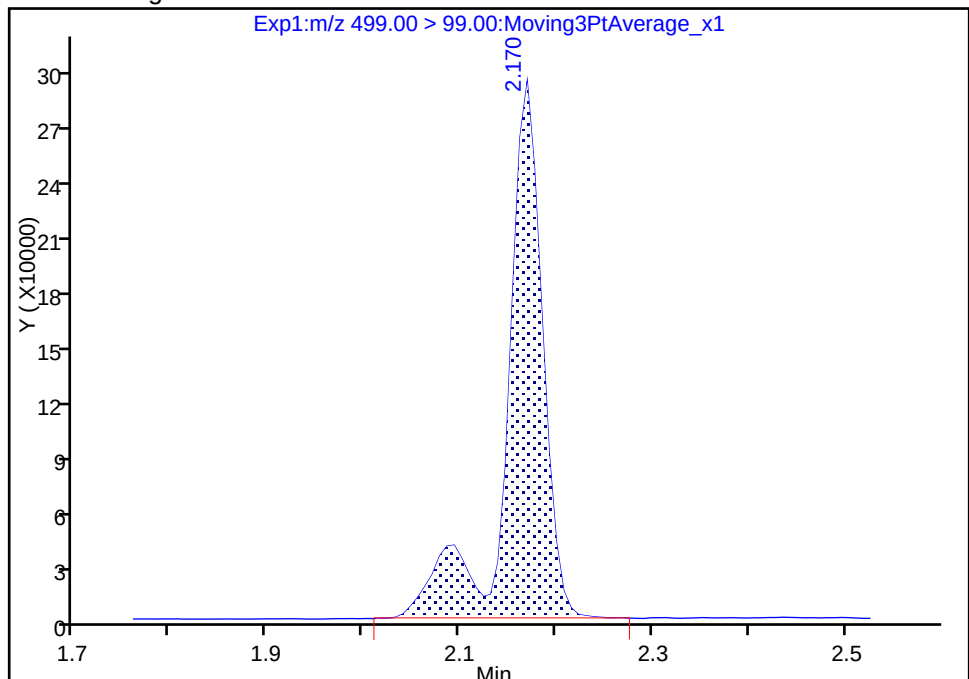
Not Detected

Expected RT: 2.17

Processing Integration Results



Manual Integration Results



RT: 2.17

Area: 759268

Amount: 19.605605

Amount Units: ng/ml

Reviewer: barnettj, 15-Aug-2017 13:57:05

Audit Action: Manually Integrated

Audit Reason: Missed Peak

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_001.d

Injection Date: 14-Aug-2017 19:24:06

Instrument ID: A8_N

Lims ID: CCV L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 1

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

Method: 537_A8_N

Limit Group: LC 537 ICAL

Column:

Detector EXP1

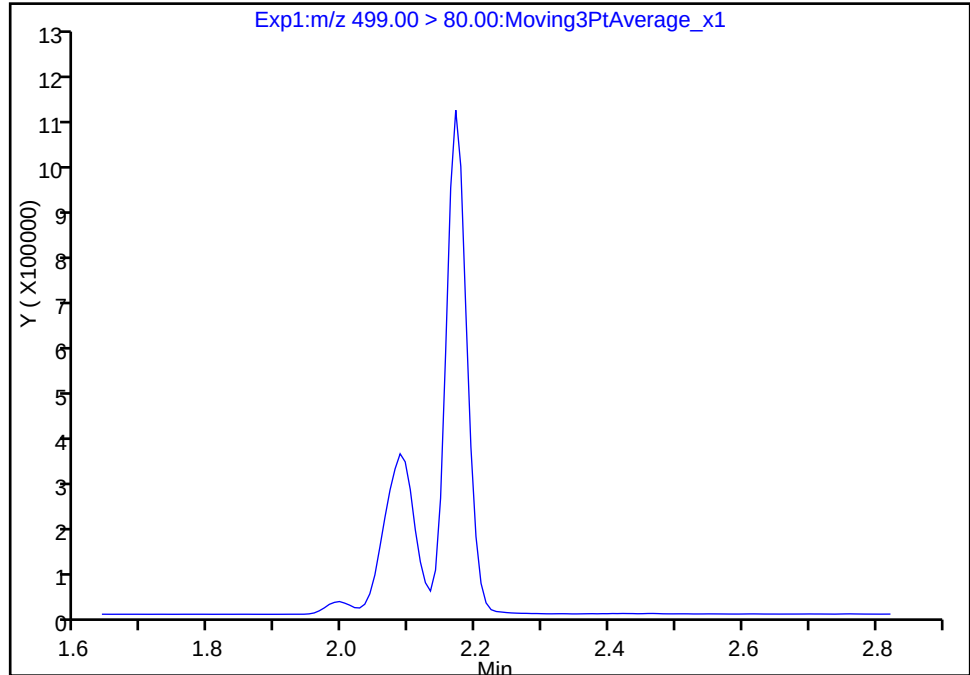
8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

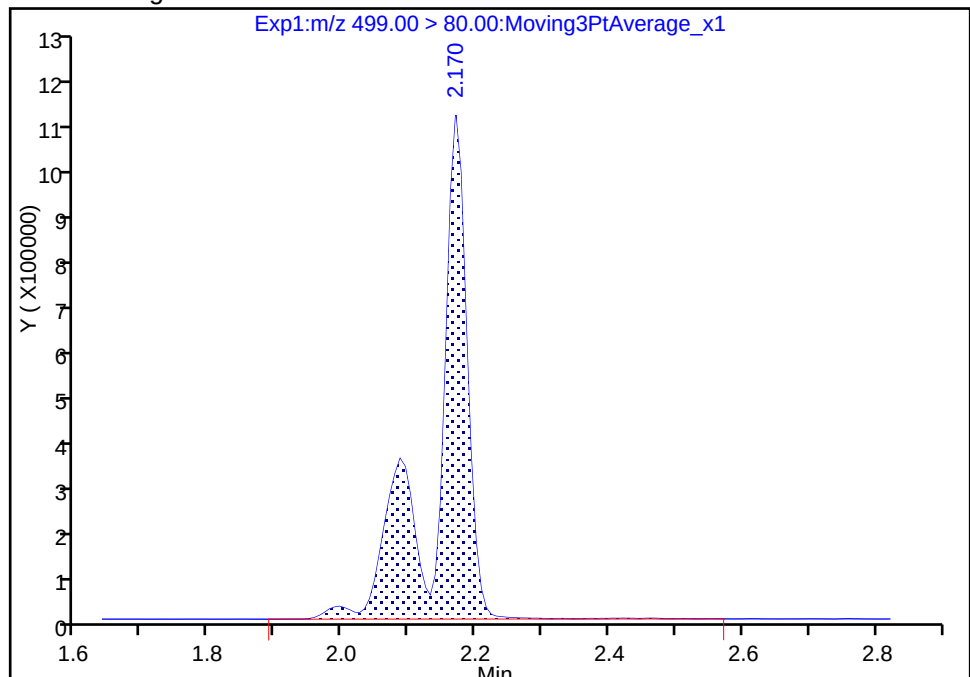
Not Detected

Expected RT: 2.17

Processing Integration Results



Manual Integration Results



RT: 2.17

Area: 3665050

Amount: 19.605605

Amount Units: ng/ml

Reviewer: barnettj, 15-Aug-2017 13:57:05

Audit Action: Manually Integrated

Audit Reason: Missed Peak

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Lab Sample ID: CCV 320-179510/13 Calibration Date: 08/14/2017 20:21
 Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/14/2017 13:12
 Lab File ID: 2017.08.14_537B_013.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		0.8027		130	135	-3.7	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.8560	0.9404		16.5	15.0	9.9	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.494	1.460		44.0	45.0	-2.3	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9068	0.9327		30.9	30.0	2.8	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9236	0.9291		60.4	60.0	0.6	30.0
Perfluorononanoic acid (PFNA)	Ave	0.5665	0.6467		34.3	30.0	14.2	30.0
13C2 PFHxA	Ave	1.069	1.189		11.1	10.0	11.2	30.0
13C2 PFDA	Ave	0.5877	0.6635		11.3	10.0	12.9	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_013.d
 Lims ID: CCV L5
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 14-Aug-2017 20:21:08 ALS Bottle#: 5 Worklist Smp#: 13
 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*sub1
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 16-Aug-2017 14:14:25 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK009

First Level Reviewer: barnettj

Date: 15-Aug-2017 13:58:13

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.442	1.453	-0.011	1.000	21474944	130.0		1995	
298.90 > 99.00	1.442	1.453	-0.011	1.000	15709404		1.37(0.00-0.00)	2220	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.571	1.582	-0.012	1.000	2438362	11.1		10596	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.722	1.742	-0.020	1.000	13025345	44.0		1642	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.722	1.742	-0.020	1.000	2894049	16.5		247	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.920	1.955	-0.035	1.000	5743896	30.9		282	
413.00 > 169.00	1.920	1.955	-0.035	1.000	2977580		1.93(0.00-0.00)	4286	
* 6 13C2-PFOA									
415.00 > 370.00	1.920	1.955	-0.035		2051129	10.0		8102	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.177	2.170	0.007	1.000	11049701	60.4		5917	
499.00 > 99.00	2.170	2.170	0.0	0.997	2365908		4.67(0.00-0.00)	1850	
* 7 13C4 PFOS									
503.00 > 80.00	2.170	2.205	-0.035		5683418	28.7		5329	
9 Perfluorononanoic acid									
463.00 > 419.00	2.185	2.213	-0.028	1.000	3980345	34.3		657	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.329	2.354	-0.025	1.000	1361016	11.3		9975	

Reagents:

LC537-L5_00024

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_013.d

Injection Date: 14-Aug-2017 20:21:08

Instrument ID: A8_N

Lims ID: CCV L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 13

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

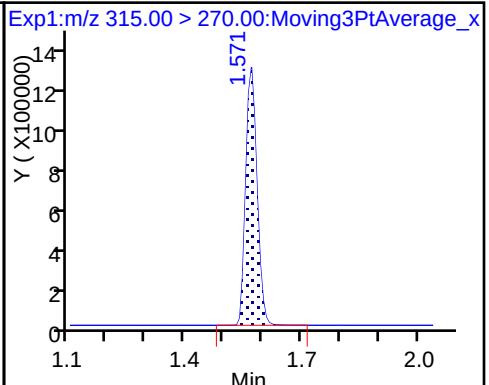
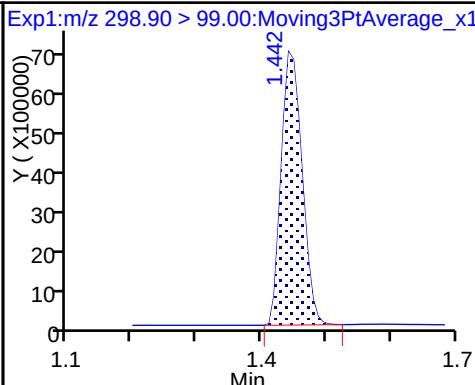
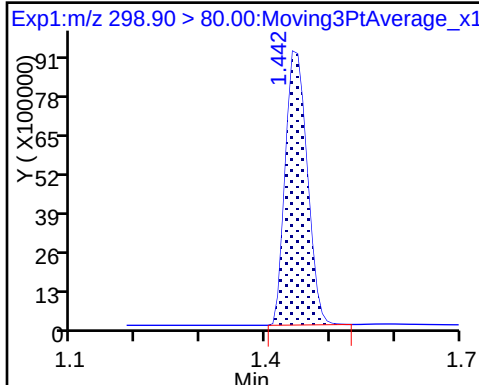
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

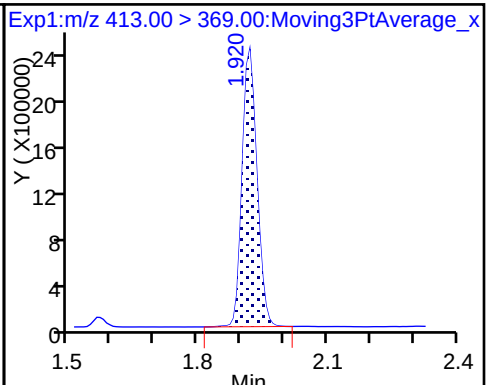
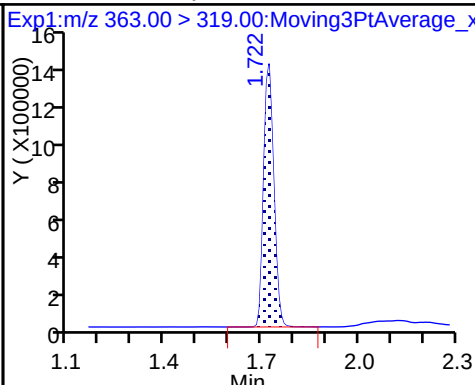
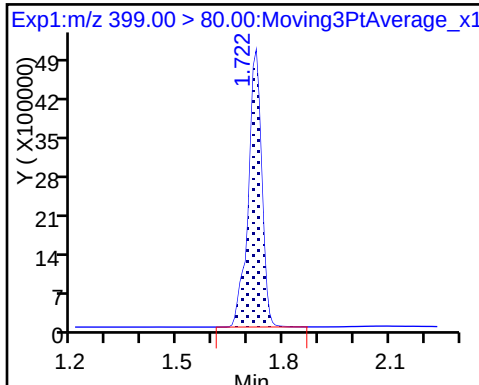
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

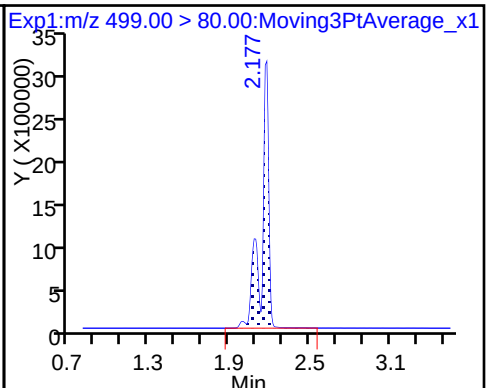
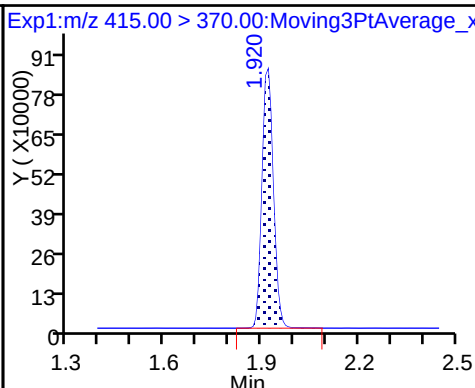
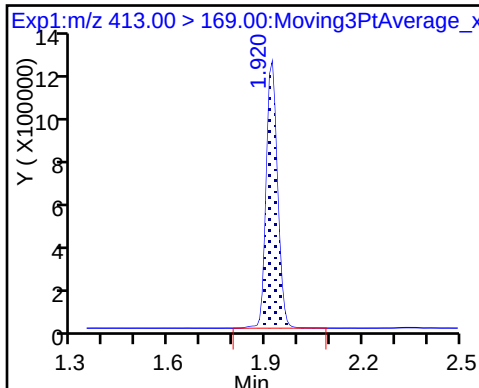
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

* 6 13C2-PFOA

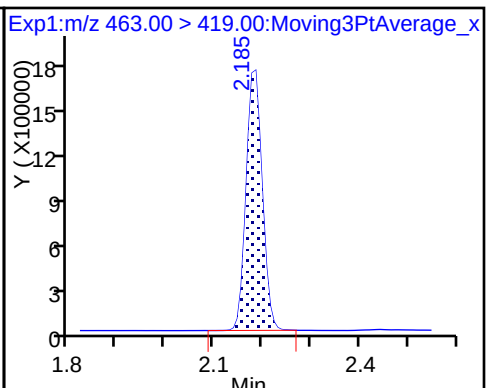
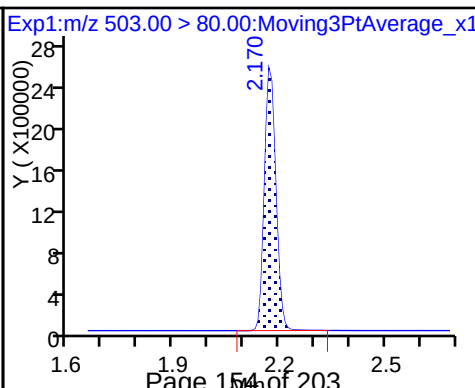
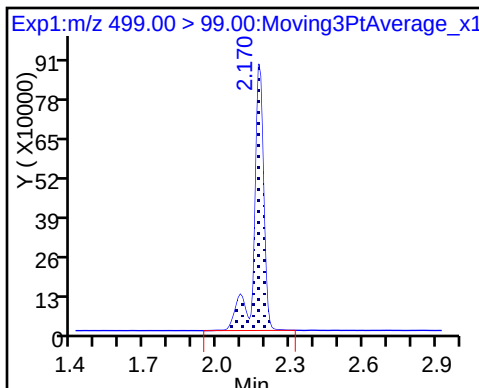
8 Perfluorooctane sulfonic acid



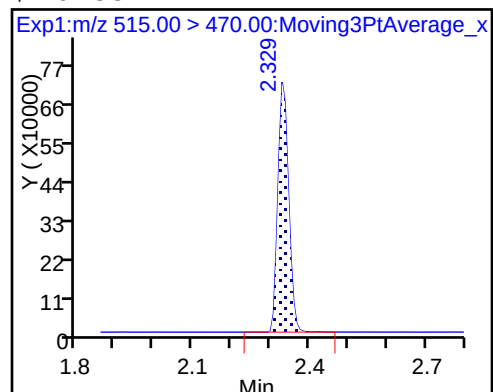
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Lab Sample ID: CCV 320-179701/13 Calibration Date: 08/16/2017 11:43
 Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/14/2017 13:12
 Lab File ID: 2017.08.16_537B_018.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		1.068		47.1	45.0	4.7	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.8560	0.9583		5.60	5.00	11.9	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.494	1.599		16.1	15.0	7.0	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9068	0.8976		9.91	10.0	-1.0	30.0
Perfluorononanoic acid (PFNA)	Ave	0.5665	0.6736		11.9	10.0	18.9	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9236	0.9553		20.7	20.0	3.4	30.0
13C2 PFHxA	Ave	1.069	1.159		10.8	10.0	8.4	30.0
13C2 PFDA	Ave	0.5877	0.7414		12.6	10.0	26.2	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\2017.08.16_537B_018.d
 Lims ID: CCV L3
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 16-Aug-2017 11:43:53 ALS Bottle#: 3 Worklist Smp#: 13
 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*sub1
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 16-Aug-2017 14:31:07 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK009

First Level Reviewer: barnettj Date: 16-Aug-2017 14:03:04

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.442	1.453	-0.011	1.000	9558651	47.1		1153	
298.90 > 99.00	1.442	1.453	-0.011	1.000	6577266		1.45(0.00-0.00)	1212	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.586	1.582	0.004	1.000	2340736	10.8		5228	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.753	1.742	0.011	1.000	4771866	16.1		1088	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.753	1.742	0.011	1.000	967663	5.60		68.4	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.957	1.955	0.002	1.000	1813917	9.91		106	
413.00 > 169.00	1.957	1.955	0.002	1.000	950335		1.91(0.00-0.00)	1067	
* 6 13C2-PFOA									
415.00 > 370.00	1.950	1.955	-0.005		2019138	10.0		5637	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.185	2.177	0.008	1.000	3800434	20.7		2227	M
499.00 > 99.00	2.185	2.177	0.008	1.000	786242		4.83(0.00-0.00)	824	M
* 7 13C4 PFOS									
503.00 > 80.00	2.185	2.205	-0.020		5703707	28.7		5898	
9 Perfluorononanoic acid									
463.00 > 419.00	2.185	2.213	-0.028	1.000	1360242	11.9		165	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.329	2.354	-0.025	1.000	1497072	12.6		4829	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LC537-L3_00023

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\2017.08.16_537B_018.d

Injection Date: 16-Aug-2017 11:43:53

Instrument ID: A8_N

Lims ID: CCV L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 13

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

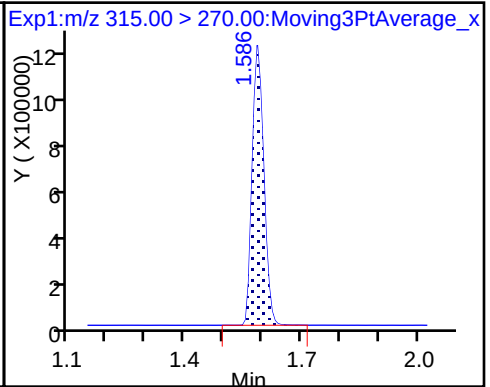
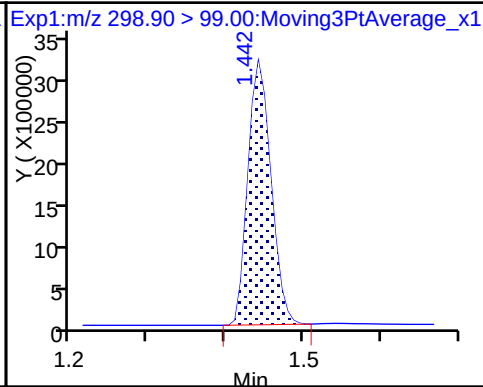
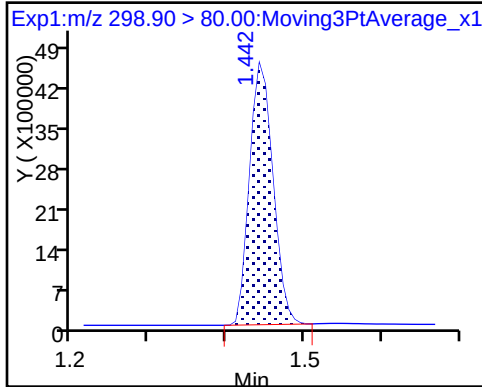
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

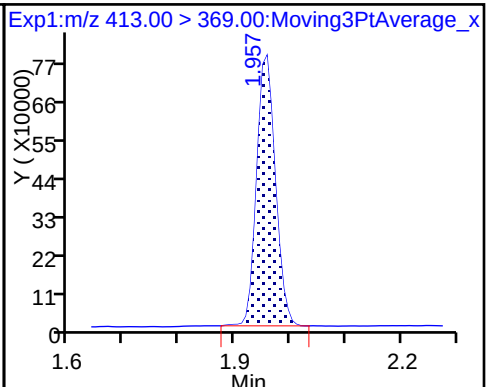
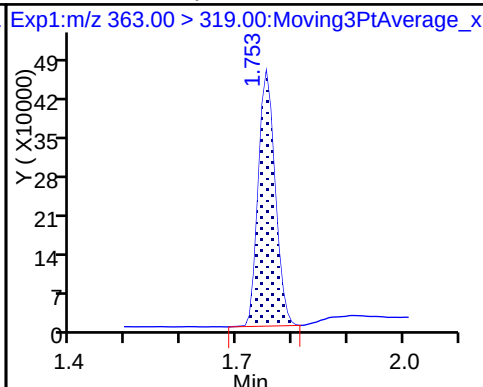
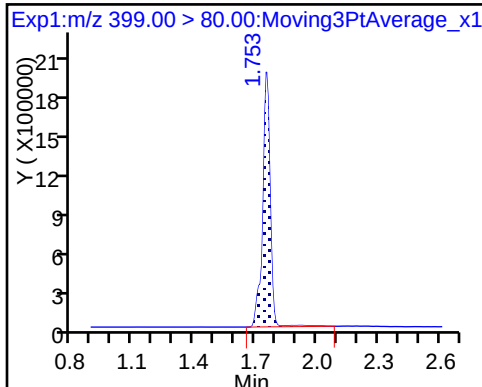
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

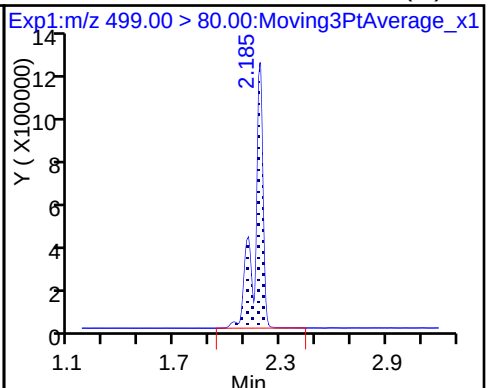
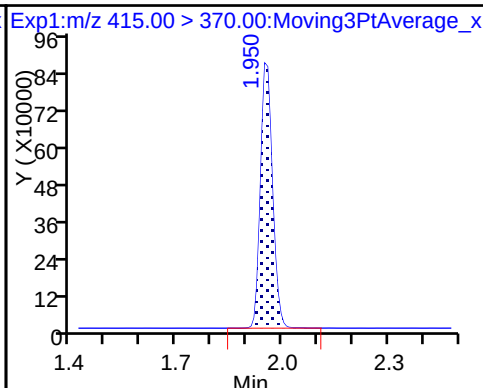
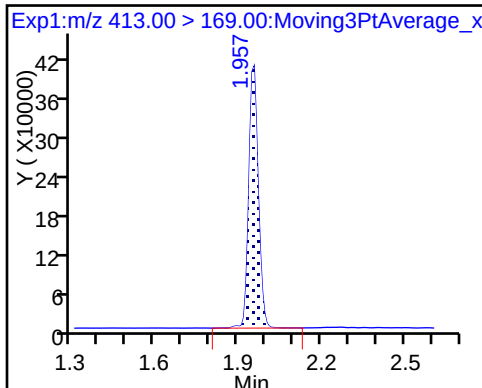
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

* 6 13C2-PFOA

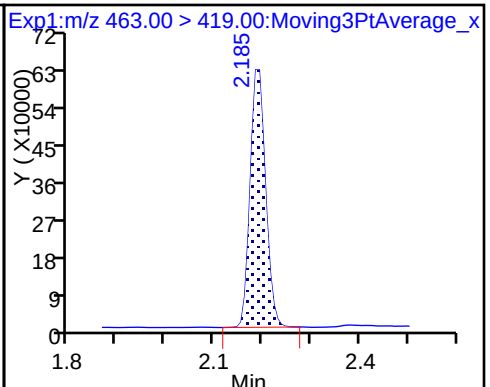
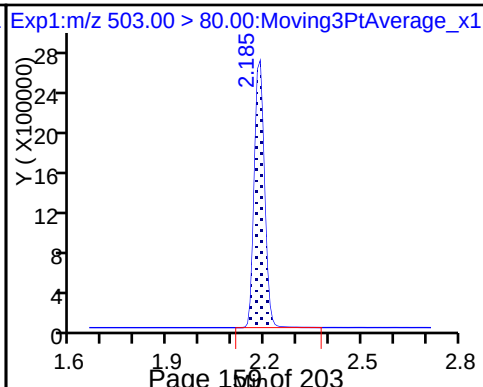
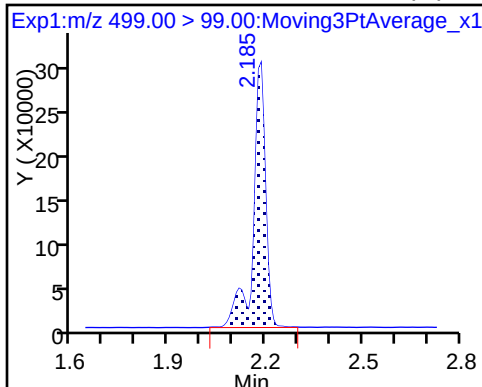
8 Perfluorooctane sulfonic acid (M)



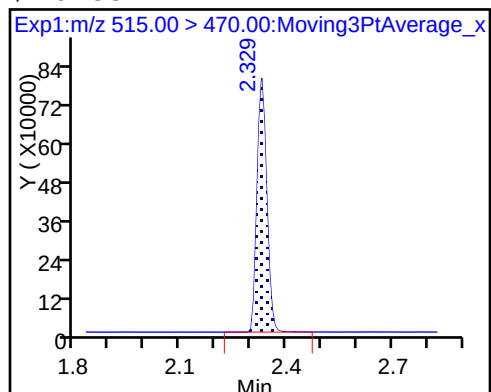
8 Perfluorooctane sulfonic acid (M)

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

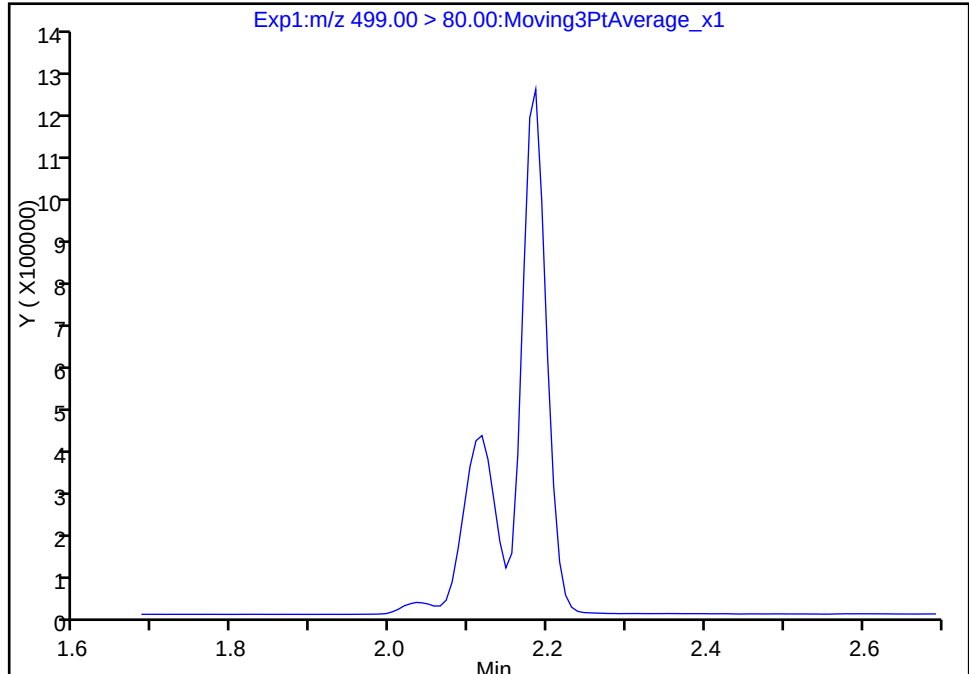
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Injection Date: 16-Aug-2017 11:43:53 Instrument ID: A8_N
Lims ID: CCV L3
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 13
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

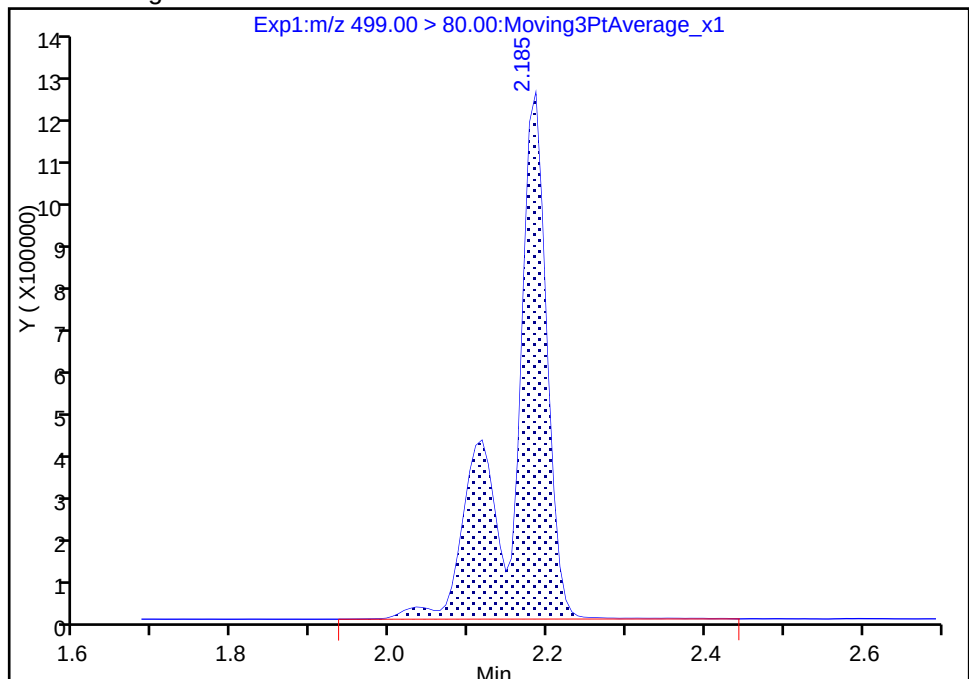
Not Detected
Expected RT: 2.18

Processing Integration Results



RT: 2.19
Area: 3800434
Amount: 20.689894
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 16-Aug-2017 14:02:27

Audit Action: Assigned Compound ID

Audit Reason: Missed Peak

TestAmerica Sacramento

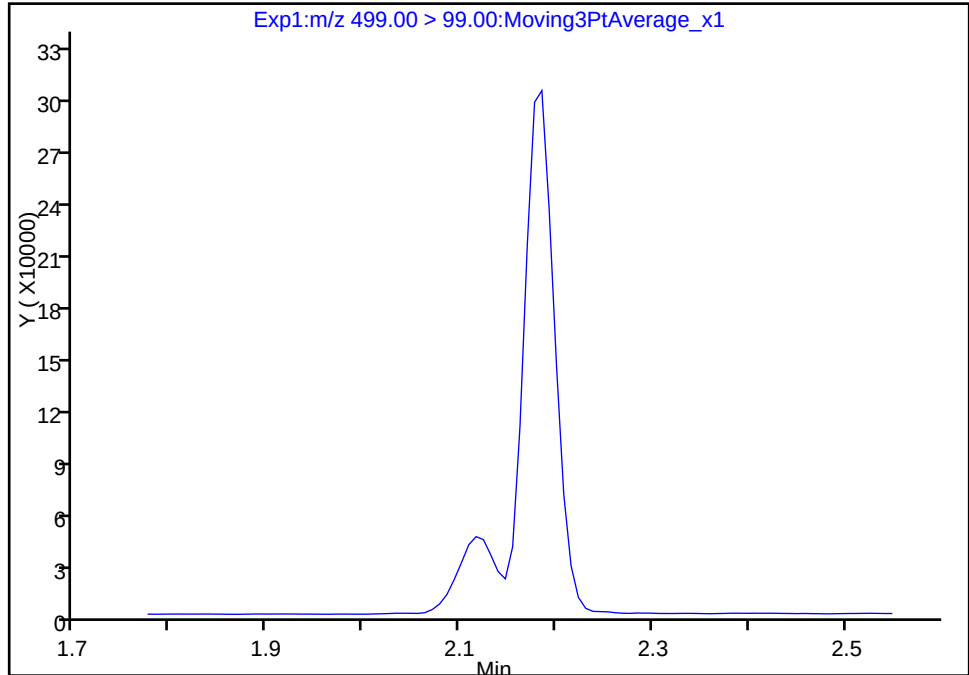
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Injection Date: 16-Aug-2017 11:43:53 Instrument ID: A8_N
Lims ID: CCV L3
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 13
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 2

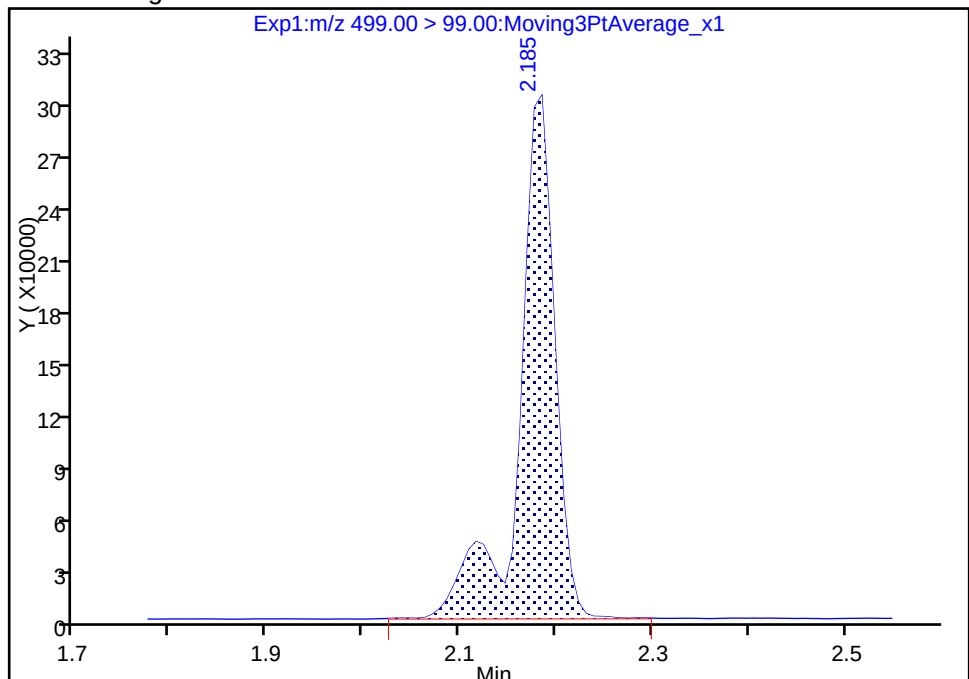
Not Detected
Expected RT: 2.18

Processing Integration Results



Manual Integration Results

RT: 2.19
Area: 786242
Amount: 20.689894
Amount Units: ng/ml



Reviewer: barnettj, 16-Aug-2017 14:02:55

Audit Action: Manually Integrated

Audit Reason: Missed Peak

TestAmerica Sacramento

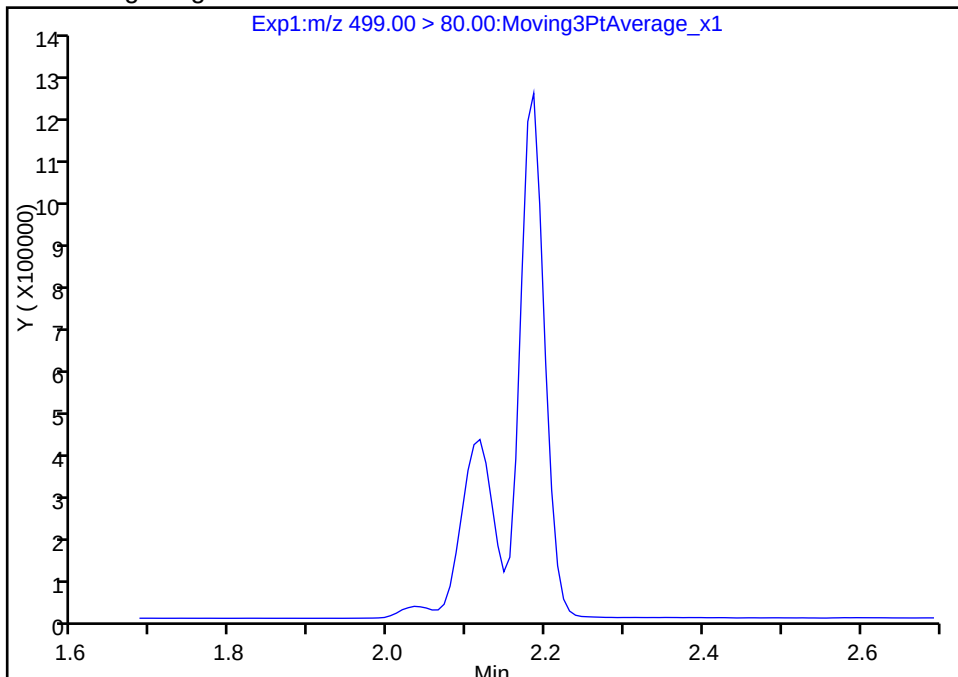
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Injection Date: 16-Aug-2017 11:43:53 Instrument ID: A8_N
Lims ID: CCV L3
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 13
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

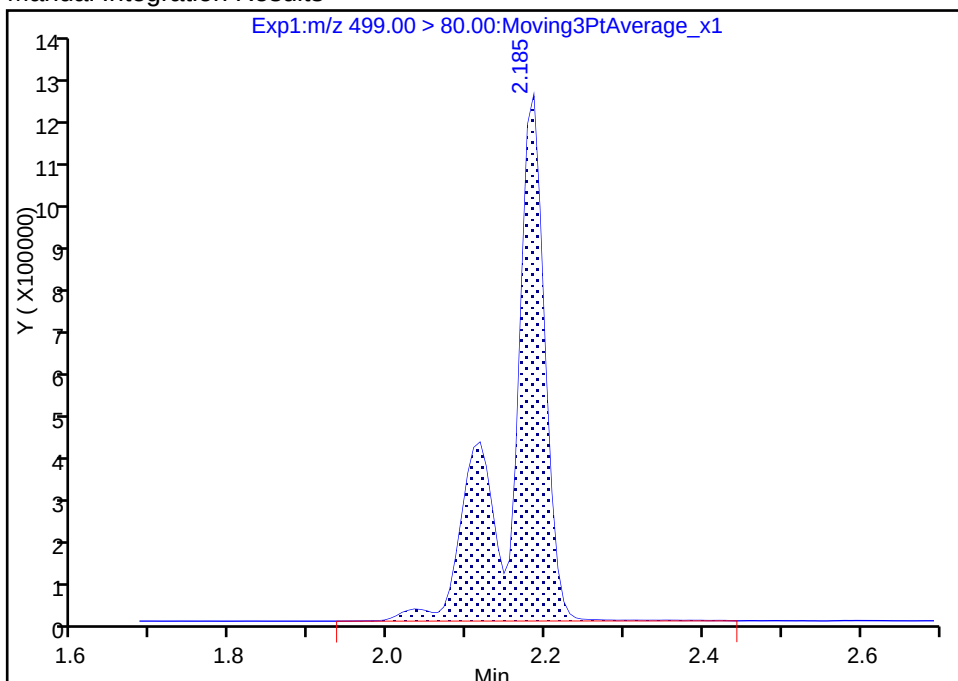
Not Detected
Expected RT: 2.18

Processing Integration Results



Manual Integration Results

RT: 2.19
Area: 3800434
Amount: 20.689894
Amount Units: ng/ml



Reviewer: barnettj, 16-Aug-2017 14:02:55

Audit Action: Manually Integrated

Audit Reason: Missed Peak

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Lab Sample ID: CCV 320-179701/23 Calibration Date: 08/16/2017 12:31
 Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/14/2017 13:12
 Lab File ID: 2017.08.16_537B_028.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		0.7884		126	135	-6.3	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.8560	0.9059		15.9	15.0	5.8	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.494	1.455		43.8	45.0	-2.6	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9068	0.9139		30.3	30.0	0.8	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9236	0.9444		61.4	60.0	2.2	30.0
Perfluorononanoic acid (PFNA)	Ave	0.5665	0.6625		35.1	30.0	16.9	30.0
13C2 PFHxA	Ave	1.069	1.230		11.5	10.0	15.1	30.0
13C2 PFDA	Ave	0.5877	0.7479		12.7	10.0	27.3	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\2017.08.16_537B_028.d
 Lims ID: CCV L5
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 16-Aug-2017 12:31:22 ALS Bottle#: 5 Worklist Smp#: 23
 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*sub1
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 16-Aug-2017 14:31:21 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK009

First Level Reviewer: barnettj

Date: 16-Aug-2017 14:03:18

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.442	1.453	-0.011	1.000	21835712	126.5		2189	
298.90 > 99.00	1.442	1.453	-0.011	1.000	16108055		1.36(0.00-0.00)	2481	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.586	1.582	0.004	1.000	2535063	11.5		5324	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.753	1.742	0.011	1.000	13431314	43.8		1858	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.745	1.742	0.003	1.000	2800379	15.9		185	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.950	1.955	-0.005	1.000	5653809	30.3		317	
413.00 > 169.00	1.950	1.955	-0.005	1.000	3022884		1.87(0.00-0.00)	2947	
* 6 13C2-PFOA									
415.00 > 370.00	1.950	1.955	-0.005		2060448	10.0		5772	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.177	2.177	0.0	1.000	11626056	61.4		4991	
499.00 > 99.00	2.177	2.177	0.0	1.000	2482983		4.68(0.00-0.00)	2173	
* 7 13C4 PFOS									
503.00 > 80.00	2.177	2.205	-0.028		5883312	28.7		5460	
9 Perfluorononanoic acid									
463.00 > 419.00	2.185	2.213	-0.028	1.000	4095718	35.1		578	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.322	2.354	-0.032	1.000	1541073	12.7		5433	

Reagents:

LC537-L5_00024

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b\2017.08.16_537B_028.d

Injection Date: 16-Aug-2017 12:31:22

Instrument ID: A8_N

Lims ID: CCV L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 23

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

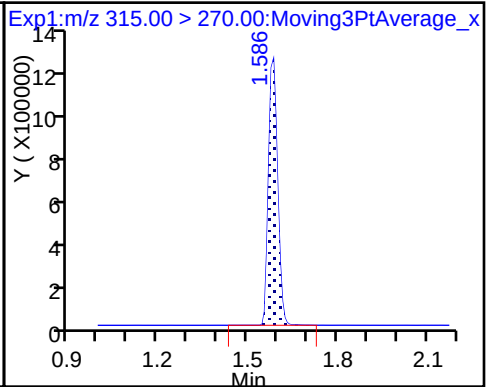
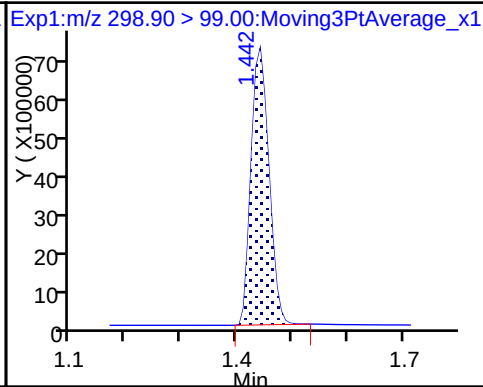
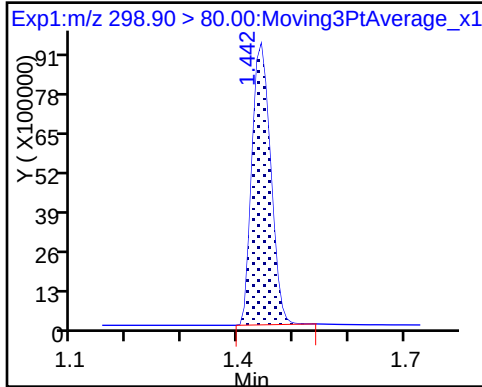
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

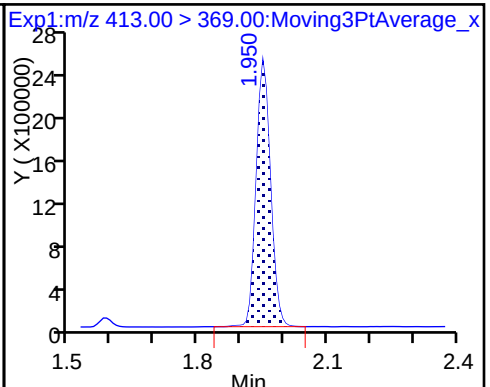
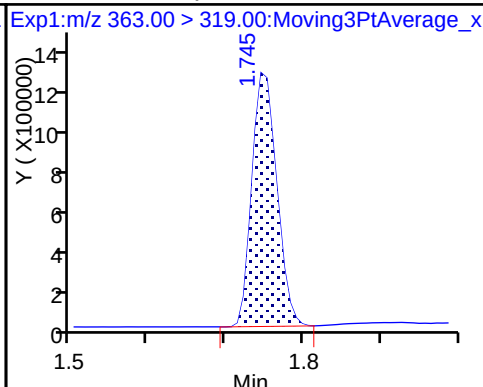
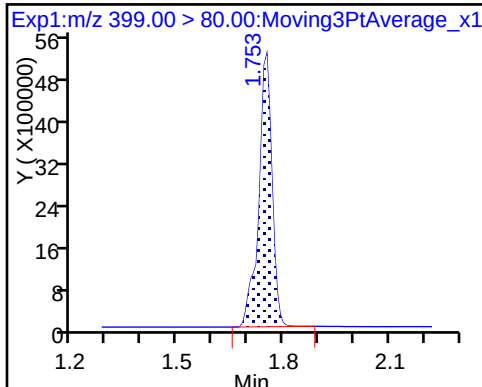
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

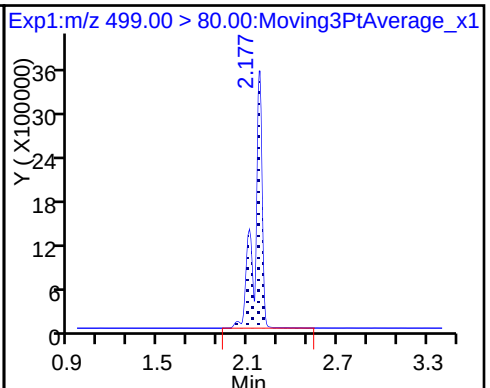
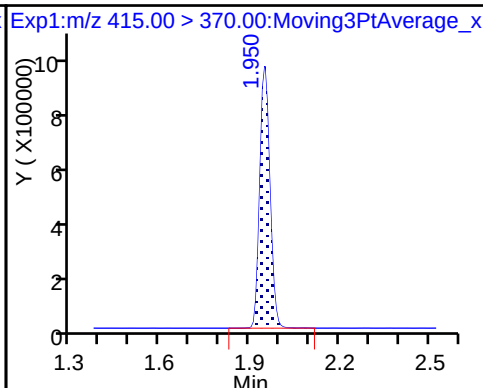
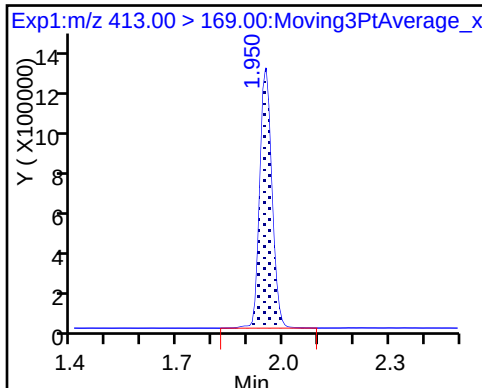
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

* 6 13C2-PFOA

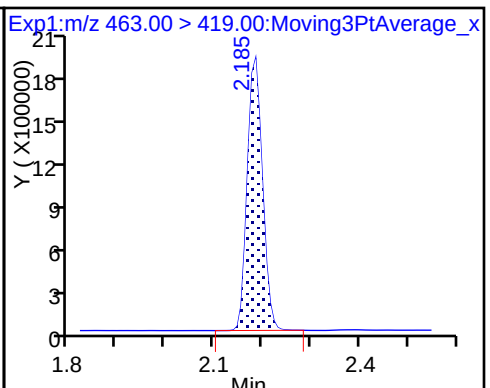
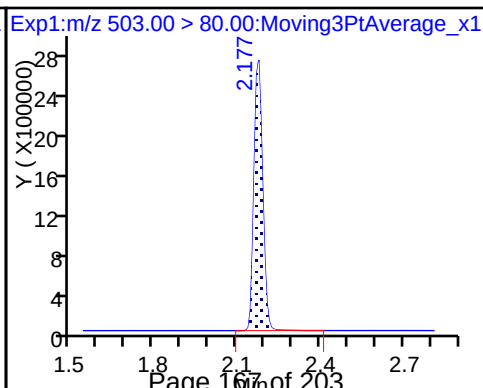
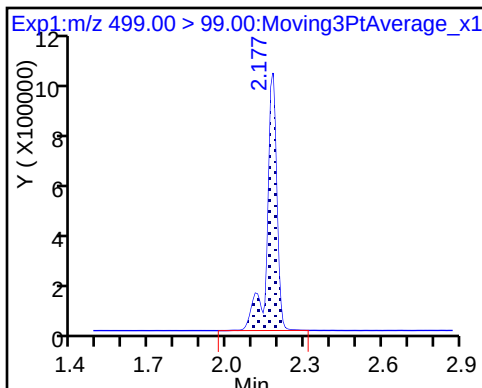
8 Perfluorooctane sulfonic acid



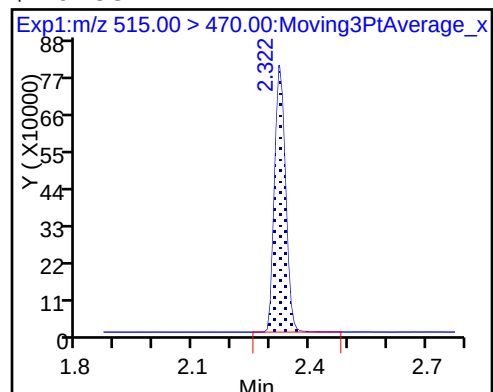
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: MB 320-177417/1-A
 Matrix: Water Lab File ID: 2017.08.14_537B_003.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 08/03/2017 10:02
 Sample wt/vol: 250 (mL) Date Analyzed: 08/14/2017 19:33
 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.: 179510 Units: ng/L

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

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	98		70-130
STL00996	13C2 PFDA	124		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_003.d
 Lims ID: MB 320-177417/1-A
 Client ID:
 Sample Type: MB
 Inject. Date: 14-Aug-2017 19:33:36 ALS Bottle#: 1 Worklist Smp#: 3
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: mb 320-177417/1-a
 Misc. Info.: Plate: 1 Rack: 3
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 16-Aug-2017 14:14:15 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK009

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.571	1.582	-0.012	1.000	2357589	9.80		8184	
* 6 13C2-PFOA									
415.00 > 370.00	1.920	1.955	-0.035		2249354	10.0		8207	
* 7 13C4 PFOS									
503.00 > 80.00	2.177	2.205	-0.028		6501071	28.7		4841	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.337	2.354	-0.017	1.000	1636879	12.4		9342	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_003.d

Injection Date: 14-Aug-2017 19:33:36

Instrument ID: A8_N

Lims ID: MB 320-177417/1-A

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 1

Worklist Smp#: 3

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

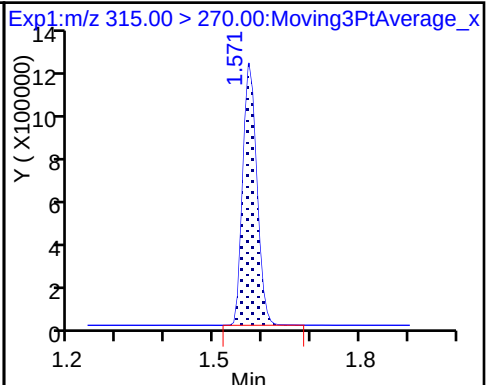
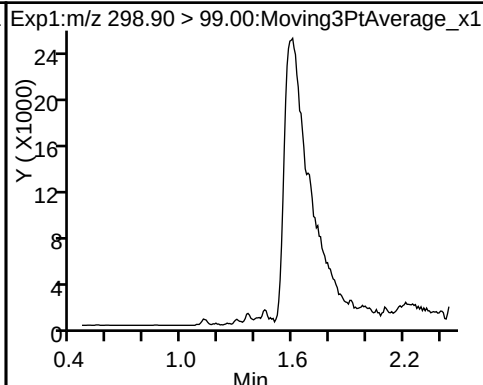
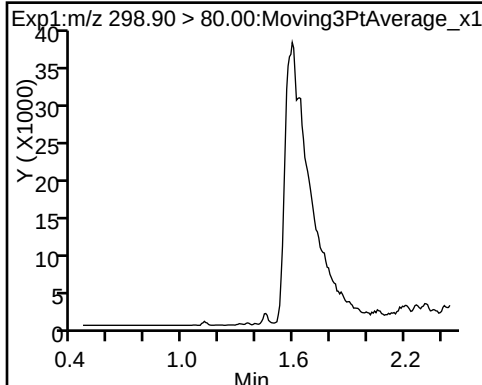
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid (ND)

1 Perfluorobutanesulfonic acid (ND)

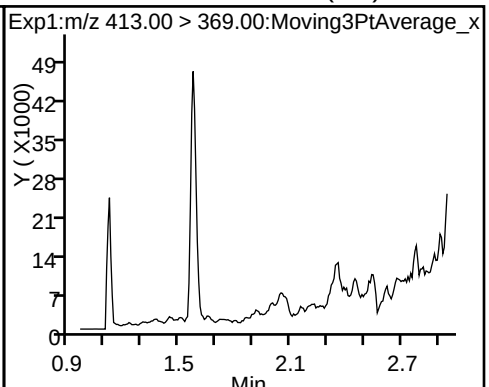
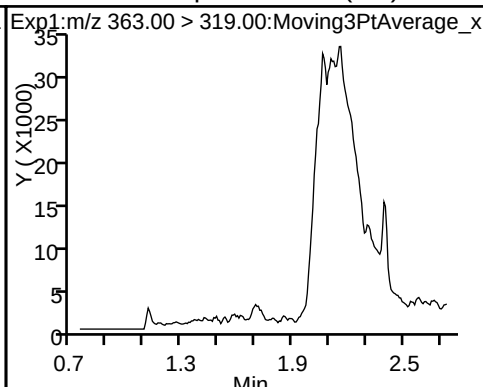
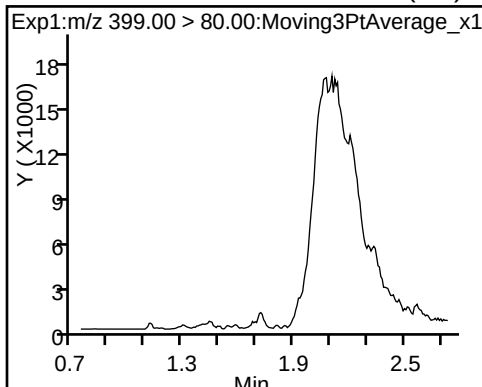
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid (ND)

4 Perfluoroheptanoic acid (ND)

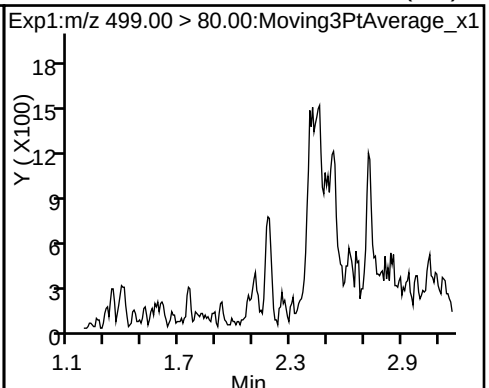
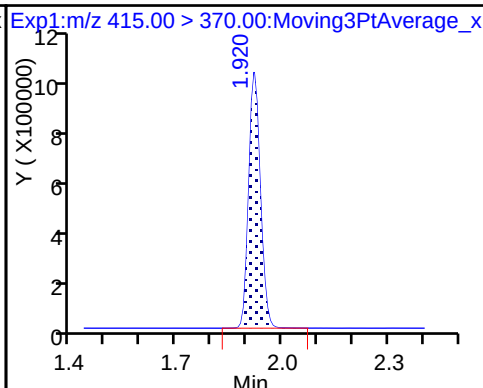
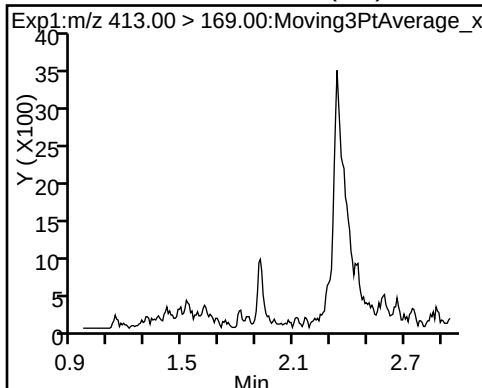
5 Perfluorooctanoic acid (ND)



5 Perfluorooctanoic acid (ND)

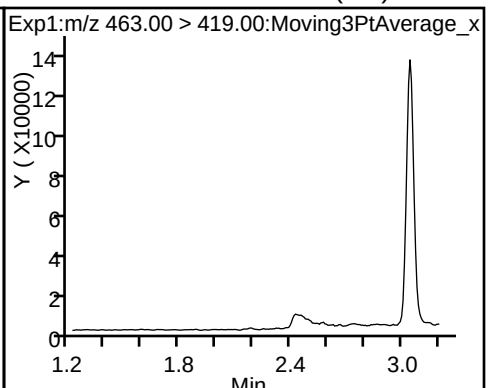
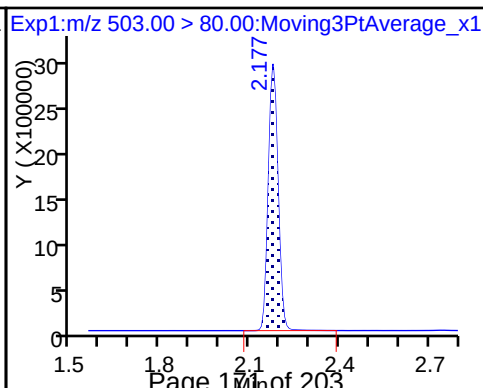
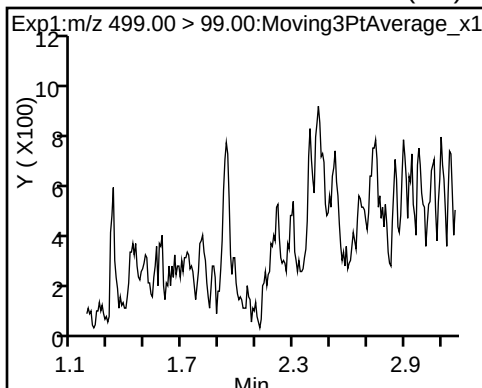
* 6 13C2-PFOA

8 Perfluorooctane sulfonic acid (ND)

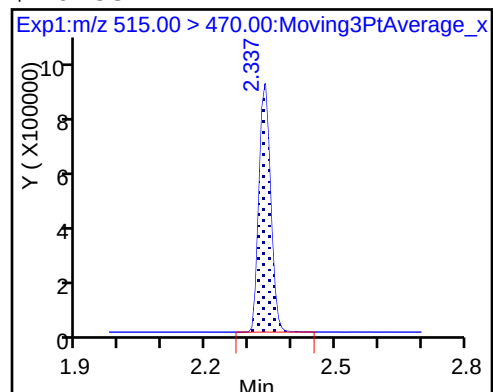


8 Perfluorooctane sulfonic acid (ND) * 7 13C4 PFOS

9 Perfluorononanoic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_003.d
Lims ID: MB 320-177417/1-A
Client ID:
Sample Type: MB
Inject. Date: 14-Aug-2017 19:33:36 ALS Bottle#: 1 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-177417/1-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 16-Aug-2017 14:14:15 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d

Column 1 : Det: EXP1

Process Host: XAWRK009

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.80	98.02
\$ 10 13C2 PFDA	10.0	12.4	123.83

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: LCS 320-177417/2-A
 Matrix: Water Lab File ID: 2017.08.14_537B_004.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 08/03/2017 10:02
 Sample wt/vol: 250 (mL) Date Analyzed: 08/14/2017 19:38
 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.: 179510 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	323	E	40	16	6.8
335-67-1	Perfluorooctanoic acid (PFOA)	144		20	8.0	2.8
375-95-1	Perfluorononanoic acid (PFNA)	164	E	24	20	8.0
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	201		30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	91.6	E	10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	589		90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	94		70-130
STL00996	13C2 PFDA	116		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_004.d
 Lims ID: LCS 320-177417/2-A
 Client ID:
 Sample Type: LCS
 Inject. Date: 14-Aug-2017 19:38:21 ALS Bottle#: 2 Worklist Smp#: 4
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: lcs 320-177417/2-a
 Misc. Info.: Plate: 1 Rack: 3
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 16-Aug-2017 14:14:15 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d
 Column 1 : Det: EXP1
 Process Host: XAWRK009

First Level Reviewer: barnettj

Date: 15-Aug-2017 13:59:27

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.449	1.453	-0.004	1.000	25374780	147.3		3094	
298.90 > 99.00	1.449	1.453	-0.004	1.000	18767378		1.35(0.00-0.00)	2316	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.571	1.582	-0.012	1.000	2266919	9.38		8407	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.722	1.742	-0.020	1.000	16302563	50.3		2014	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.722	1.742	-0.020	1.000	4429408	22.9		377	E
5 Perfluorooctanoic acid									
413.00 > 369.00	1.920	1.955	-0.035	1.000	7378095	36.0		426	
413.00 > 169.00	1.920	1.955	-0.035	1.000	4071300		1.81(0.00-0.00)	5045	
* 6 13C2-PFOA									
415.00 > 370.00	1.920	1.955	-0.035		2259712	10.0		8207	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.177	2.170	0.007	1.000	16165376	80.7		6013	E
499.00 > 99.00	2.177	2.170	0.007	1.000	3777395		4.28(0.00-0.00)	2735	E
* 7 13C4 PFOS									
503.00 > 80.00	2.177	2.205	-0.028		6216901	28.7		4842	
9 Perfluorononanoic acid									
463.00 > 419.00	2.185	2.213	-0.028	1.000	5243776	41.0		534	E
\$ 10 13C2 PFDA									
515.00 > 470.00	2.337	2.354	-0.017	1.000	1542917	11.6		9923	

[QC Flag Legend](#)

Processing Flags

E - Exceeded Maximum Amount

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_004.d

Injection Date: 14-Aug-2017 19:38:21

Instrument ID: A8_N

Lims ID: LCS 320-177417/2-A

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 4

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

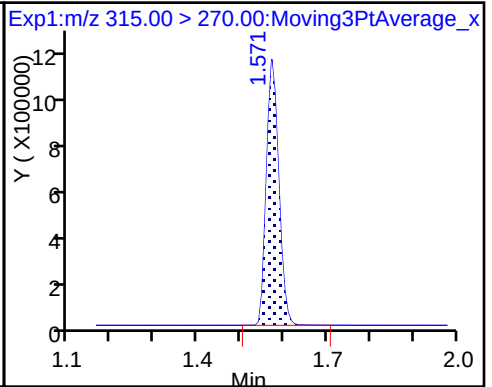
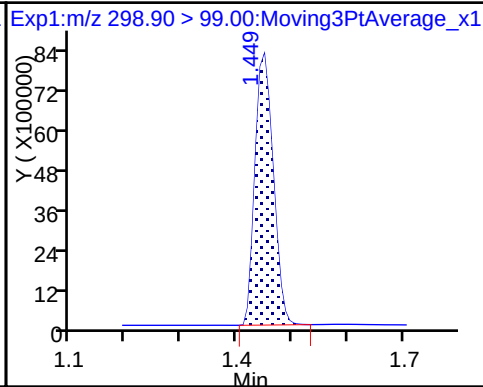
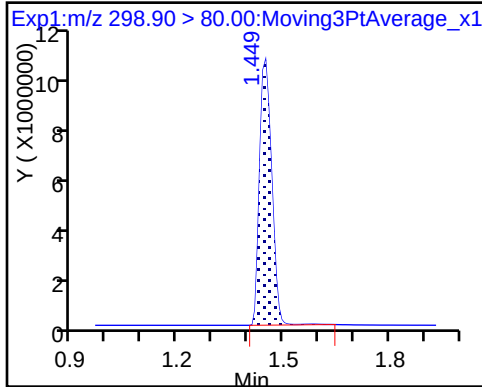
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

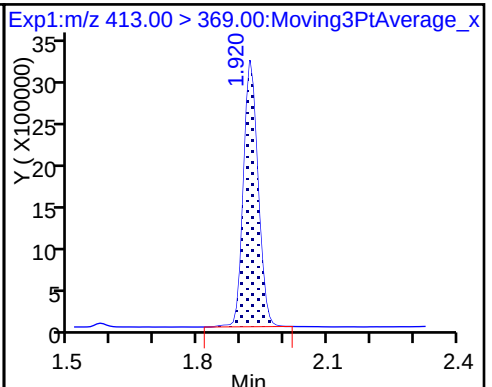
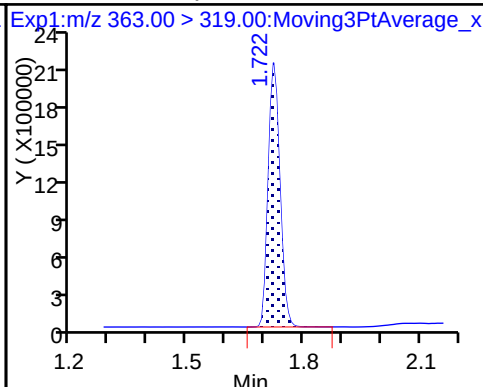
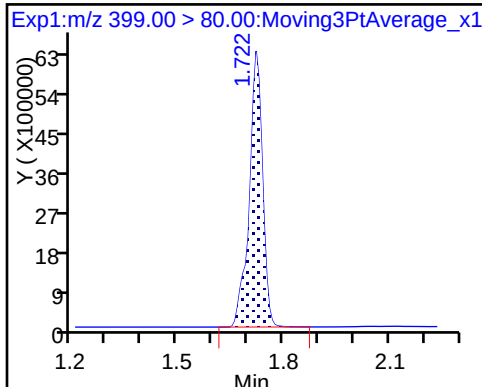
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

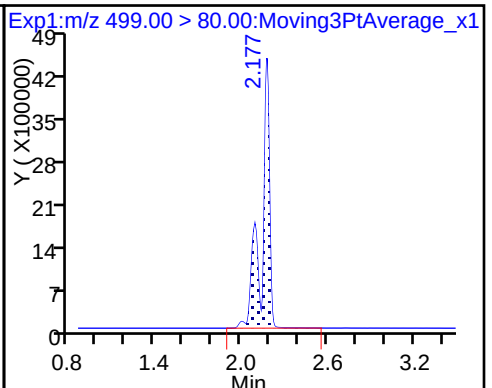
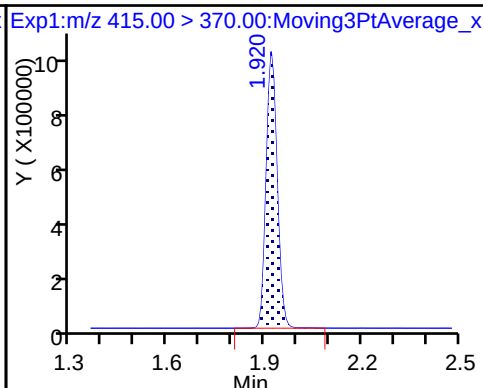
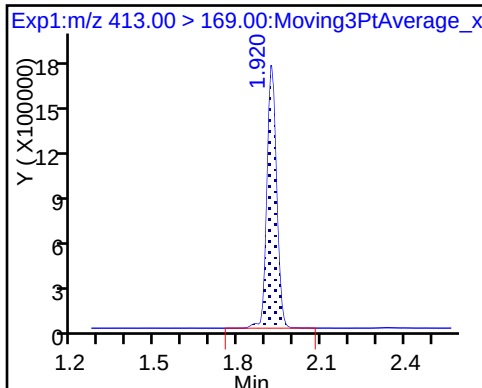
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

* 6 13C2-PFOA

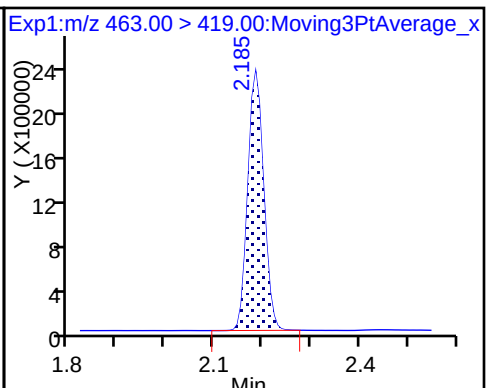
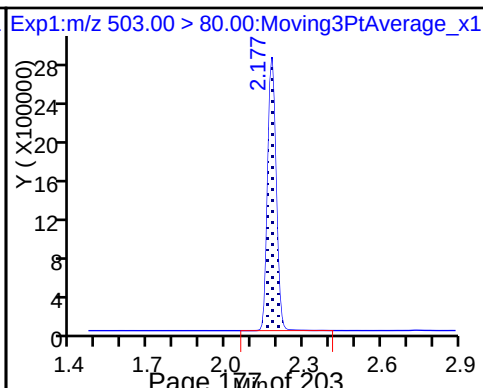
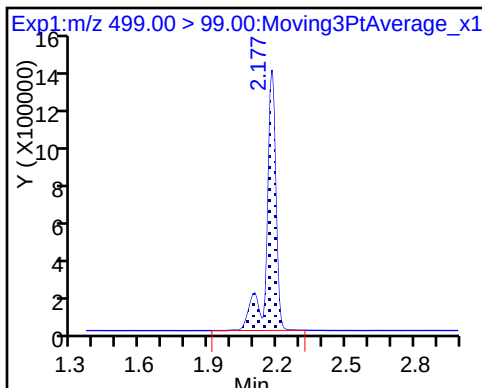
8 Perfluorooctane sulfonic acid



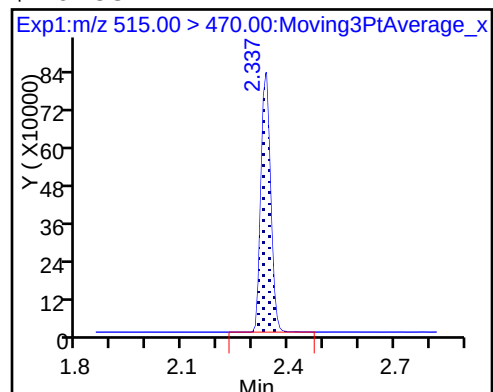
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_004.d
Lims ID: LCS 320-177417/2-A
Client ID:
Sample Type: LCS
Inject. Date: 14-Aug-2017 19:38:21 ALS Bottle#: 2 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-177417/2-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 16-Aug-2017 14:14:15 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d
Column 1 : Det: EXP1
Process Host: XAWRK009

First Level Reviewer: barnettj

Date: 15-Aug-2017 13:59:27

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.38	93.82
\$ 10 13C2 PFDA	10.0	11.6	116.19

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: LCSD 320-177417/3-A
 Matrix: Water Lab File ID: 2017.08.14_537B_005.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 08/03/2017 10:02
 Sample wt/vol: 250 (mL) Date Analyzed: 08/14/2017 19:43
 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.: 179510 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	315		40	16	6.8
335-67-1	Perfluorooctanoic acid (PFOA)	145		20	8.0	2.8
375-95-1	Perfluorononanoic acid (PFNA)	172	E	24	20	8.0
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	198		30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	89.2	E	10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	575		90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	97		70-130
STL00996	13C2 PFDA	132	Q	70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_005.d
 Lims ID: LCSD 320-177417/3-A
 Client ID:
 Sample Type: LCSD
 Inject. Date: 14-Aug-2017 19:43:06 ALS Bottle#: 3 Worklist Smp#: 5
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: lcsd 320-177417/3-a
 Misc. Info.: Plate: 1 Rack: 3
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 16-Aug-2017 14:14:15 Calib Date: 14-Aug-2017 13:12:40
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d
 Column 1 : Det: EXP1
 Process Host: XAWRK009

First Level Reviewer: barnettj

Date: 15-Aug-2017 14:00:01

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.442	1.453	-0.011	1.000	24986038	143.6		3006	
298.90 > 99.00	1.442	1.453	-0.011	1.000	18502070		1.35(0.00-0.00)	3543	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.571	1.582	-0.012	1.000	2272556	9.67		9175	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.722	1.742	-0.020	1.000	16021765	49.5		1913	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.722	1.742	-0.020	1.000	4194535	22.3		365	E
5 Perfluorooctanoic acid									
413.00 > 369.00	1.912	1.955	-0.043	1.000	7211013	36.2		417	
413.00 > 169.00	1.912	1.955	-0.043	1.000	3950573		1.83(0.00-0.00)	4399	
* 6 13C2-PFOA									
415.00 > 370.00	1.912	1.955	-0.043		2198507	10.0		7845	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.170	2.170	0.0	1.000	15745089	78.7		5521	
499.00 > 99.00	2.170	2.170	0.0	1.000	3710726		4.24(0.00-0.00)	2525	
* 7 13C4 PFOS									
503.00 > 80.00	2.170	2.205	-0.035		6213934	28.7		3652	
9 Perfluorononanoic acid									
463.00 > 419.00	2.177	2.213	-0.036	1.000	5341524	42.9		305	E
\$ 10 13C2 PFDA									
515.00 > 470.00	2.329	2.354	-0.025	1.000	1700951	13.2		10839	

[QC Flag Legend](#)

Processing Flags

E - Exceeded Maximum Amount

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_005.d

Injection Date: 14-Aug-2017 19:43:06

Instrument ID: A8_N

Lims ID: LCSD 320-177417/3-A

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 5

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

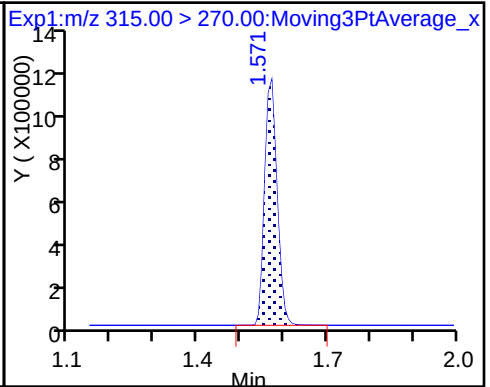
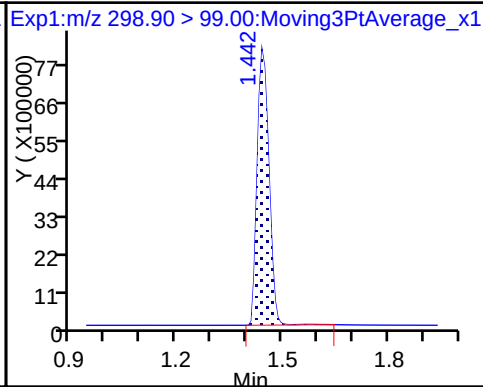
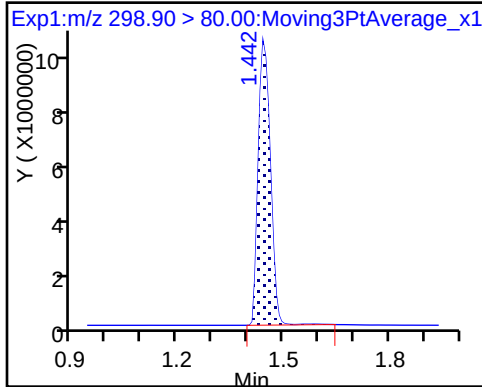
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

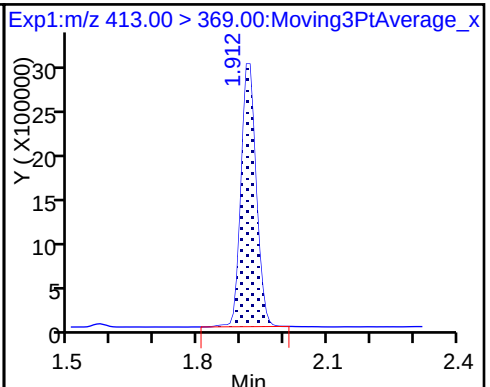
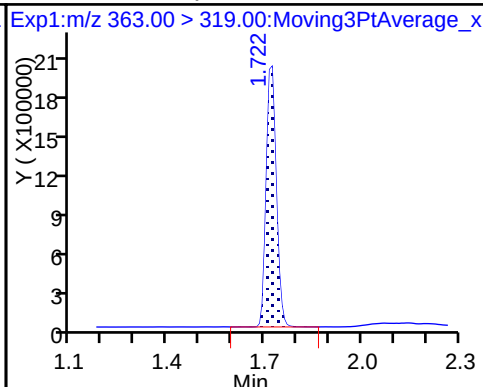
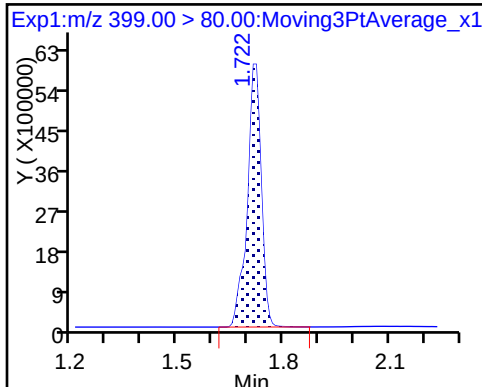
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

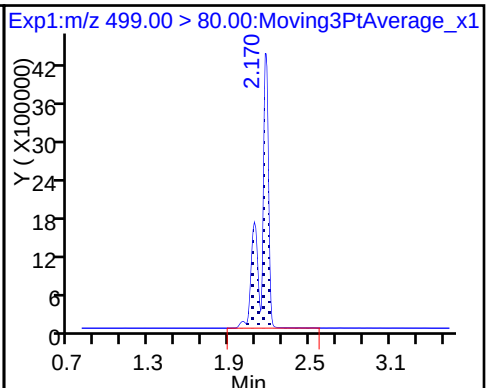
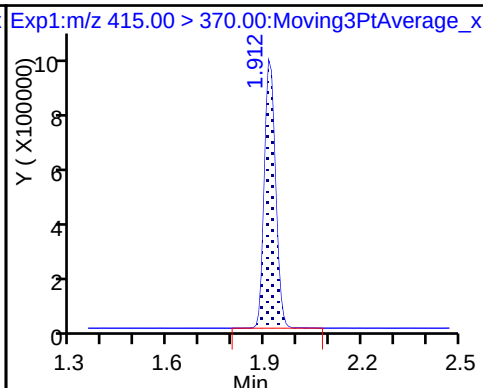
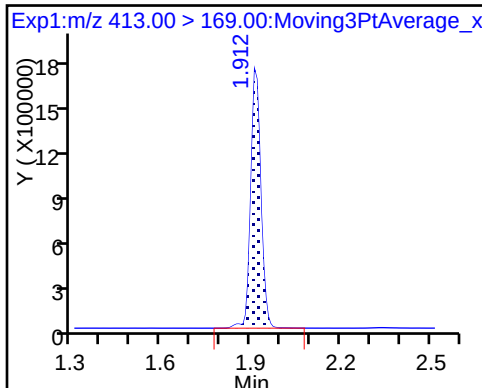
5 Perfluorooctanoic acid



5 Perfluorooctanoic acid

* 6 13C2-PFOA

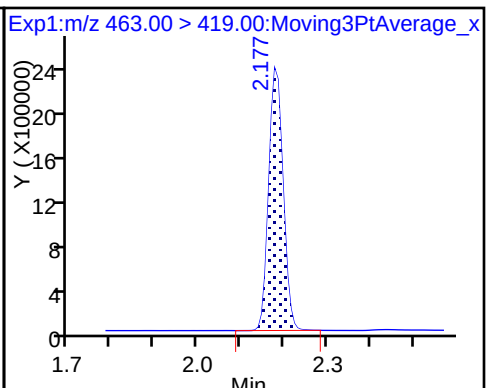
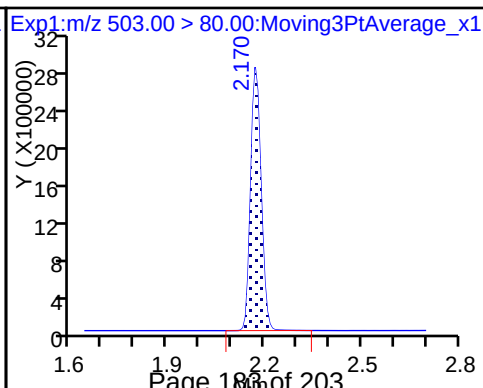
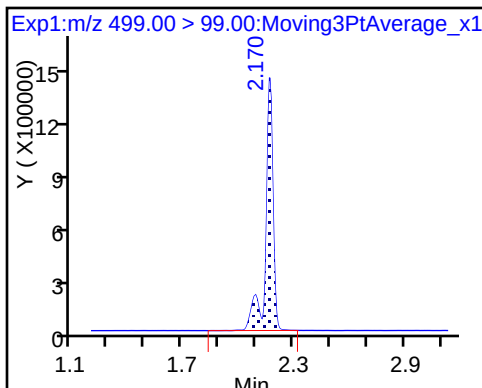
8 Perfluorooctane sulfonic acid



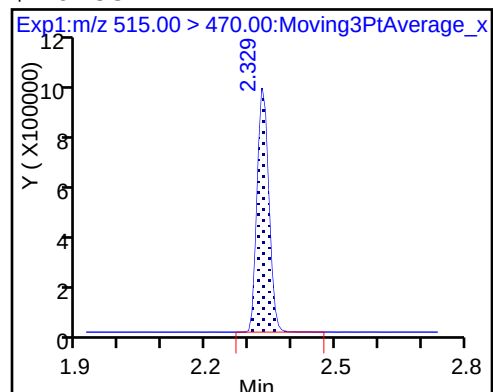
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\2017.08.14_537B_005.d
Lims ID: LCSD 320-177417/3-A
Client ID:
Sample Type: LCSD
Inject. Date: 14-Aug-2017 19:43:06 ALS Bottle#: 3 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcsd 320-177417/3-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Method: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 16-Aug-2017 14:14:15 Calib Date: 14-Aug-2017 13:12:40
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20170814-46675.b\2017.08.14_537ICAL_007.d
Column 1 : Det: EXP1
Process Host: XAWRK009

First Level Reviewer: barnettj

Date: 15-Aug-2017 14:00:01

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.67	96.67
\$ 10 13C2 PFDA	10.0	13.2	131.65

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-30136-1

SDG No.: _____

Instrument ID: A8_NStart Date: 08/14/2017 12:48Analysis Batch Number: 179319End Date: 08/14/2017 13:31

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-179319/2		08/14/2017 12:48	1	2017.08.14_537I CAL 002.d	GeminiC18 3x100 3(mm)
IC 320-179319/3		08/14/2017 12:53	1	2017.08.14_537I CAL 003.d	GeminiC18 3x100 3(mm)
IC 320-179319/4		08/14/2017 12:58	1	2017.08.14_537I CAL 004.d	GeminiC18 3x100 3(mm)
IC 320-179319/5 ICISAV		08/14/2017 13:03	1	2017.08.14_537I CAL 005.d	GeminiC18 3x100 3(mm)
IC 320-179319/6		08/14/2017 13:07	1	2017.08.14_537I CAL 006.d	GeminiC18 3x100 3(mm)
IC 320-179319/7		08/14/2017 13:12	1	2017.08.14_537I CAL 007.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 13:17	1		GeminiC18 3x100 3(mm)
CCVL 320-179319/9		08/14/2017 13:22	1	2017.08.14_537I CAL 009.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 13:26	1		GeminiC18 3x100 3(mm)
ICV 320-179319/11		08/14/2017 13:31	1	2017.08.14_537I CAL 011.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-30136-1

SDG No.: _____

Instrument ID: A8_NStart Date: 08/14/2017 19:24Analysis Batch Number: 179510End Date: 08/14/2017 20:21

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-179510/1 CCVIS		08/14/2017 19:24	1	2017.08.14_537B 001.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 19:28	1		GeminiC18 3x100 3(mm)
MB 320-177417/1-A		08/14/2017 19:33	1	2017.08.14_537B 003.d	GeminiC18 3x100 3(mm)
LCS 320-177417/2-A		08/14/2017 19:38	1	2017.08.14_537B 004.d	GeminiC18 3x100 3(mm)
LCSD 320-177417/3-A		08/14/2017 19:43	1	2017.08.14_537B 005.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 19:47	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 19:52	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 19:57	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 20:02	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 20:06	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 20:11	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 20:16	1		GeminiC18 3x100 3(mm)
CCV 320-179510/13 CCVIS		08/14/2017 20:21	1	2017.08.14_537B 013.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1

SDG No.: _____

Instrument ID: A8_N Start Date: 08/16/2017 11:43Analysis Batch Number: 179701 End Date: 08/16/2017 12:31

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-179701/13 CCVIS		08/16/2017 11:43	1	2017.08.16_537B 018.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/16/2017 11:48	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/16/2017 11:53	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/16/2017 12:02	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/16/2017 12:07	1		GeminiC18 3x100 3(mm)
320-30136-1		08/16/2017 12:12	1	2017.08.16_537B 024.d	GeminiC18 3x100 3(mm)
320-30136-2		08/16/2017 12:17	1	2017.08.16_537B 025.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/16/2017 12:21	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/16/2017 12:26	1		GeminiC18 3x100 3(mm)
CCV 320-179701/23 CCVIS		08/16/2017 12:31	1	2017.08.16_537B 028.d	GeminiC18 3x100 3(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1

SDG No.: _____

Batch Number: 177417 Batch Start Date: 08/03/17 10:02 Batch Analyst: Branscum, CassieBatch Method: 537 Batch End Date: 08/04/17 21:08

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-HSP 00018
MB 320-177417/1		537, 537				250 mL	1.00 mL	7 SU	
LCS 320-177417/2		537, 537				250 mL	1.00 mL	7 SU	100 uL
LCSD 320-177417/3		537, 537				250 mL	1.00 mL	7 SU	100 uL
320-30136-A-1	WGNA-072517-RW-4842	537, 537	T	284.32 g	28.18 g	256.1 mL	1.00 mL	7 SU	
320-30136-A-2	WGNA-072517-FRB-4842	537, 537	T	286.87 g	28.31 g	258.6 mL	1.00 mL	7 SU	

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-IS 00044	LC537-IS 00046	LC537-SU 00046	AnalysisComment		
MB 320-177417/1		537, 537		100 uL		100 uL	ch nd		
LCS 320-177417/2		537, 537		100 uL		100 uL	ch nd		
LCSD 320-177417/3		537, 537		100 uL		100 uL	ch nd		
320-30136-A-1	WGNA-072517-RW-4842	537, 537	T		100 uL	100 uL	ch nd		
320-30136-A-2	WGNA-072517-FRB-4842	537, 537	T		100 uL	100 uL	ch nd		

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

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1

SDG No.: _____

Batch Number: 177417 Batch Start Date: 08/03/17 10:02 Batch Analyst: Branscum, CassieBatch Method: 537 Batch End Date: 08/04/17 21:08

Batch Notes	
Batch Comment	IS:975029/1002798
Manifold ID	3,9
Methanol ID	988835
Pipette ID	M16387D
Analyst ID - IS Reagent Drop	JER/CCB
Analyst ID - IS Reagent Drop Witness	TN
Analyst ID - SU Reagent Drop	CCB
Analyst ID - SU Reagent Drop Witness	JNS
Analyst ID - TA Reagent Drop	CCB
Analyst ID - TA Reagent Drop Witness	JNS
SPE Cartridge ID	6357081-02
Trizma ID	SLBR4303V
Reagent Water ID	8-1-17

Basis	Basis Description
T	Total/NA

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

A8

Job No: 30142, 30136 Instrument ID & Date: 8-14-17 ICAL Batch: 179319
Extraction Batch: 177417 Worklist #: 46718, 46765 TALS Batch: 179510, 179511, 179701

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

1st Level Reviewer / Date: JRB 8-16-17

2nd Level Reviewer / Date: neway 8/17/17

NCM # and Comments: 97843, 97844, 97852, 97853

A8

Instrument ID & Date: 8-14-17 Worklist#: 46675

ICAL Batch: 179319, 179320 Calibration ID number: 33517

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

1st Level Reviewer / Date: JRB 8-14-17

2nd Level Reviewer / Date: CAW 8/14/17

NCM # and Comments: _____

TestAmerica Laboratories
Worklist QC Batch Report

Worklist Name: 14AUG2017_537C

Worklist Number: 46718

Instrument Name: A8_N

Chrom Method: 537_A8_N

Data Directory: \\ChromNa\Sacramento\ChromData\A8_N\20170815-46718.b

QC Batching: Enabled

Limit Group Batching: Enabled

QC Batch: 1	LC 537 ICAL Raw Batch: 179510
# 1 CCV L3	# 1 CCV L3
# 2 RB	# 2 RB
# 3 MB 320-177417/1-A	# 3 MB 320-177417/1-A
# 4 LCS 320-177417/2-A	# 4 LCS 320-177417/2-A
# 5 LCSD 320-177417/3-A	# 5 LCSD 320-177417/3-A
# 6 320-30142-A-1-A	# 6 320-30142-A-1-A
# 7 320-30142-A-2-A	# 7 320-30142-A-2-A
# 8 320-30142-A-3-A	# 8 320-30142-A-3-A
# 9 320-30142-A-4-A	# 9 320-30142-A-4-A
#10 320-30142-A-5-A	#10 320-30142-A-5-A
#11 320-30142-A-6-A	#11 320-30142-A-6-A
#12 320-30142-A-7-A	#12 320-30142-A-7-A
#13 CCV L5	#13 CCV L5

QC Batch: 2	LC 537 ICAL Raw Batch: 179511
#13 CCV L5	#13 CCV L5
#14 RB	#14 RB
#15 320-30142-A-8-A	#15 320-30142-A-8-A
#16 320-30136-A-1-B	#16 320-30136-A-1-B
#17 320-30136-A-2-B	#17 320-30136-A-2-B
#18 CCV L3	#18 CCV L3
#19 RB	#19 RB

TestAmerica Laboratories
Worklist QC Batch Report

Worklist Name: 16AUG2017_537C

Worklist Number: 46765

Instrument Name: A8_N

Chrom Method: 537_A8_N

Data Directory: \\ChromNa\Sacramento\ChromData\A8_N\20170816-46765.b

QC Batching: Enabled

Limit Group Batching: Enabled

QC Batch: 1	LC 537 ICAL Raw Batch: 179700
# 1 CCV L5	# 1 CCV L5
# 2 RB	# 2 RB
# 3 MB 320-177904/1-A	# 3 MB 320-177904/1-A
# 4 LCS 320-177904/2-A	# 4 LCS 320-177904/2-A
# 5 LCSD 320-177904/3-A	# 5 LCSD 320-177904/3-A
# 6 320-29930-B-11-A	# 6 320-29930-B-11-A
# 7 320-29930-B-12-A	# 7 320-29930-B-12-A
# 8 320-30327-A-1-A	# 8 320-30327-A-1-A
# 9 320-30327-A-2-A	# 9 320-30327-A-2-A
#10 320-30327-A-3-A	#10 320-30327-A-3-A
#11 320-30327-A-4-A	#11 320-30327-A-4-A
#12 320-30327-A-5-A	#12 320-30327-A-5-A
#13 CCV L3	#13 CCV L3

QC Batch: 2	LC 537 ICAL Raw Batch: 179701
#13 CCV L3	#13 CCV L3
#14 RB	#14 RB
#15 320-30327-A-6-A	#15 320-30327-A-6-A
#16 RINSE	#16 RINSE
#17 LCSD 320-177417/3-A	#17 LCSD 320-177417/3-A
#18 320-30142-A-8-A	#18 320-30142-A-8-A
#19 320-30136-A-1-B	#19 320-30136-A-1-B
#20 320-30136-A-2-B	#20 320-30136-A-2-B
#21 320-30136-A-1-B	#21 320-30136-A-1-B
#22 320-30136-A-2-B	#22 320-30136-A-2-B
#23 CCV L5	#23 CCV L5
#24 RB	#24 RB

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Aqueous Extraction Analysis Sheet

RI AB 16/17

(To Accompany Samples to Instruments)

Batch Number: 320-177417

Analyst: Branscum, Cassie

Batch Open: 8/3/2017 10:02:00AM

Method Code: 320-537_Prep-320

Batch End: 8/4/2017 9:08:00PM

8/23

Extraction of Perfluorinated Alkyl Acids

	Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmnt FinAmnt	Rcvd	PHs Adj1	Adj2	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
1	MB-320-177417/1 N/A	N/A		250 mL	7			N/A	N/A	N/A	ch nd	
				1.00 mL								
2	LCS-320-177417/2 N/A	N/A		250 mL	7			N/A	N/A	N/A	ch nd	
				1.00 mL								
3	LCSD-320-177417/3 N/A	N/A		250 mL	7			N/A	N/A	N/A	ch nd RI	
				1.00 mL								
4	320-30142-A-1 (537_DOD5)	N/A (320-30142-1)	278.99 g	250.5 mL	7			8/1/17	16_Days	4	ch nd	
			28.48 g	1.00 mL								
5	320-30142-A-2 (537_DOD5)	N/A (320-30142-1)	275.17 g	246.7 mL	7			8/1/17	16_Days	4	ch nd	
			28.52 g	1.00 mL								
6	320-30142-A-3 (537_DOD5)	N/A (320-30142-1)	286.01 g	256.7 mL	7			8/1/17	16_Days	4	ch nd	
			29.36 g	1.00 mL								
7	320-30142-A-4 (537_DOD5)	N/A (320-30142-1)	274.19 g	246.3 mL	7			8/1/17	16_Days	4	ch nd	
			27.88 g	1.00 mL								
8	320-30142-A-5 (537_DOD5)	N/A (320-30142-1)	283.69 g	255 mL	7			8/1/17	16_Days	4	ch nd	
			28.65 g	1.00 mL								
9	320-30142-A-6 (537_DOD5)	N/A (320-30142-1)	291.31 g	262.7 mL	7			8/1/17	16_Days	4	ch nd	
			28.61 g	1.00 mL								
10	320-30142-A-7 (537_DOD5)	N/A (320-30142-1)	287.28 g	259.1 mL	7			8/1/17	16_Days	4	ch nd	
			28.23 g	1.00 mL								

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-177417

Analyst: Branscum, Cassie

Batch Open: 8/3/2017 10:02:00AM

Method Code: 320-537_Prep-320

Batch End: 8/4/2017 9:08:00PM

11	320-30142-A-8 (537_DOD5)	N/A (320-30142-1)	286.99 g	259.3 mL	7		8/1/17	16_Days	4	ch nd	RI	
			27.71 g	1.00 mL								
12	320-30136-A-1 (537_DOD5)	N/A (320-30136-1)	284.32 g	256.1 mL	7		8/1/17	16_Days	4	ch nd	RI	
			28.18 g	1.00 mL								
13	320-30136-A-2 (537_DOD5)	N/A (320-30136-1)	286.87 g	258.6 mL	7		8/1/17	16_Days	4	ch nd	RI	
			28.31 g	1.00 mL								

Batch Notes

Manifold ID 3,9

Trizma ID SLBR4303V

SPE Cartridge ID 6357081-02

Methanol ID 988835

Reagent Water ID 8-1-17

Pipette ID M16387D

Analyst ID - TA Reagent Drop CCB

Analyst ID - TA Reagent Drop JNS

Witness

Analyst ID - SU Reagent Drop CCB

Analyst ID - SU Reagent Drop JNS

Witness

Analyst ID - IS Reagent Drop JER/CCB

Analyst ID - IS Reagent Drop TN

Witness

Batch Comment IS:975029/1002798

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-177417

Analyst: Branscum, Cassie

Batch Open: 8/3/2017 10:02:00AM

Method Code: 320-537_Prep-320

Batch End:

Comments

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-177417

Analyst: Branscum, Cassie

Batch Open: 8/3/2017 10:02:00AM

Method Code: 320-537_Prep-320

Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-177417/1	LC537-SU_00046	100 uL	1.00 mL	CAB 8-3-17	JNS 8/3/17
LCS 320-177417/2	LC537-HSP_00018	100 uL	1.00 mL		
LCS 320-177417/2	LC537-SU_00046	100 uL	1.00 mL		
LCSD 320-177417/3	LC537-HSP_00018	100 uL	1.00 mL		
LCSD 320-177417/3	LC537-SU_00046	100 uL	1.00 mL		
320-30142-A-1	LC537-SU_00046	100 uL	1.00 mL		
320-30142-A-2	LC537-SU_00046	100 uL	1.00 mL		
320-30142-A-3	LC537-SU_00046	100 uL	1.00 mL		
320-30142-A-4	LC537-SU_00046	100 uL	1.00 mL		
320-30142-A-5	LC537-SU_00046	100 uL	1.00 mL		
320-30142-A-6	LC537-SU_00046	100 uL	1.00 mL		
320-30142-A-7	LC537-SU_00046	100 uL	1.00 mL		
320-30142-A-8	LC537-SU_00046	100 uL	1.00 mL		
320-30136-A-2	LC537-SU_00046	100 uL	1.00 mL		
320-30136-A-1	LC537-SU_00046	100 uL	1.00 mL		

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Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-177417

Analyst: Branscum, Cassie

Batch Open: 8/3/2017 10:02:00AM

Method Code: 320-537_Prep-320

Batch End:

Other Reagents:		
Reagent	Amount/Units	Lot#:

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Preparation Batch Number(s): 177417 Test: 537 - DOD5
 Earliest Holding Time: 8-8-17

Sample List Tab	1 st Level Reviewer	2 nd Level Reviewer
Samples identified to the correct method	✓	✓
All necessary NCMs filed (including holding time)	✓	✓
Method/sample/login/QAS checked and correct	✓	✓
Worksheet Tab	1 st Level Reviewer	2 nd Level Reviewer
All samples properly preserved	✓	✓
Weights in anticipated range and not targeted	✓	✓
All additional test requirements performed, documented, and uploaded to TALS correctly (e.g. final amount, initial amount, turbidity, and CI Check)	✓	✓
The pH is transcribed correctly in TALS	✓	✓
All additional information transcribed into TALS is correct and raw data is attached	✓	✓
Comments are transcribed correctly in TALS	✓	✓
Reagents Tab	1 st Level Reviewer	2 nd Level Reviewer
All necessary reagents not expired and entered into TALS	✓	✓
All spike amounts correct and added to necessary samples and QC	✓	✓
Batch Information	1 st Level Reviewer	2 nd Level Reviewer
Date and time accurate and entered into TALS correctly	✓	✓
All necessary 'batch information' complete and entered into TALS correctly	✓	✓

1st Level Reviewer: TN

Date: 08/04/17

2nd Level Reviewer: NSH

Date: 8/5/17

Comments: _____

Shipping and Receiving Documents

880 Riverside Parkway

Regulatory Program: ☒ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

[illegible]

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

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 320-30136-1

Login Number: 30136

List Source: TestAmerica Sacramento

List Number: 1

Creator: Turpen, Troy

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

"WGNA-072517-RW-4842","537","RES","320-30136-1","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","11","ng/L","J","6.6","DL","","TRG","","","39","LOQ","YES","-99","","256.1","1.00","16",""
"WGNA-072517-RW-4842","537","RES","320-30136-1","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","12","ng/L","J M","2.7","DL","","TRG","","","20","LOQ","YES","-99","","256.1","1.00","7.8",""
"WGNA-072517-RW-4842","537","RES","320-30136-1","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","12","ng/L","U","5.4","DL","","TRG","","","29","LOQ","YES","-99","","256.1","1.00","12",""
"WGNA-072517-RW-4842","537","RES","320-30136-1","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","35","ng/L","U","16","DL","","TRG","","","88","LOQ","YES","-99","","256.1","1.00","35",""
"WGNA-072517-RW-4842","537","RES","320-30136-1","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","4.1","ng/L","J","1.9","DL","","TRG","","","9.8","LOQ","YES","-99","","256.1","1.00","3.9",""
"WGNA-072517-RW-4842","537","RES","320-30136-1","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","20","ng/L","U","7.8","DL","","TRG","","","23","LOQ","YES","-99","","256.1","1.00","20",""
"WGNA-072517-RW-4842","537","RES","320-30136-1","TALSAC","STL00993","13C2 PFHxA","29","ng/L","","-99","DL","","SURRE","75","","-99","LOQ","YES","39.0","","256.1","1.00","0",""
"WGNA-072517-RW-4842","537","RES","320-30136-1","TALSAC","STL00996","13C2 PFDA","49","ng/L","","-99","DL","","SURRE","125","","-99","LOQ","YES","39.0","","256.1","1.00","0",""
"WGNA-072517-FRB-4842","537","RES","320-30136-2","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","15","ng/L","U","6.6","DL","","TRG","","","39","LOQ","YES","-99","","258.6","1.00","15",""
"WGNA-072517-FRB-4842","537","RES","320-30136-2","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","7.7","ng/L","U","2.7","DL","","TRG","","","19","LOQ","YES","-99","","258.6","1.00","7.7",""
"WGNA-072517-FRB-4842","537","RES","320-30136-2","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","12","ng/L","U","5.3","DL","","TRG","","","29","LOQ","YES","-99","","258.6","1.00","12",""
"WGNA-072517-FRB-4842","537","RES","320-30136-2","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","35","ng/L","U","16","DL","","TRG","","","87","LOQ","YES","-99","","258.6","1.00","35",""
"WGNA-072517-FRB-4842","537","RES","320-30136-2","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","3.9","ng/L","U","1.8","DL","","TRG","","","9.7","LOQ","YES","-99","","258.6","1.00","3.9",""
"WGNA-072517-FRB-4842","537","RES","320-30136-2","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","19","ng/L","U","7.7","DL","","TRG","","","23","LOQ","YES","-99","","258.6","1.00","19",""
"WGNA-072517-FRB-4842","537","RES","320-30136-2","TALSAC","STL00993","13C2 PFHxA","34","ng/L","","-99","DL","","SURRE","87","","-99","LOQ","YES","38.7","","258.6","1.00","0",""
"WGNA-072517-FRB-4842","537","RES","320-30136-2","TALSAC","STL00996","13C2 PFDA","44","ng/L","","-99","DL","","SURRE","113","","-99","LOQ","YES","38.7","","258.6","1.00","0",""
"LCS 320-177417/2-A","537","RES","LCS 320-177417/2-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","323","ng/L","E","6.8","DL","","SPK","108","","40","LOQ","YES","300","","250","1.00","16",""
"LCS 320-177417/2-A","537","RES","LCS 320-177417/2-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","144","ng/L","","2.8","DL","","SPK","96","","20","LOQ","YES","150","","250","1.00","8.0",""
"LCS 320-177417/2-A","537","RES","LCS 320-177417/2-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","201","ng/L","","5.5","DL","","SPK","89","","30","LOQ","YES","225","","250","1.00","12",""
"LCS 320-177417/2-A","537","RES","LCS 320-177417/2-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","589","ng/L","","16","DL","","SPK","89","","90","LOQ","YES","663","","250","1.00","36",""
"LCS 320-177417/2-A","537","RES","LCS 320-177417/2-A","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","91.6","ng/L","E","1.9","DL","","SPK","123","","10","LOQ","YES","74.3","","250","1.00","4.0",""
"LCS 320-177417/2-A","537","RES","LCS 320-177417/2-A","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","164","ng/L","E","8.0","DL","","SPK","113","","24","LOQ","YES","144","","250","1.00","20",""
"LCS 320-177417/2-A","537","RES","LCS 320-177417/2-A","TALSAC","STL00993","13C2 PFHxA","37.5","ng/L","","-99","DL","","SURRE","94","","-99","LOQ","YES","40.0","","250","1.00","0",""
"LCS 320-177417/2-A","537","RES","LCS 320-177417/2-A","TALSAC","STL00996","13C2 PFDA","46.5","ng/L","","-99","DL","","SURRE","116","","-99","LOQ","YES","40.0","","250","1.00","0",""
"LCSD 320-177417/3-A","537","RES","LCSD 320-177417/3-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","315","ng/L","","6.8","DL","","SPK","105","3","40","LOQ","YES","300","LCS 320-177417/2-A","250","1.00","16",""
"LCSD 320-177417/3-A","537","RES","LCSD 320-177417/3-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","145","ng/L","","2.8","DL","","SPK","97","0","20","LOQ","YES","150","LCS 320-177417/2-

A","250","1.00","8.0",,""
"LCSD 320-177417/3-A","537","RES","LCSD 320-177417/3-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","198","ng/L",,"","5.5","DL",,"","SPK","88","2","30","LOQ","YES","225","LCS 320-177417/2-A","250","1.00","12",,""
"LCSD 320-177417/3-A","537","RES","LCSD 320-177417/3-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","575","ng/L",,"","16","DL",,"","SPK","87","3","90","LOQ","YES","663","LCS 320-177417/2-A","250","1.00","36",,""
"LCSD 320-177417/3-A","537","RES","LCSD 320-177417/3-A","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","89.2","ng/L","E","1.9","DL",,"","SPK","120","3","10","LOQ","YES","74.3","LCS 320-177417/2-A","250","1.00","4.0",,""
"LCSD 320-177417/3-A","537","RES","LCSD 320-177417/3-A","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","172","ng/L","E","8.0","DL",,"","SPK","119","5","24","LOQ","YES","144","LCS 320-177417/2-A","250","1.00","20",,""
"LCSD 320-177417/3-A","537","RES","LCSD 320-177417/3-A","TALSAC","STL00993","13C2 PFHxA","38.7","ng/L",,"","-99","DL",,"","SURR","97",,"","-99","LOQ","YES","40.0","LCS 320-177417/2-A","250","1.00","0",,""
"LCSD 320-177417/3-A","537","RES","LCSD 320-177417/3-A","TALSAC","STL00996","13C2 PFDA","52.7","ng/L","Q","-99","DL",,"","SURR","132",,"","-99","LOQ","YES","40.0","LCS 320-177417/2-A","250","1.00","0",,""
"MB 320-177417/1-A","537","RES","MB 320-177417/1-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 320-177417/1-A","537","RES","MB 320-177417/1-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 320-177417/1-A","537","RES","MB 320-177417/1-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 320-177417/1-A","537","RES","MB 320-177417/1-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","36","ng/L","U","16","DL",,"","TRG",,"","","90","LOQ","YES","-99",,"","250","1.00","36",,""
"MB 320-177417/1-A","537","RES","MB 320-177417/1-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 320-177417/1-A","537","RES","MB 320-177417/1-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 320-177417/1-A","537","RES","MB 320-177417/1-A","TALSAC","STL00993","13C2 PFHxA","39.2","ng/L",,"","-99","DL",,"","SURR","98",,"","-99","LOQ","YES","40.0",,"","250","1.00","0",,""
"MB 320-177417/1-A","537","RES","MB 320-177417/1-A","TALSAC","STL00996","13C2 PFDA","49.5","ng/L",,"","-99","DL",,"","SURR","124",,"","-99","LOQ","YES","40.0",,"","250","1.00","0",,""
Unknown","Unknown","WGNA-072517-RW-4842","07/25/2017 12:50","AQ","320-30136-1","NM",,"","1.70","537","METHOD","RES","08/03/2017 10:02","08/16/2017 12:12","TALSAC","COA","WET","NA","1","NA","NA",,"","100","320-177417","320-177417","NA","320-179701","320-30136-1","07/26/2017 09:20","07/27/2017 09:50",,""
Unknown","Unknown","WGNA-072517-FRB-4842","07/25/2017 12:45","AQ","320-30136-2","FB",,"","1.70","537","METHOD","RES","08/03/2017 10:02","08/16/2017 12:17","TALSAC","COA","WET","NA","1","NA","NA",,"","100","320-177417","320-177417","NA","320-179701","320-30136-1","07/26/2017 09:20","07/27/2017 09:50",,""
Unknown","Unknown","LCS 320-177417/2-A",,"","AQ","LCS 320-177417/2-A","LCS",,"","-99","537","METHOD","RES","08/03/2017 10:02","08/14/2017 19:38","TALSAC","COA","WET","NA","1","NA","NA",,"","100","320-177417","320-177417","NA","320-179510","320-30136-1","08/03/2017 10:02","07/27/2017 09:50",,""
Unknown","Unknown","LCSD 320-177417/3-A",,"","AQ","LCSD 320-177417/3-A","LCSD",,"","-99","537","METHOD","RES","08/03/2017 10:02","08/14/2017 19:43","TALSAC","COA","WET","NA","1","NA","NA",,"","100","320-177417","320-177417","NA","320-179510","320-30136-1","08/03/2017 10:02","07/27/2017 09:50",,""
Unknown","Unknown","MB 320-177417/1-A",,"","AQ","MB 320-177417/1-A","MB",,"","-99","537","METHOD","RES","08/03/2017 10:02","08/14/2017 19:33","TALSAC","COA","WET","NA","1","NA","NA",,"","100","320-177417","320-177417","NA","320-

179510","320-30136-1","08/03/2017 10:02","07/27/2017 09:50",""



TO:	A. FREBOWITZ	DATE:	AUGUST 29, 2017
FROM:	TERRI L. SOLOMON	COPIES:	DV FILE
SUBJECT:	ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS) NAS JRB WILLOW GROVE SAMPLE DELIVERY GROUP (SDG) 320-30136-1		
SAMPLES:	1/Field Reagent Blank (FRB) WGNA-072517-FRB-4842 1/Drinking Water WGNA-072517-RW-4842		

<u>Sample</u>	<u>Internal Standard</u>
WGNA-072517-FRB-4842	13C2 Perfluorooctanoic acid; 13C2 Perfluorooctanesulfonic acid
WGNA-072517-RW-4842	13C2 Perfluorooctanoic acid; 13C2 Perfluorooctanesulfonic acid

TO: A. FREBOWITZ
SDG: 320-30136-1

PAGE 2

Notes

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

<u>Sample</u>	<u>Associated FRB</u>
WGNA-072517-RW-4842	WGNA-072517-FRB-4842

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

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

Executive Summary

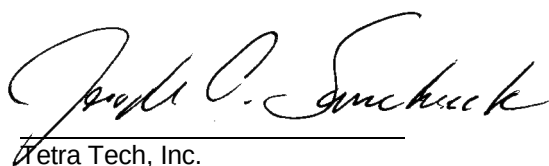
Laboratory Performance: Several surrogate recoveries were noncompliant.

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) and the US EPA National Functional Guidelines for Organic Data Review (January 2017) as applicable. The text of this report has been formulated to address only those areas affecting data quality.



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



Tetra Tech, Inc.
Joseph A. Samchuck
Data Validation Manager

Attachments:

Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Data Qualifier Definitions

The following definitions provide brief explanations of the validation qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted method detection limit for sample and method.
J	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the reporting limit).
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported detection limit is approximate and may be inaccurate or imprecise.
R	The sample result (detected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
UR	The sample result (nondetected) is unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.

Appendix A

Qualified Analytical Results

Qualifier Codes:

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

PROJ_NO: 08005-WE04 SDG: 320-30136-1 FRACTION: PFAS MEDIA: WATER	NSAMPLE	WGNA-072517-FRB-4842			WGNA-072517-RW-4842		
	LAB_ID	320-30136-2			320-30136-1		
	SAMP_DATE	7/25/2017			7/25/2017		
	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		7.7	U		12	J	NP
PERFLUOROBUTANESULFONIC ACID		35	U		35	U	
PERFLUOROHEPTANOIC ACID		3.9	U		4.1	J	NP
PERFLUOROHEXANESULFONIC ACID		12	U		12	U	
PERFLUORONONANOIC ACID		19	U		20	U	
PERFLUOROOCTANE SULFONIC ACID		15	U		11	J	NP

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Client Sample ID: WGNA-072517-RW-4842 Lab Sample ID: 320-30136-1
 Matrix: Water Lab File ID: 2017.08.16_537B_024.d
 Analysis Method: 537 Date Collected: 07/25/2017 12:50
 Extraction Method: 537 Date Extracted: 08/03/2017 10:02
 Sample wt/vol: 256.1 (mL) Date Analyzed: 08/16/2017 12:12
 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.: 179701 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	11	J	39	16	6.6
335-67-1	Perfluorooctanoic acid (PFOA)	12	J M	20	7.8	2.7
375-95-1	Perfluorononanoic acid (PFNA)	20	U	23	20	7.8
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	29	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.1	J	9.8	3.9	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	88	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	75		70-130
STL00996	13C2 PFDA	125		70-130


08/29/2017

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-30136-1</u>
SDG No.: _____	
Client Sample ID: <u>WGNA-072517-FRB-4842</u>	Lab Sample ID: <u>320-30136-2</u>
Matrix: <u>Water</u>	Lab File ID: <u>2017.08.16_537B_025.d</u>
Analysis Method: <u>537</u>	Date Collected: <u>07/25/2017 12:45</u>
Extraction Method: <u>537</u>	Date Extracted: <u>08/03/2017 10:02</u>
Sample wt/vol: <u>258.6(mL)</u>	Date Analyzed: <u>08/16/2017 12:17</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>179701</u>	Units: <u>ng/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	39	15	6.6
335-67-1	Perfluorooctanoic acid (PFOA)	7.7	U	19	7.7	2.7
375-95-1	Perfluorononanoic acid (PFNA)	19	U	23	19	7.7
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	29	12	5.3
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.9	U	9.7	3.9	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	87	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	87		70-130
STL00996	13C2 PFDA	113		70-130

Ali L. Salem
08/29/2017

Appendix B

Results as Reported by the Laboratory

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-30136-1</u>
SDG No.: _____	
Client Sample ID: <u>WGNA-072517-RW-4842</u>	Lab Sample ID: <u>320-30136-1</u>
Matrix: <u>Water</u>	Lab File ID: <u>2017.08.16_537B_024.d</u>
Analysis Method: <u>537</u>	Date Collected: <u>07/25/2017 12:50</u>
Extraction Method: <u>537</u>	Date Extracted: <u>08/03/2017 10:02</u>
Sample wt/vol: <u>256.1 (mL)</u>	Date Analyzed: <u>08/16/2017 12:12</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>179701</u>	Units: <u>ng/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	11	J	39	16	6.6
335-67-1	Perfluorooctanoic acid (PFOA)	12	J M	20	7.8	2.7
375-95-1	Perfluorononanoic acid (PFNA)	20	U	23	20	7.8
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	29	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.1	J	9.8	3.9	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	88	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	75		70-130
STL00996	13C2 PFDA	125		70-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-30136-1</u>
SDG No.: _____	
Client Sample ID: <u>WGNA-072517-FRB-4842</u>	Lab Sample ID: <u>320-30136-2</u>
Matrix: <u>Water</u>	Lab File ID: <u>2017.08.16_537B_025.d</u>
Analysis Method: <u>537</u>	Date Collected: <u>07/25/2017 12:45</u>
Extraction Method: <u>537</u>	Date Extracted: <u>08/03/2017 10:02</u>
Sample wt/vol: <u>258.6(mL)</u>	Date Analyzed: <u>08/16/2017 12:17</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>179701</u>	Units: <u>ng/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	39	15	6.6
335-67-1	Perfluorooctanoic acid (PFOA)	7.7	U	19	7.7	2.7
375-95-1	Perfluorononanoic acid (PFNA)	19	U	23	19	7.7
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	29	12	5.3
375-85-9	Perfluoroheptanoic acid (PFHpA)	3.9	U	9.7	3.9	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	87	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	87		70-130
STL00996	13C2 PFDA	113		70-130

Appendix C

Support Documentation

880 Riverside Parkway

Regulatory Program: ☒ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

[illegible]

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

Job Narrative
320-30136-1

Receipt

The samples were received on 7/26/2017 9:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.7° C.

LCMS

Method(s) 537: Internal standard (ISTD) response for the following samples was outside control limits: WGNA-072517-RW-4842 (320-30136-1) and WGNA-072517-FRB-4842 (320-30136-2). The samples were re-analyzed with concurring results, and the original set of data has been reported.

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

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

Organic Prep

Method(s) 537: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-177417.

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

Method Summary

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

TestAmerica Job ID: 320-30136-1

Method	Method Description	Protocol	Laboratory
537	Perfluorinated Alkyl Acids (LC/MS)	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: 320-30136-1

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

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-30136-1	WGNA-072517-RW-4842	Water	07/25/17 12:50	07/26/17 09:20
320-30136-2	WGNA-072517-FRB-4842	Water	07/25/17 12:45	07/26/17 09:20

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1

SDG No.: _____

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
WGNA-072517-RW-484 2	320-30136-1	75	125
WGNA-072517-FRB-48 42	320-30136-2	87	113
	MB 320-177417/1-A	98	124
	LCS 320-177417/2-A	94	116
	LCSD 320-177417/3-A	97	132 Q

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.: 320-30136-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 2017.08.14_537B_004.d
 Lab ID: LCS 320-177417/2-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	300	323	108	70-130	E
Perfluorooctanoic acid (PFOA)	150	144	96	70-130	
Perfluorononanoic acid (PFNA)	144	164	113	70-130	E
Perfluorohexanesulfonic acid (PFHxS)	225	201	89	70-130	
Perfluoroheptanoic acid (PFHpA)	74.3	91.6	123	70-130	E
Perfluorobutanesulfonic acid (PFBS)	663	589	89	70-130	

Column to be used to flag recovery and RPD values

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 2017.08.14_537B_005.d
 Lab ID: LCSD 320-177417/3-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LCSD CONCENTRATION (ng/L)	LCSD % REC	% RPD	QC LIMITS		#
					RPD	REC	
Perfluorooctanesulfonic acid (PFOS)	300	315	105	3	30	70-130	
Perfluorooctanoic acid (PFOA)	150	145	97	0	30	70-130	
Perfluorononanoic acid (PFNA)	144	172	119	5	30	70-130	E
Perfluorohexanesulfonic acid (PFHxS)	225	198	88	2	30	70-130	
Perfluoroheptanoic acid (PFHpA)	74.3	89.2	120	3	30	70-130	E
Perfluorobutanesulfonic acid (PFBS)	663	575	87	3	30	70-130	

Column to be used to flag recovery and RPD values

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
SDG No.: _____
Lab File ID: 2017.08.14_537B_003.d Lab Sample ID: MB 320-177417/1-A
Matrix: Water Date Extracted: 08/03/2017 10:02
Instrument ID: A8_N Date Analyzed: 08/14/2017 19:33
Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-177417/2-A	2017.08.14_ 537B 004.d	08/14/2017 19:38
	LCSD 320-177417/3-A	2017.08.14_ 537B 005.d	08/14/2017 19:43
WGNA-072517-RW-4842	320-30136-1	2017.08.16_ 537B 024.d	08/16/2017 12:12
WGNA-072517-FRB-4842	320-30136-2	2017.08.16_ 537B 025.d	08/16/2017 12:17

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: MB 320-177417/1-A
 Matrix: Water Lab File ID: 2017.08.14_537B_003.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 08/03/2017 10:02
 Sample wt/vol: 250 (mL) Date Analyzed: 08/14/2017 19:33
 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.: 179510 Units: ng/L

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

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	98		70-130
STL00996	13C2 PFDA	124		70-130

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Instrument ID: A8_N Calibration Start Date: 08/14/2017 12:48
 GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 08/14/2017 13:12
 Calibration ID: 33517

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
50%							
INITIAL CALIBRATION MEAN AREA AND MEAN RT		2250916	1.95	5850602	2.21		
UPPER LIMIT		3376374	2.45	8775903	2.71		
LOWER LIMIT		1125458	1.45	2925301	1.71		
LAB SAMPLE ID	CLIENT SAMPLE ID						
CCVL 320-179319/9		2177935	1.94	5998180	2.20		
ICV 320-179319/11		1980065	1.94	5824653	2.19		
CCV 320-179510/1 CCVIS		2104942	1.91	5804729	2.17		
MB 320-177417/1-A		2249354	1.92	6501071	2.18		
LCS 320-177417/2-A		2259712	1.92	6216901	2.18		
LCSD 320-177417/3-A		2198507	1.91	6213934	2.17		
CCV 320-179510/13 CCVIS		2051129	1.92	5683418	2.17		
CCV 320-179701/13 CCVIS		2019138	1.95	5703707	2.19		
320-30136-1	WGNA-072517-RW-4842	4123283Q	1.94	10677081Q	2.17		
320-30136-2	WGNA-072517-FRB-4842	4735686Q	1.94	12242111Q	2.17		
CCV 320-179701/23 CCVIS		2060448	1.95	5883312	2.18		

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.: 320-30136-1
 SDG No.: _____
 Sample No.: CCV 320-179510/1 Date Analyzed: 08/14/2017 19:24
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2017.08.14_537B_001 Heated Purge: (Y/N) N
 Calibration ID: 33517

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	2104942	1.91	5804729	2.17		
UPPER LIMIT	2946919	2.41	8126621	2.67		
LOWER LIMIT	1473459	1.41	4063310	1.67		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-177417/1-A		2249354	1.92	6501071	2.18	
LCS 320-177417/2-A		2259712	1.92	6216901	2.18	
LCSD 320-177417/3-A		2198507	1.91	6213934	2.17	

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.: 320-30136-1
 SDG No.: _____
 Sample No.: CCV 320-179510/13 Date Analyzed: 08/14/2017 20:21
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2017.08.14_537B_013 Heated Purge: (Y/N) N
 Calibration ID: 33517

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	2051129	1.92	5683418	2.17		
UPPER LIMIT	2871581	2.42	7956785	2.67		
LOWER LIMIT	1435790	1.42	3978393	1.67		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-177417/1-A		2249354	1.92	6501071	2.18	
LCS 320-177417/2-A		2259712	1.92	6216901	2.18	
LCSD 320-177417/3-A		2198507	1.91	6213934	2.17	

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.: 320-30136-1
 SDG No.: _____
 Sample No.: CCV 320-179701/13 Date Analyzed: 08/16/2017 11:43
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2017.08.16_537B_018 Heated Purge: (Y/N) N
 Calibration ID: 33517

70-140%		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		2019138	1.95	5703707	2.19		
UPPER LIMIT		2826793	2.45	7985190	2.69		
LOWER LIMIT		1413397	1.45	3992595	1.69		
LAB SAMPLE ID	CLIENT SAMPLE ID						
320-30136-1	WGNA-072517-RW-4842	4123283Q	1.94	10677081Q	2.17		
320-30136-2	WGNA-072517-FRB-4842	4735686Q	1.94	12242111Q	2.17		

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.: 320-30136-1
 SDG No.: _____
 Sample No.: CCV 320-179701/23 Date Analyzed: 08/16/2017 12:31
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2017.08.16_537B_028 Heated Purge: (Y/N) N
 Calibration ID: 33517

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		2060448	1.95	5883312	2.18		
UPPER LIMIT		2884627	2.45	8236637	2.68		
LOWER LIMIT		1442314	1.45	4118318	1.68		
LAB SAMPLE ID	CLIENT SAMPLE ID						
320-30136-1	WGNA-072517-RW-4842	4123283Q	1.94	10677081Q	2.17		
320-30136-2	WGNA-072517-FRB-4842	4735686Q	1.94	12242111Q	2.17		

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.: 320-30136-1 Analy Batch No.: 179319

SDG No.: _____

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

Calibration Start Date: 08/14/2017 12:48 Calibration End Date: 08/14/2017 13:12 Calibration ID: 33517

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-179319/2	2017.08.14_537ICAL_002.d
Level 2	IC 320-179319/3	2017.08.14_537ICAL_003.d
Level 3	IC 320-179319/4	2017.08.14_537ICAL_004.d
Level 4	IC 320-179319/5	2017.08.14_537ICAL_005.d
Level 5	IC 320-179319/6	2017.08.14_537ICAL_006.d
Level 6	IC 320-179319/7	2017.08.14_537ICAL_007.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)	1.1417 0.7313	1.1495	1.0943	0.9210	0.7959	QuaF		1.1266	-0.002254						0.9980		0.9600
Perfluoroheptanoic acid (PFHpA)	0.8346 0.8325	0.8724	0.8737	0.8715	0.8517	Ave		0.8560				2.2		30.0			
Perfluorohexanesulfonic acid (PFHxS)	1.4757 1.3970	1.5378	1.5080	1.5703	1.4756	Ave		1.4941				4.0		30.0			
Perfluorooctanoic acid (PFOA)	0.8851 0.9102	0.8837	0.8984	0.9375	0.9261	Ave		0.9068				2.4		30.0			
Perfluorooctanesulfonic acid (PFOS)	0.8922 0.9252	0.9148	0.9148	0.9461	0.9486	Ave		0.9236				2.3		30.0			
Perfluorononanoic acid (PFNA)	0.5491 0.5714	0.5670	0.5764	0.5665	0.5686	Ave		0.5665				1.6		30.0			
13C2 PFHxA	1.0141 1.0999	1.0032	1.0998	1.0933	1.1053	Ave		1.0693				4.4		30.0			
13C2 PFDA	0.5512 0.6012	0.5785	0.5919	0.5906	0.6127	Ave		0.5877				3.6		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.: 320-30136-1 Analy Batch No.: 179319

SDG No.: _____

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

Calibration Start Date: 08/14/2017 12:48 Calibration End Date: 08/14/2017 13:12 Calibration ID: 33517

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-179319/2	2017.08.14_537ICAL_002.d
Level 2	IC 320-179319/3	2017.08.14_537ICAL_003.d
Level 3	IC 320-179319/4	2017.08.14_537ICAL_004.d
Level 4	IC 320-179319/5	2017.08.14_537ICAL_005.d
Level 5	IC 320-179319/6	2017.08.14_537ICAL_006.d
Level 6	IC 320-179319/7	2017.08.14_537ICAL_007.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	QuaF	2176776 26040065	4858409	10071471	16707104	21165476	9.00 180	20.0	45.0	90.0	135
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	198176 3589599	455479	965342	1966143	2763295	1.00 20.0	2.22	5.00	10.0	15.0
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	938005 16584369	2166866	4626981	9496666	13083092	3.00 60.0	6.67	15.0	30.0	45.0
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	420599 7854398	923370	1986507	4232647	6012905	2.00 40.0	4.45	10.0	20.0	30.0
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	756213 14645432	1718775	3742396	7629588	11213929	4.00 80.0	8.89	20.0	40.0	60.0
Perfluorononanoic acid (PFNA)	13PF OA	Ave	260762 4927051	592024	1273686	2556105	3689416	2.00 40.0	4.45	10.0	20.0	30.0
13C2 PFHxA	13PF OA	Ave	2407096 2370885	2356458	2429839	2465941	2390227	10.0 10.0	10.0	10.0	10.0	10.0
13C2 PFDA	13PF OA	Ave	1308306 1295768	1358920	1307668	1332089	1324957	10.0 10.0	10.0	10.0	10.0	10.0

Curve Type Legend:

Ave = Average ISTD
QuaF = Quadratic ISTD forced zero

FORM VI
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
READBACK PERCENT ERROR

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1 Analy Batch No.: 179319

SDG No.: _____

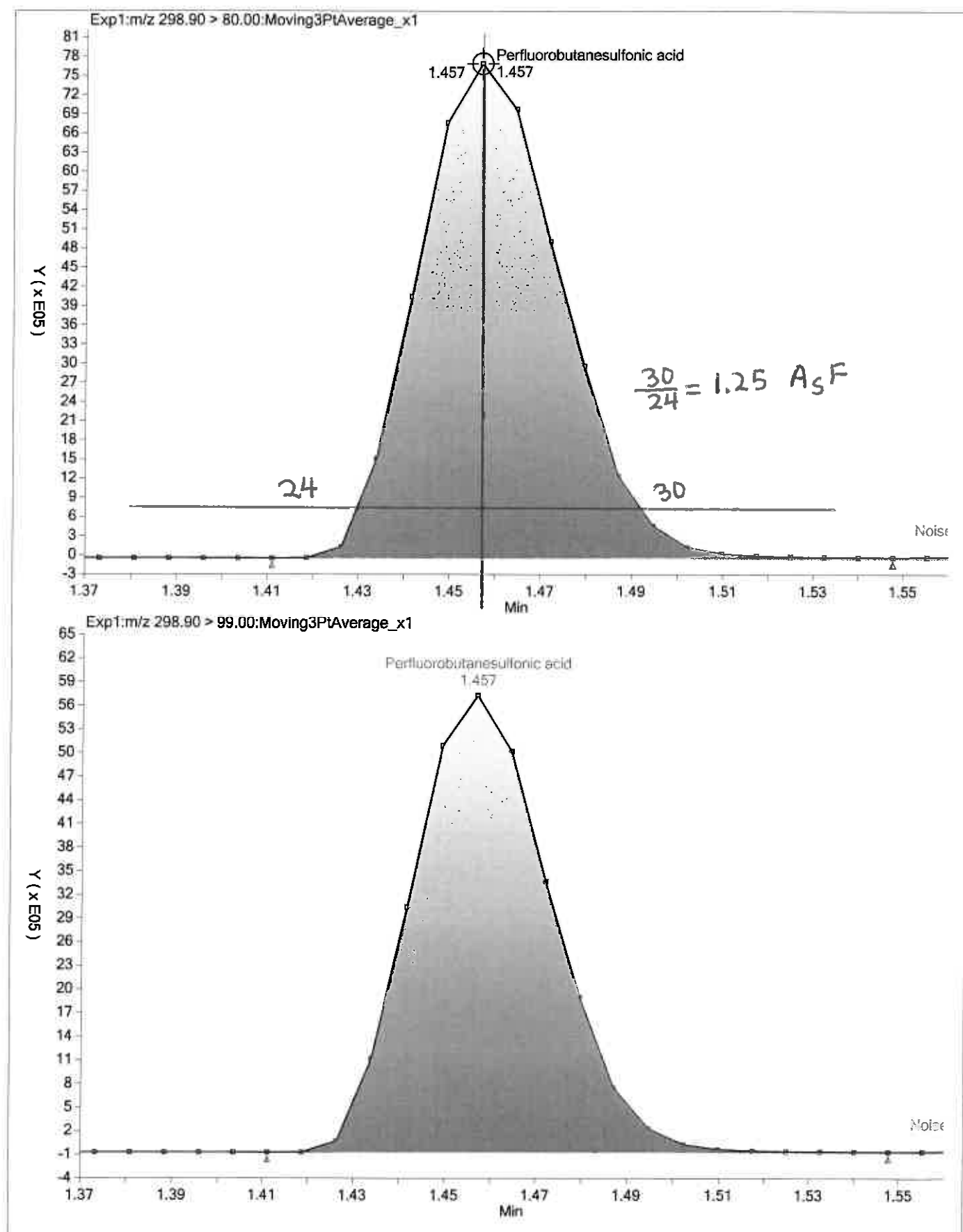
Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

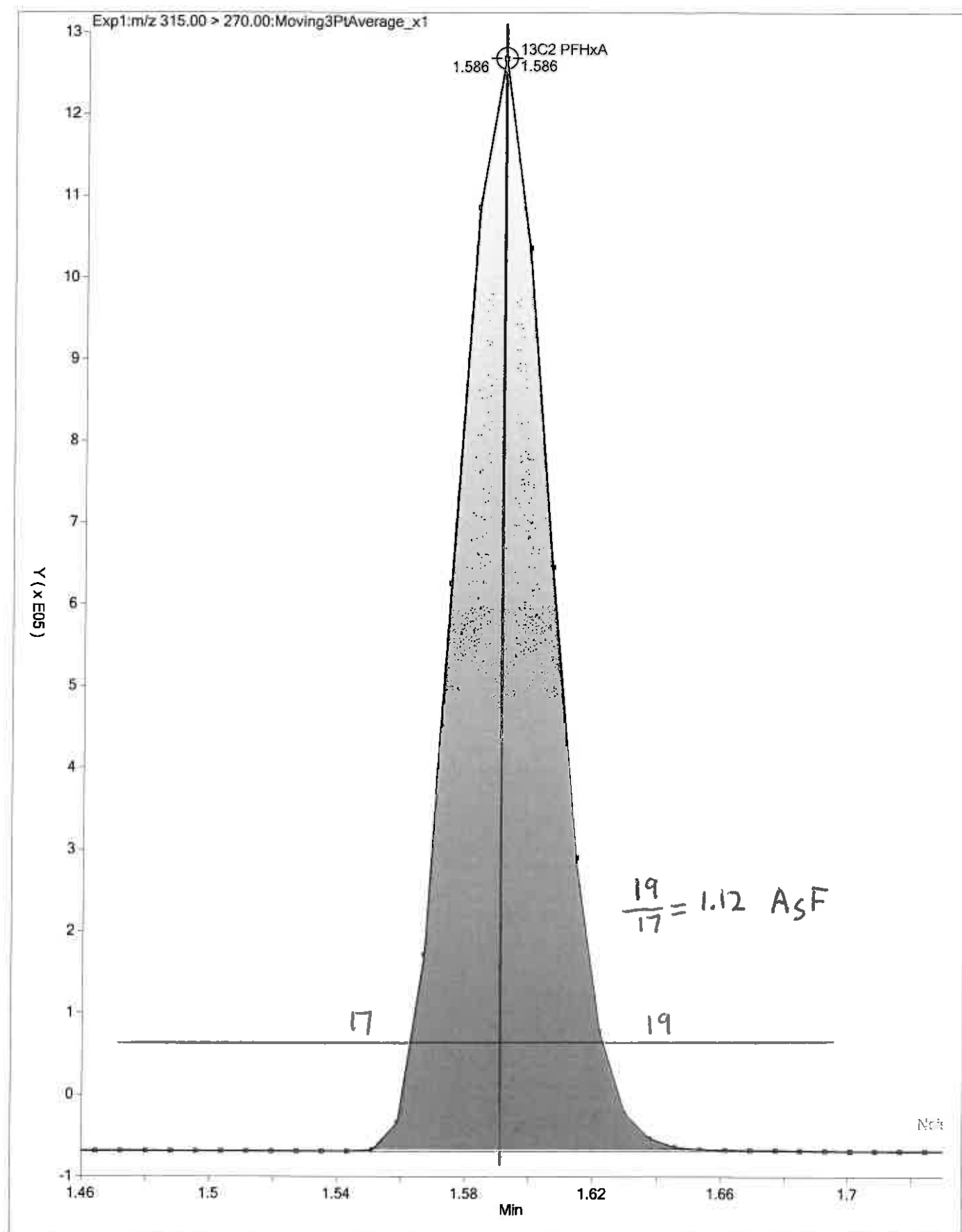
Calibration Start Date: 08/14/2017 12:48 Calibration End Date: 08/14/2017 13:12 Calibration ID: 33517

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-179319/2	2017.08.14_537ICAL_002.d
Level 2	IC 320-179319/3	2017.08.14_537ICAL_003.d
Level 3	IC 320-179319/4	2017.08.14_537ICAL_004.d
Level 4	IC 320-179319/5	2017.08.14_537ICAL_005.d
Level 5	IC 320-179319/6	2017.08.14_537ICAL_006.d
Level 6	IC 320-179319/7	2017.08.14_537ICAL_007.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)	3.3	6.6	7.5	-0.4	-5.0	3.4	50	50	50	50	50	50
Perfluoroheptanoic acid (PFHpA)	-2.5	1.9	2.1	1.8	-0.5	-2.8	50	50	50	50	50	50
Perfluorohexanesulfonic acid (PFHxS)	-1.2	2.9	0.9	5.1	-1.2	-6.5	50	50	50	50	50	50
Perfluorooctanoic acid (PFOA)	-2.4	-2.5	-0.9	3.4	2.1	0.4	50	50	50	50	50	50
Perfluorooctanesulfonic acid (PFOS)	-3.4	-1.0	-1.0	2.4	2.7	0.2	50	50	50	50	50	50
Perfluorononanoic acid (PFNA)	-3.1	0.1	1.7	0.0	0.4	0.9	50	50	50	50	50	50
13C2 PFHxA	-5.2	-6.2	2.9	2.2	3.4	2.9	30	30	30	30	30	30
13C2 PFDA	-6.2	-1.6	0.7	0.5	4.3	2.3	30	30	30	30	30	30





FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Lab Sample ID: CCVL 320-179319/9 Calibration Date: 08/14/2017 13:22
 Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/14/2017 13:12
 Lab File ID: 2017.08.14_537ICAL_009.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		1.212		22.5	20.0	12.7	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.8560	0.9386		2.44	2.22	9.6	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.494	1.568		7.00	6.67	4.9	50.0
Perfluorooctanoic acid (PFOA)	Ave	0.9068	0.9308		4.57	4.45	2.6	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9236	0.9255		8.91	8.89	0.2	50.0
Perfluorononanoic acid (PFNA)	Ave	0.5665	0.6283		4.93	4.45	10.9	50.0
13C2 PFHxA	Ave	1.069	1.128		10.5	10.0	5.5	30.0
13C2 PFDA	Ave	0.5877	0.6289		10.7	10.0	7.0	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Lab Sample ID: ICV 320-179319/11 Calibration Date: 08/14/2017 13:31
 Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/14/2017 13:12
 Lab File ID: 2017.08.14_537ICAL_011.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		0.9251		104	100	3.6	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.8560	0.9672		11.3	10.0	13.0	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.494	1.761		23.7	20.1	17.9	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9068	0.9396		21.2	20.5	3.6	30.0
Perfluorononanoic acid (PFNA)	Ave	0.5665	0.7333		26.1	20.1	29.4	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9236	1.121		23.9	19.7	21.3	30.0
13C2 PFHxA	Ave	1.069	1.124		10.5	10.0	5.1	30.0
13C2 PFDA	Ave	0.5877	0.6385		10.9	10.0	8.7	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Lab Sample ID: CCV 320-179510/1 Calibration Date: 08/14/2017 19:24
 Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/14/2017 13:12
 Lab File ID: 2017.08.14_537B_001.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		1.087		48.0	45.0	6.7	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.8560	0.9611		5.61	5.00	12.3	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.494	1.657		16.6	15.0	10.9	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9068	0.9103		10.0	10.0	0.4	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9236	0.9052		19.6	20.0	-2.0	30.0
Perfluorononanoic acid (PFNA)	Ave	0.5665	0.6404		11.3	10.0	13.0	30.0
13C2 PFHxA	Ave	1.069	1.167		10.9	10.0	9.1	30.0
13C2 PFDA	Ave	0.5877	0.6255		10.6	10.0	6.4	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Lab Sample ID: CCV 320-179510/13 Calibration Date: 08/14/2017 20:21
 Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/14/2017 13:12
 Lab File ID: 2017.08.14_537B_013.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		0.8027		130	135	-3.7	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.8560	0.9404		16.5	15.0	9.9	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.494	1.460		44.0	45.0	-2.3	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9068	0.9327		30.9	30.0	2.8	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9236	0.9291		60.4	60.0	0.6	30.0
Perfluorononanoic acid (PFNA)	Ave	0.5665	0.6467		34.3	30.0	14.2	30.0
13C2 PFHxA	Ave	1.069	1.189		11.1	10.0	11.2	30.0
13C2 PFDA	Ave	0.5877	0.6635		11.3	10.0	12.9	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Lab Sample ID: CCV 320-179701/13 Calibration Date: 08/16/2017 11:43
 Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/14/2017 13:12
 Lab File ID: 2017.08.16_537B_018.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		1.068		47.1	45.0	4.7	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.8560	0.9583		5.60	5.00	11.9	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.494	1.599		16.1	15.0	7.0	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9068	0.8976		9.91	10.0	-1.0	30.0
Perfluorononanoic acid (PFNA)	Ave	0.5665	0.6736		11.9	10.0	18.9	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9236	0.9553		20.7	20.0	3.4	30.0
13C2 PFHxA	Ave	1.069	1.159		10.8	10.0	8.4	30.0
13C2 PFDA	Ave	0.5877	0.7414		12.6	10.0	26.2	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1
 SDG No.: _____
 Lab Sample ID: CCV 320-179701/23 Calibration Date: 08/16/2017 12:31
 Instrument ID: A8_N Calib Start Date: 08/14/2017 12:48
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 08/14/2017 13:12
 Lab File ID: 2017.08.16_537B_028.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		0.7884		126	135	-6.3	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.8560	0.9059		15.9	15.0	5.8	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.494	1.455		43.8	45.0	-2.6	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9068	0.9139		30.3	30.0	0.8	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9236	0.9444		61.4	60.0	2.2	30.0
Perfluorononanoic acid (PFNA)	Ave	0.5665	0.6625		35.1	30.0	16.9	30.0
13C2 PFHxA	Ave	1.069	1.230		11.5	10.0	15.1	30.0
13C2 PFDA	Ave	0.5877	0.7479		12.7	10.0	27.3	30.0

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-30136-1

SDG No.: _____

Instrument ID: A8_NStart Date: 08/14/2017 12:48Analysis Batch Number: 179319End Date: 08/14/2017 13:31

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-179319/2		08/14/2017 12:48	1	2017.08.14_537I CAL 002.d	GeminiC18 3x100 3(mm)
IC 320-179319/3		08/14/2017 12:53	1	2017.08.14_537I CAL 003.d	GeminiC18 3x100 3(mm)
IC 320-179319/4		08/14/2017 12:58	1	2017.08.14_537I CAL 004.d	GeminiC18 3x100 3(mm)
IC 320-179319/5 ICISAV		08/14/2017 13:03	1	2017.08.14_537I CAL 005.d	GeminiC18 3x100 3(mm)
IC 320-179319/6		08/14/2017 13:07	1	2017.08.14_537I CAL 006.d	GeminiC18 3x100 3(mm)
IC 320-179319/7		08/14/2017 13:12	1	2017.08.14_537I CAL 007.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 13:17	1		GeminiC18 3x100 3(mm)
CCVL 320-179319/9		08/14/2017 13:22	1	2017.08.14_537I CAL 009.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 13:26	1		GeminiC18 3x100 3(mm)
ICV 320-179319/11		08/14/2017 13:31	1	2017.08.14_537I CAL 011.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-30136-1

SDG No.: _____

Instrument ID: A8_NStart Date: 08/14/2017 19:24Analysis Batch Number: 179510End Date: 08/14/2017 20:21

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-179510/1 CCVIS		08/14/2017 19:24	1	2017.08.14_537B 001.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 19:28	1		GeminiC18 3x100 3(mm)
MB 320-177417/1-A		08/14/2017 19:33	1	2017.08.14_537B 003.d	GeminiC18 3x100 3(mm)
LCS 320-177417/2-A		08/14/2017 19:38	1	2017.08.14_537B 004.d	GeminiC18 3x100 3(mm)
LCSD 320-177417/3-A		08/14/2017 19:43	1	2017.08.14_537B 005.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 19:47	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 19:52	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 19:57	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 20:02	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 20:06	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 20:11	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/14/2017 20:16	1		GeminiC18 3x100 3(mm)
CCV 320-179510/13 CCVIS		08/14/2017 20:21	1	2017.08.14_537B 013.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1

SDG No.: _____

Instrument ID: A8_N Start Date: 08/16/2017 11:43Analysis Batch Number: 179701 End Date: 08/16/2017 12:31

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-179701/13 CCVIS		08/16/2017 11:43	1	2017.08.16_537B 018.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/16/2017 11:48	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/16/2017 11:53	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/16/2017 12:02	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/16/2017 12:07	1		GeminiC18 3x100 3(mm)
320-30136-1		08/16/2017 12:12	1	2017.08.16_537B 024.d	GeminiC18 3x100 3(mm)
320-30136-2		08/16/2017 12:17	1	2017.08.16_537B 025.d	GeminiC18 3x100 3(mm)
ZZZZZ		08/16/2017 12:21	1		GeminiC18 3x100 3(mm)
ZZZZZ		08/16/2017 12:26	1		GeminiC18 3x100 3(mm)
CCV 320-179701/23 CCVIS		08/16/2017 12:31	1	2017.08.16_537B 028.d	GeminiC18 3x100 3(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1

SDG No.: _____

Batch Number: 177417 Batch Start Date: 08/03/17 10:02 Batch Analyst: Branscum, CassieBatch Method: 537 Batch End Date: 08/04/17 21:08

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-HSP 00018
MB 320-177417/1		537, 537				250 mL	1.00 mL	7 SU	
LCS 320-177417/2		537, 537				250 mL	1.00 mL	7 SU	100 uL
LCSD 320-177417/3		537, 537				250 mL	1.00 mL	7 SU	100 uL
320-30136-A-1	WGNA-072517-RW-4842	537, 537	T	284.32 g	28.18 g	256.1 mL	1.00 mL	7 SU	
320-30136-A-2	WGNA-072517-FRB-4842	537, 537	T	286.87 g	28.31 g	258.6 mL	1.00 mL	7 SU	

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-IS 00044	LC537-IS 00046	LC537-SU 00046	AnalysisComment		
MB 320-177417/1		537, 537		100 uL		100 uL	ch nd		
LCS 320-177417/2		537, 537		100 uL		100 uL	ch nd		
LCSD 320-177417/3		537, 537		100 uL		100 uL	ch nd		
320-30136-A-1	WGNA-072517-RW-4842	537, 537	T		100 uL	100 uL	ch nd		
320-30136-A-2	WGNA-072517-FRB-4842	537, 537	T		100 uL	100 uL	ch nd		

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

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-30136-1

SDG No.: _____

Batch Number: 177417 Batch Start Date: 08/03/17 10:02 Batch Analyst: Branscum, CassieBatch Method: 537 Batch End Date: 08/04/17 21:08

Batch Notes	
Batch Comment	IS:975029/1002798
Manifold ID	3,9
Methanol ID	988835
Pipette ID	M16387D
Analyst ID - IS Reagent Drop	JER/CCB
Analyst ID - IS Reagent Drop Witness	TN
Analyst ID - SU Reagent Drop	CCB
Analyst ID - SU Reagent Drop Witness	JNS
Analyst ID - TA Reagent Drop	CCB
Analyst ID - TA Reagent Drop Witness	JNS
SPE Cartridge ID	6357081-02
Trizma ID	SLBR4303V
Reagent Water ID	8-1-17

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.

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Aqueous Extraction Analysis Sheet

RI AB 16/17

(To Accompany Samples to Instruments)

Batch Number: 320-177417

Analyst: Branscum, Cassie

Batch Open: 8/3/2017 10:02:00AM

Method Code: 320-537_Prep-320

Batch End: 8/4/2017 9:08:00PM

8/23

Extraction of Perfluorinated Alkyl Acids

Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmnt FinAmnt	Rcvd	PHs Adj1	Adj2	Due Date	Analytical TAT	Dlv Rank	Comments	Output Sample Lab ID
1 MB-320-177417/1 N/A	N/A		250 mL	7			N/A	N/A	N/A	ch nd	MB 320-177417/1-A
			1.00 mL								
2 LCS-320-177417/2 N/A	N/A		250 mL	7			N/A	N/A	N/A	ch nd	LCS 320-177417/2-A
			1.00 mL								
3 LCSD-320-177417/3 N/A	N/A		250 mL	7			N/A	N/A	N/A	ch nd	LCSD 320-177417/3-A
			1.00 mL								
4 320-30142-A-1 (537_DOD5)	N/A (320-30142-1)	278.99 g	250.5 mL	7			8/1/17	16_Days	4	ch nd	320-30142-A-1-A
		28.48 g	1.00 mL								
5 320-30142-A-2 (537_DOD5)	N/A (320-30142-1)	275.17 g	246.7 mL	7			8/1/17	16_Days	4	ch nd	320-30142-A-2-A
		28.52 g	1.00 mL								
6 320-30142-A-3 (537_DOD5)	N/A (320-30142-1)	286.01 g	256.7 mL	7			8/1/17	16_Days	4	ch nd	320-30142-A-3-A
		29.36 g	1.00 mL								
7 320-30142-A-4 (537_DOD5)	N/A (320-30142-1)	274.19 g	246.3 mL	7			8/1/17	16_Days	4	ch nd	320-30142-A-4-A
		27.88 g	1.00 mL								
8 320-30142-A-5 (537_DOD5)	N/A (320-30142-1)	283.69 g	255 mL	7			8/1/17	16_Days	4	ch nd	320-30142-A-5-A
		28.65 g	1.00 mL								
9 320-30142-A-6 (537_DOD5)	N/A (320-30142-1)	291.31 g	262.7 mL	7			8/1/17	16_Days	4	ch nd	320-30142-A-6-A
		28.61 g	1.00 mL								
10 320-30142-A-7 (537_DOD5)	N/A (320-30142-1)	287.28 g	259.1 mL	7			8/1/17	16_Days	4	ch nd	320-30142-A-7-A
		28.23 g	1.00 mL								

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-177417

Analyst: Branscum, Cassie

Batch Open: 8/3/2017 10:02:00AM

Method Code: 320-537_Prep-320

Batch End: 8/4/2017 9:08:00PM

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12

13

320-30142-A-8 (537_DOD5)	N/A (320-30142-1)	286.99 g	259.3 mL	7			8/1/17	16_Days	4	ch nd	RI	
		27.71 g	1.00 mL									
320-30136-A-1 (537_DOD5)	N/A (320-30136-1)	284.32 g	256.1 mL	7			8/1/17	16_Days	4	ch nd	RI	
		28.18 g	1.00 mL									
320-30136-A-2 (537_DOD5)	N/A (320-30136-1)	286.87 g	258.6 mL	7			8/1/17	16_Days	4	ch nd	RI	
		28.31 g	1.00 mL									

Batch Notes

Manifold ID 3,9

Trizma ID SLBR4303V

SPE Cartridge ID 6357081-02

Methanol ID 988835

Reagent Water ID 8-1-17

Pipette ID M16387D

Analyst ID - TA Reagent Drop CCB

Analyst ID - TA Reagent Drop JNS

Witness

Analyst ID - SU Reagent Drop CCB

Analyst ID - SU Reagent Drop JNS

Witness

Analyst ID - IS Reagent Drop JER/CCB

Analyst ID - IS Reagent Drop TN

Witness

Batch Comment IS:975029/1002798

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Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-177417

Analyst: Branscum, Cassie

Batch Open: 8/3/2017 10:02:00AM

Method Code: 320-537_Prep-320

Batch End:

Comments

PFAS Calibration Calculations:

Initial Calibration 8/14/2017
Instrument A8_N

Perfluorohexanesulfonic acid

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	Reported RRF
3	938005	6074703	28.7	1.47720	1.4757
6.67	2166866	6060332	28.7	1.53848	1.5378
15	4626981	5865253	28.7	1.50939	1.508
30	9496666	5780409	28.7	1.57171	1.5703
45	13083092	5649456	28.7	1.47698	1.4756
60	16584369	5673459	28.7	1.39824	1.397
Average				1.49533	1.4941
Standard Deviation				0.0600	
RSD				0.0401	
%RSD				4.01090	4

Continuing Calibration 08/14/2017 @ 19:24
A8_N

Perfluorohexanesulfonic acid

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	%D	Reported RRF	Reported %D
15	5030742	5804729	28.7	1.6582	10.984178	1.657	10.9

Willow Grove
SDG 320-30136-1

Sample Identification

WGNA-072517-RW-4842

Compound

Perfluoroheptanoic acid

Compound Area	368270
Internal Standard Amount (ng)	10
Dilution Factor	1
Internal Standard Area	4123283
Average RRF	0.856
Sample Volume(ml)	256.1
Volume Extract (ml)	1
Injection Volume (µl)	1
µl to ml	1000.00
Concentration	4.07 ng/L

DODCMD_ID	INSTALLATION_ID	SDG	SITE_NAME	NORM_SITE_NAME	LOCATION_NAME	LOCATION_TYPE_DESC	COORD_X	COORD_Y	CONTRACT_ID	DO_CTO_NUMBER	CONTR_NAME	SAMPLE_NAME	SAMPLE_MATRIX_DESC	SAMPLE_TYPE_DESC	COLLECT_DATE	ANALYTICAL_METHOD	ANALYTICAL_METHOD_GRP_DESC
MID_ATLANTIC	WILLOW_GROVE_NAS	320-30136-1							N6247016D9008	WE04	TETRA TECH, INC.	WGNA-072517-FRB-4842	Water for QC samples	Field Reagent Blank	25-Jul-17	537	Perfluoroalkyl Compounds
MID_ATLANTIC	WILLOW_GROVE_NAS	320-30136-1	OFFSITE_RW	SITE 00005	WGNA-RW-4842	Domestic well	2686194.141	326833.9176	N6247016D9008	WE04	TETRA TECH, INC.	WGNA-072517-RW-4842	Drinking water	Normal (Regular)	25-Jul-17	537	Perfluoroalkyl Compounds