



**Off-Base Drinking Water Sample Results,
Combined Level 2 and Level 4 Laboratory Report,
Electronic Data Deliverable, Data Validation Report,
and the Sample Location Figure, SDG 320-32676-1**

*Naval Air Station Willow Grove
Willow Grove, Pennsylvania*

August 2019

N00158_000718
WILLOW_GROVE_NAS
SSIC 5000-33c

**LABORATORY DATA PACKAGE, 320-32676-1, NAWC WARMINSTER NAS
WILLOW GROVE PA**

11/08/2017
TESTAMERICA LABORATORIES INC

Approved for public release: distribution unlimited.

ANALYTICAL REPORT

Job Number: 320-32676-1

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.
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11/8/2017 3:23 PM

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Definitions/Glossary

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

TestAmerica Job ID: 320-32676-1

Qualifiers

LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.
J	Estimated: The analyte was positively identified; the quantitation is an estimation
M	Manual integrated compound.

Glossary

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

Job Narrative
320-32676-1

Receipt

The samples were received on 10/25/2017 9:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4° C.

LCMS

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

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

Organic Prep

Method(s) 537: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-191373.

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: 320-32676-1

Client Sample ID: WGNA-102417-RW-4829 Lab Sample ID: 320-32676-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	8.9	J M	43	7.2	ng/L	1		537	Total/NA
Perfluorooctanoic acid (PFOA)	12	J	21	3.0	ng/L	1		537	Total/NA
Perfluoroheptanoic acid (PFHpA)	8.0	J	11	2.0	ng/L	1		537	Total/NA

Client Sample ID: WGNA-102417-FRB-4829 Lab Sample ID: 320-32676-2

No Detections.

Client Sample Results

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

TestAmerica Job ID: 320-32676-1

Client Sample ID: WGNA-102417-RW-4829

Lab Sample ID: 320-32676-1

Date Collected: 10/24/17 08:10

Matrix: Water

Date Received: 10/25/17 09:40

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	8.9	J M	43	7.2	ng/L	—	10/27/17 08:32	11/06/17 10:09	1
Perfluorooctanoic acid (PFOA)	12	J	21	3.0	ng/L	—	10/27/17 08:32	11/06/17 10:09	1
Perfluorononanoic acid (PFNA)	21	U M	26	8.5	ng/L	—	10/27/17 08:32	11/06/17 10:09	1
Perfluorohexanesulfonic acid (PFHxS)	13	U	32	5.8	ng/L	—	10/27/17 08:32	11/06/17 10:09	1
Perfluoroheptanoic acid (PFHpA)	8.0	J	11	2.0	ng/L	—	10/27/17 08:32	11/06/17 10:09	1
Perfluorobutanesulfonic acid (PFBS)	38	U	96	17	ng/L	—	10/27/17 08:32	11/06/17 10:09	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	83		70 - 130	10/27/17 08:32	11/06/17 10:09	1
13C2 PFDA	96		70 - 130	10/27/17 08:32	11/06/17 10:09	1

Client Sample ID: WGNA-102417-FRB-4829

Lab Sample ID: 320-32676-2

Date Collected: 10/24/17 08:05

Matrix: Water

Date Received: 10/25/17 09:40

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	15	U	38	6.5	ng/L	—	10/27/17 08:32	11/06/17 10:13	1
Perfluorooctanoic acid (PFOA)	7.7	U	19	2.7	ng/L	—	10/27/17 08:32	11/06/17 10:13	1
Perfluorononanoic acid (PFNA)	19	U	23	7.7	ng/L	—	10/27/17 08:32	11/06/17 10:13	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	29	5.3	ng/L	—	10/27/17 08:32	11/06/17 10:13	1
Perfluoroheptanoic acid (PFHpA)	3.8	U	9.6	1.8	ng/L	—	10/27/17 08:32	11/06/17 10:13	1
Perfluorobutanesulfonic acid (PFBS)	35	U	86	15	ng/L	—	10/27/17 08:32	11/06/17 10:13	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	90		70 - 130	10/27/17 08:32	11/06/17 10:13	1
13C2 PFDA	97		70 - 130	10/27/17 08:32	11/06/17 10:13	1

Default Detection Limits

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-32676-1

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: 320-32676-1

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 PFDA (70-130)
320-32676-1	WGNA-102417-RW-4829	83	96
320-32676-2	WGNA-102417-FRB-4829	90	97
LLCS 320-191373/2-A	Lab Control Sample	93	98
LLCSD 320-191373/3-A	Lab Control Sample Dup	86	95
MB 320-191373/1-A	Method Blank	90	95

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: 320-32676-1

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

Lab Sample ID: MB 320-191373/1-A

Matrix: Water

Analysis Batch: 193089

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 191373

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	16	U	40	6.8	ng/L		10/27/17 08:32	11/06/17 09:54	1
Perfluorooctanoic acid (PFOA)	8.0	U	20	2.8	ng/L		10/27/17 08:32	11/06/17 09:54	1
Perfluorononanoic acid (PFNA)	20	U	24	8.0	ng/L		10/27/17 08:32	11/06/17 09:54	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	30	5.5	ng/L		10/27/17 08:32	11/06/17 09:54	1
Perfluoroheptanoic acid (PFHpA)	4.0	U	10	1.9	ng/L		10/27/17 08:32	11/06/17 09:54	1
Perfluorobutanesulfonic acid (PFBS)	36	U	90	16	ng/L		10/27/17 08:32	11/06/17 09:54	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	90		70 - 130	10/27/17 08:32	11/06/17 09:54	1
13C2 PFDA	95		70 - 130	10/27/17 08:32	11/06/17 09:54	1

Lab Sample ID: LLCS 320-191373/2-A

Matrix: Water

Analysis Batch: 193089

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 191373

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanesulfonic acid (PFOS)	40.0	36.7	J	ng/L		92	50 - 150
Perfluorooctanoic acid (PFOA)	20.0	20.2		ng/L		101	50 - 150
Perfluorononanoic acid (PFNA)	20.0	20.9	J	ng/L		104	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	30.0	29.5	J	ng/L		98	50 - 150
Perfluoroheptanoic acid (PFHpA)	10.0	10.6		ng/L		106	50 - 150
Perfluorobutanesulfonic acid (PFBS)	90.0	86.4	J	ng/L		96	50 - 150

Surrogate	LLCS %Recovery	LLCS Qualifier	Limits
13C2 PFHxA	93		70 - 130
13C2 PFDA	98		70 - 130

Lab Sample ID: LLCSD 320-191373/3-A

Matrix: Water

Analysis Batch: 193089

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 191373

Analyte	Spike Added	LLCSD Result	LLCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)	40.0	34.7	J	ng/L		87	50 - 150	6	50
Perfluorooctanoic acid (PFOA)	20.0	18.7	J	ng/L		94	50 - 150	8	50
Perfluorononanoic acid (PFNA)	20.0	19.5	J	ng/L		98	50 - 150	7	50
Perfluorohexanesulfonic acid (PFHxS)	30.0	26.8	J	ng/L		89	50 - 150	10	50
Perfluoroheptanoic acid (PFHpA)	10.0	9.85	J	ng/L		99	50 - 150	7	50
Perfluorobutanesulfonic acid (PFBS)	90.0	81.0	J	ng/L		90	50 - 150	7	50

Surrogate	LLCSD %Recovery	LLCSD Qualifier	Limits
13C2 PFHxA	86		70 - 130
13C2 PFDA	95		70 - 130

TestAmerica Sacramento

QC Association Summary

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-32676-1

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

LCMS

Prep Batch: 191373

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-32676-1	WGNA-102417-RW-4829	Total/NA	Water	537	
320-32676-2	WGNA-102417-FRB-4829	Total/NA	Water	537	
MB 320-191373/1-A	Method Blank	Total/NA	Water	537	
LLCS 320-191373/2-A	Lab Control Sample	Total/NA	Water	537	
LLCSD 320-191373/3-A	Lab Control Sample Dup	Total/NA	Water	537	

Analysis Batch: 193089

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-32676-1	WGNA-102417-RW-4829	Total/NA	Water	537	191373
320-32676-2	WGNA-102417-FRB-4829	Total/NA	Water	537	191373
MB 320-191373/1-A	Method Blank	Total/NA	Water	537	191373
LLCS 320-191373/2-A	Lab Control Sample	Total/NA	Water	537	191373
LLCSD 320-191373/3-A	Lab Control Sample Dup	Total/NA	Water	537	191373

Lab Chronicle

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

TestAmerica Job ID: 320-32676-1

Client Sample ID: WGNA-102417-RW-4829

Date Collected: 10/24/17 08:10

Date Received: 10/25/17 09:40

Lab Sample ID: 320-32676-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			191373	10/27/17 08:32	J1S	TAL SAC
Total/NA	Analysis	537		1	193089	11/06/17 10:09	JRB	TAL SAC

Client Sample ID: WGNA-102417-FRB-4829

Date Collected: 10/24/17 08:05

Date Received: 10/25/17 09:40

Lab Sample ID: 320-32676-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			191373	10/27/17 08:32	J1S	TAL SAC
Total/NA	Analysis	537		1	193089	11/06/17 10:13	JRB	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: Tetra Tech, Inc.

TestAmerica Job ID: 320-32676-1

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

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	UST-055	12-18-17
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-18
California	State Program	9	2897	01-31-18
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-18
Illinois	NELAP	5	200060	03-17-18
Kansas	NELAP	7	E-10375	10-31-17 *
L-A-B	DoD ELAP		L2468	01-20-18
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-18
New Jersey	NELAP	2	CA005	06-30-18
New York	NELAP	2	11666	04-01-18
Oregon	NELAP	10	4040	01-28-18
Pennsylvania	NELAP	3	68-01272	03-31-18
Texas	NELAP	6	T104704399	05-31-18
US Fish & Wildlife	Federal		LE148388-0	07-31-18
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-18
Virginia	NELAP	3	460278	03-14-18
Washington	State Program	10	C581	05-05-18
West Virginia (DW)	State Program	3	9930C	12-31-17
Wyoming	State Program	8	8TMS-L	01-28-19

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

TestAmerica Sacramento

Method Summary

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

TestAmerica Job ID: 320-32676-1

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: 320-32676-1

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

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-32676-1	WGNA-102417-RW-4829	Water	10/24/17 08:10	10/25/17 09:40
320-32676-2	WGNA-102417-FRB-4829	Water	10/24/17 08:05	10/25/17 09:40

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1

SDG No.: _____

Instrument ID: A8_N Analysis Batch Number: 192908Lab Sample ID: IC 320-192908/4 Client Sample ID: _____Date Analyzed: 11/03/17 13:37 Lab File ID: 2017.11.03_537XICAL_004.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.16	Assign Peak	phomsopha t	11/06/17 07:17

Lab Sample ID: IC 320-192908/5 Client Sample ID: _____Date Analyzed: 11/03/17 13:42 Lab File ID: 2017.11.03_537XICAL_005.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.16	Assign Peak	phomsopha t	11/06/17 07:18

Lab Sample ID: IC 320-192908/7 ICISAV Client Sample ID: _____Date Analyzed: 11/03/17 13:52 Lab File ID: 2017.11.03_537XICAL_007.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.16	Assign Peak	phomsopha t	11/06/17 07:20

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1

SDG No.: _____

Instrument ID: A8_N Analysis Batch Number: 193089Lab Sample ID: 320-32676-1 Client Sample ID: WGNA-102417-RW-4829Date Analyzed: 11/06/17 10:09 Lab File ID: 2017.11.06_537B_006.d GC Column: GeminiC18 3x1 ID: 3 (mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.16	Baseline	barnettj	11/07/17 10:05
Perfluorononanoic acid (PFNA)	2.17	Split Peak	barnettj	11/07/17 10:06

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-32676-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
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
..LC537-IS_00045	01/05/18	07/05/17	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	28.68 ng/mL
..LCM2PFOA_00007	02/12/21	Wellington Laboratories, Lot M2PFOA0216			LCMPFOS_00019	180 uL	13C4 PFOS	0.1 ug/mL
..LCMPFOS_00019	08/03/21	Wellington Laboratories, Lot MPFOS0816			(Purchased Reagent)		13C2-PFOA	0.2868 ug/mL
LC537-ICV_00028	01/05/18	08/02/17	MeOH/H2O, Lot 067374	10 mL	LC537-SU_00046	1000 uL	13C2-PFOA	50 ug/mL
..LC537-SU_00046	01/05/18	07/05/17	Methanol, Lot 104453	30000 uL	LC537ICIM_00019	20 uL	13C4 PFOS	47.8 ug/mL
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	10 ng/mL
..LCMPFHxA_00013	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	10 ng/mL
..LC537ICIM_00019	01/25/18	08/01/17	Methanol, Lot 090285	25 mL	LC537-PFBS2_00008	0.6 mL	Perfluorobutanesulfonic acid (PFBS)	100.119 ng/mL
..LC537-PFBS2_00008	01/25/18	07/25/17	Methanol, Lot 090285	20 mL	LC537-PFHxA2_00011	0.061 mL	Perfluoroheptanoic acid (PFHpA)	9.99613 ng/mL
...LC537_PFBS2_00002	09/08/22	Santa Cruz Biotechnology, Lot F0917			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	20.0761 ng/mL
..LC537-PFHxA2_00011	01/25/18	07/25/17	Methanol, Lot 09092	31 mL	LC537-PFHxS2_00008	0.122 mL	Perfluorononanoic acid (PFNA)	20.1272 ng/mL
...LC537_PFHxA2_00002	06/13/22	Afla Aesar, Lot 10200390			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	20.4843 ng/mL
..LC537-PFHxS2_00008	01/25/18	07/25/17	Methanol, Lot 090285	21 mL	LC537-PFOA2_00010	0.122 mL	Perfluorooctanesulfonic acid (PFOS)	19.698 ng/mL
...LC537_PFHxS2_00002	06/08/22	Santa Cruz Biotechnology, Lot G2516			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	2085.82 ug/mL
..LC537-PFNA2_00009	01/25/18	07/25/17	Methanol, Lot 090285	21 mL	LC537-PFOS2_00010	0.124 mL	Perfluoroheptanoic acid (PFHpA)	4.99806 ug/mL
...LC537_PFNA2_00002	06/14/22	Aldrich, Lot MKCC0699			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	10.038 ug/mL
..LC537-PFOA2_00010	01/25/18	08/01/17	Methanol, Lot 090285	20 mL	LC537-PFNA2_00002	0.0421 g	Perfluorononanoic acid (PFNA)	10.0636 ug/mL
...LC537_PFOA2_00002	06/09/22	Afla Aesar, Lot 10199078			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	10.2421 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	9.849 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	2085.82 ug/mL
							Perfluoroheptanoic acid (PFHpA)	2048.39 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	2056.98 ug/mL
							Perfluorononanoic acid (PFNA)	1996.74 ug/mL
							Perfluorooctanoic acid (PFOA)	2098.8 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.99 g/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-32676-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..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_00051	03/20/18	09/20/17	Methanol, Lot 090285	30000 uL	LCM2PFOA_00006	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00021	180 uL	13C4 PFOS	0.2868 ug/mL
.LCM2PFOA_00006	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
							13C4 PFOS	28.68 ng/mL
					LC537-MSP_00029	60 uL	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
							13C2 PFHxA	10 ng/mL
.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-MSP_00029	02/10/18	08/10/17	Methanol, Lot 141039	20000 uL	LC537SPIM_00023	166.7 uL	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-PFHxA_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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-32676-1

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-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
					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
							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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LC537-PFHpA_00015	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			LCMPFOS_00021	180 uL	13C4 PFOS	0.2868 ug/mL
..LCMPFOS_00021	12/12/21	Wellington Laboratories, Lot MPFOS1216			(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
..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
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
							13C2 PFDA	10 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-32676-1

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	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	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
							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			LCMPFOS_00021	180 uL	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
							13C2 PFDA	50 ug/mL
							13C2 PFHxA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-32676-1

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-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
							Perfluorooctanoic acid (PFOA)	1.00076 mg/mL
LC537-PFOS_00002	04/01/18		Sigma, Lot MKBP8842V				Perfluorooctanoic acid (PFOA)	0.999 g/g
LC537-PFBS_00002	04/01/18		Sigma, Lot MKBP8842V				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				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.: 320-32676-1

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
					LC537-PFHpA_00015	100 uL	Perfluorobutanesulfonic acid (PFBS)	90 ug/mL
					LC537-PFHxS_00010	150 uL	Perfluoroheptanoic acid (PFHpA)	10.0016 ug/mL
					LC537-PFNA 00013	200 uL	Perfluorohexanesulfonic acid (PFHxS)	30.0043 ug/mL
					LC537-PFOA 00013	200 uL	Perfluorononanoic acid (PFNA)	20.002 ug/mL
					LC537-PFOS_00008	400 uL	Perfluorooctanoic acid (PFOA)	20.0151 ug/mL
...LC537-PFBS_00008	02/10/18	08/10/17	Methanol, Lot 090285	49.6 mL	LC537_PFBS_00002	0.0992 g	Perfluorooctanesulfonic acid (PFOS)	40.0066 ug/mL
							Perfluorobutanesulfonic acid (PFBS)	2 mg/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-32676-1

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
					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

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-32676-1

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			(Purchased Reagent)		13C2 PFDA	0.1 ug/mL
..LCMPFHxA_00013	04/08/21	Wellington Laboratories, Lot MPFHxA0416			(Purchased Reagent)		13C2 PFHxA	0.1 ug/mL
LC537-LSP_00025	02/10/18	08/10/17	Methanol, Lot 090285	20000 uL	LC537SPIM_00023	50 uL	Perfluorobutane Sulfonate	225 ng/mL
							Perfluorobutanesulfonic acid (PFBS)	225 ng/mL
							Perfluoroheptanoic acid (PFHpA)	25.0041 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	75.0109 ng/mL
							Perfluorononanoic acid (PFNA)	50.0049 ng/mL
							Perfluorooctanoic acid (PFOA)	50.0378 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento

Job No.: 320-32676-1

SDG No.: _____

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanesulfonic acid (PFOS)	100.016 ng/mL
.LC537SPIM_00023	02/10/18	08/10/17	Methanol, Lot 104453	10000 uL	LC537-PFBS_00008	450 uL	Perfluorobutane Sulfonate	90 ug/mL
							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	Perfluorobutane Sulfonate	2 mg/mL
							Perfluorobutanesulfonic acid (PFBS)	2 mg/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_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-SU_00050	03/20/18	09/20/17	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL
.LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
.LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL

Reagent

LC537_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:

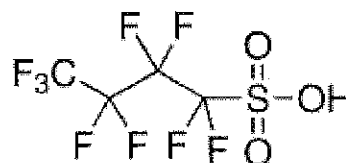
300.10 g/mol

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_PFB2_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_PFH_pA_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

Y: 4/1/15 SW

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

$$MW_{corr} = \frac{(k_{form}) - (k) + (H)}{438.20 (k_{form})} = \frac{(438.20 - 3910 + 101)}{438.20 (k_{form})} = 0.91307 \text{ (anion form)}$$

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

SW 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

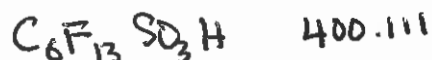
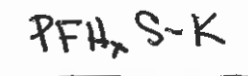


The Future is Now

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%



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

Purity $\frac{1}{9}$ MW 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

17.14.16 SW

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:

Perfluorononanoic acid - 97%

Product Number:

394459

Batch Number:

MKCC0699

Brand:

ALDRICH

CAS Number:

375-95-1

MDL Number:

MFCD00039605

Formula:

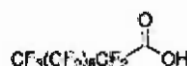
C₉H₁₇O₂

Formula Weight:

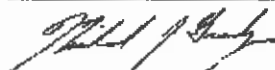
464.08 g/mol

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_00003

C: 11/30/16 SKV
PFA

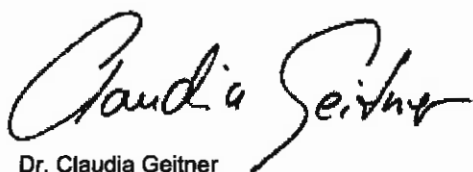
SIGMA-ALDRICH

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%

This document has been electronically generated and does not require a signature.

Order our products online www.alfa.com

ThermoFisher
SCIENTIFIC

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: HEPTADECAFLUOROOCTANESULFONIC 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

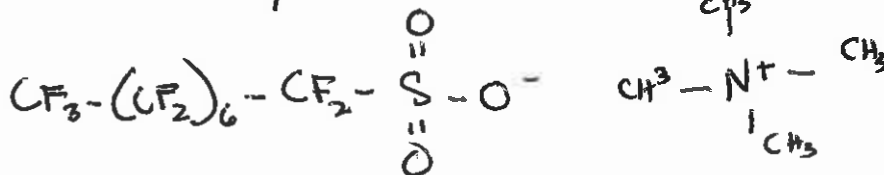
TEST	SPECIFICATION	RESULT
APPEARANCE (COLOR)	WHITE TO OFF WHITE	OFF-WHITE
APPEARANCE (FORM)	POWDER OR POWDER WITH CHUNK(S)	POWDER
CARBON CONTENT	29.77 % - 31.29 %	29.97 %
INFRARED SPECTRUM	CONFORMS TO STRUCTURE	CONFORMS

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_00006

R: 8BC 12/21/16



814260

ID: LCM2PFOA_00006

Exp: 02/12/21 Prod: SBC

¹³C2-PFOA Stock 50ug/mL



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

M2PFOA

LOT NUMBER:

M2PFOA0216

COMPOUND:

Perfluoro-n-[1,2-¹³C₂]octanoic acid

STRUCTURE:

CAS #:

Not available



MOLECULAR FORMULA:

¹³C₂¹²C₆HF₁₆O₂

CONCENTRATION:

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

416.05

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:

≥99%¹³C

LAST TESTED: (mm/dd/yyyy)

02/12/2016

EXPIRY DATE: (mm/dd/yyyy)

02/12/2021

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

(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.

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:

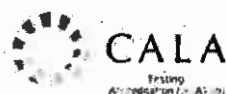
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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.

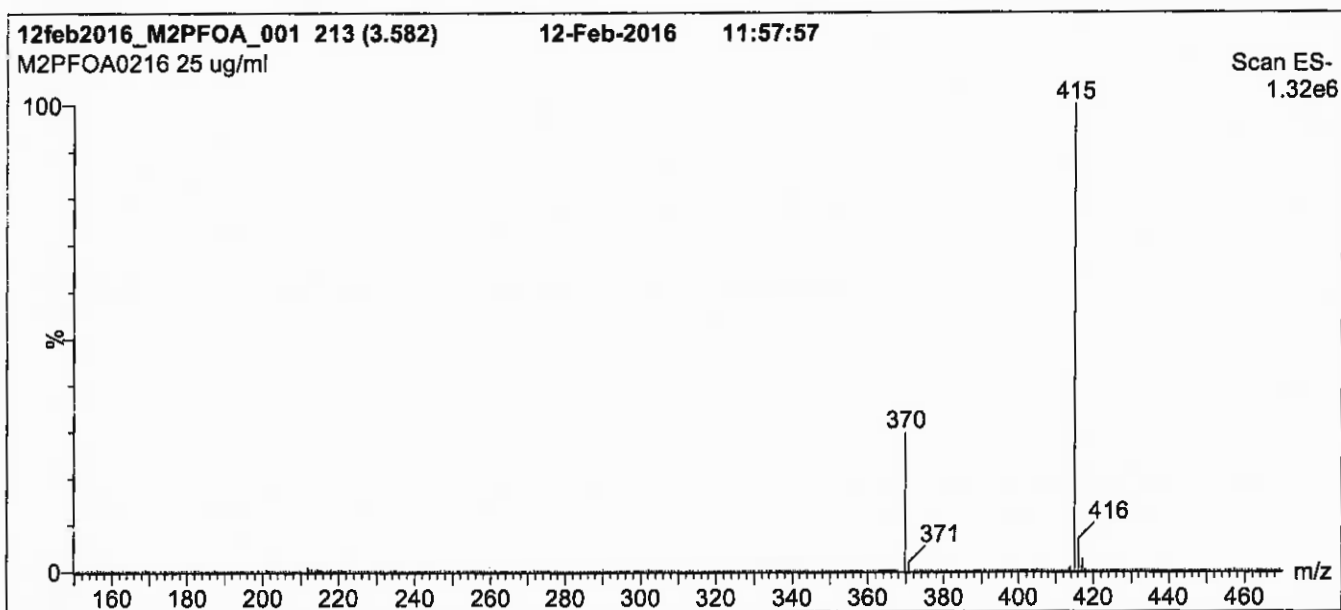
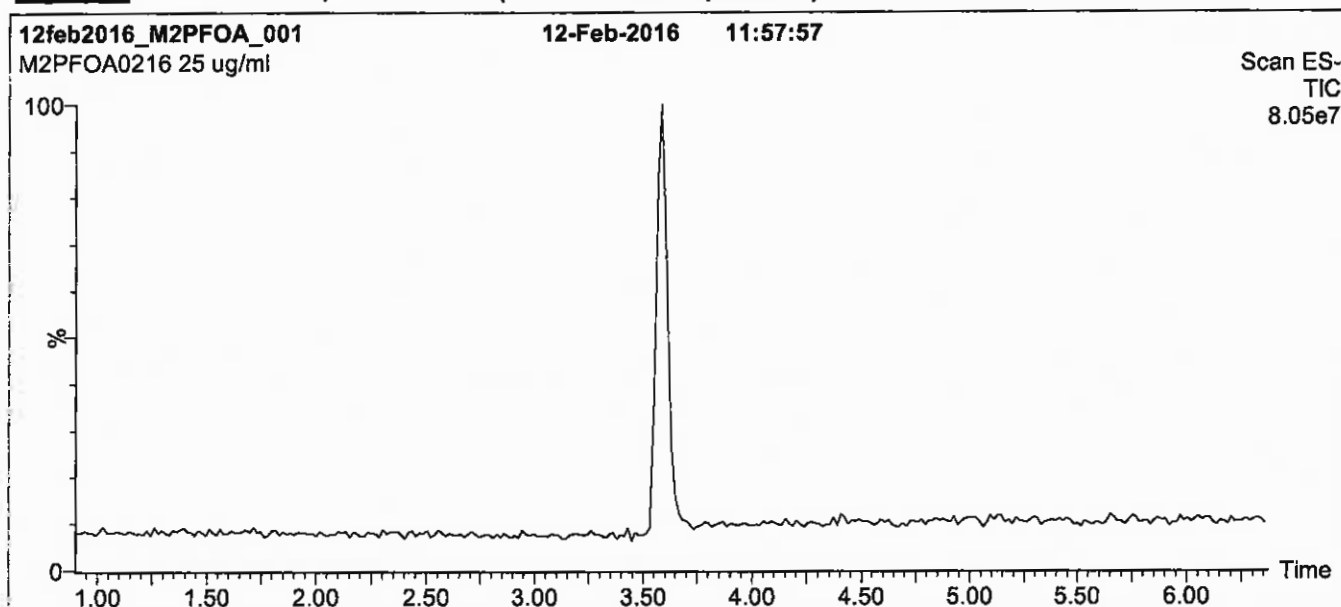
QUALITY MANAGEMENT:

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

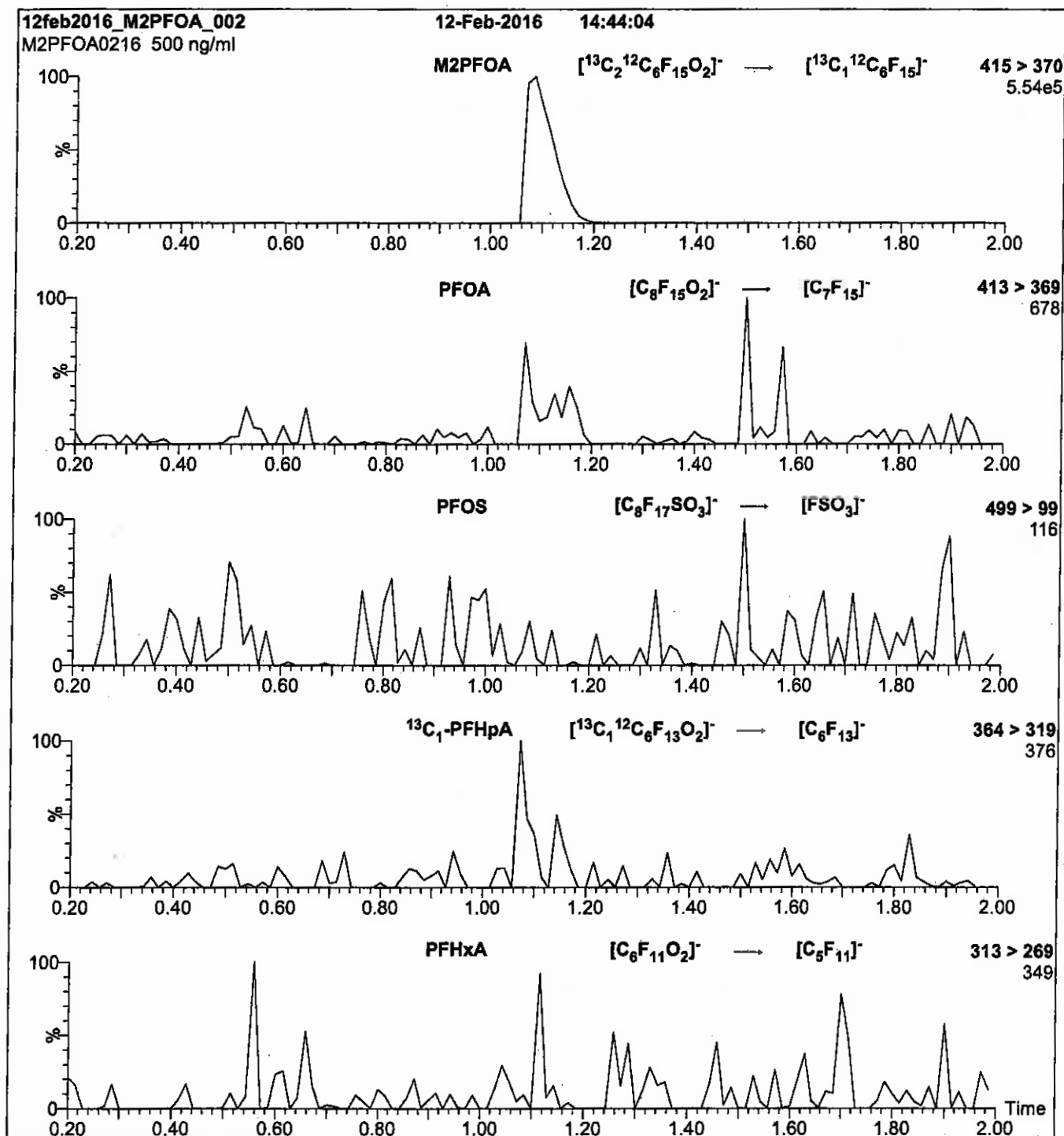
Flow: 300 μ l/min

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

LCM2PFOA_00007



WELLINGTON LABORATORIES

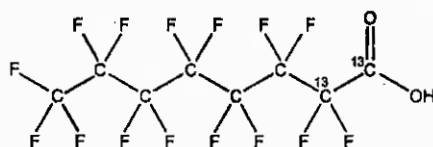
CERTIFICATE OF ANALYSIS DOCUMENTATION

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

ISOTOPIC PURITY: ≥99% ¹³C
(1,2-¹³C₂)

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

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

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

INTENDED USE:

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HAZARDS:

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

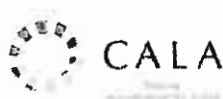
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LIMITED WARRANTY:

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

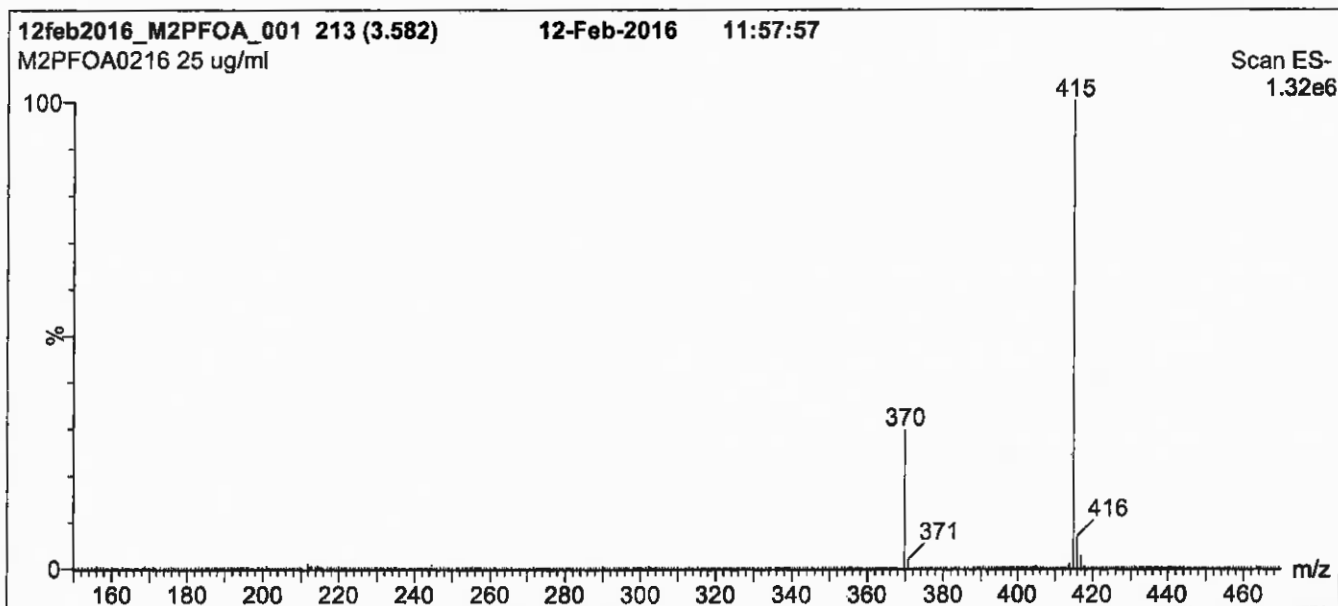
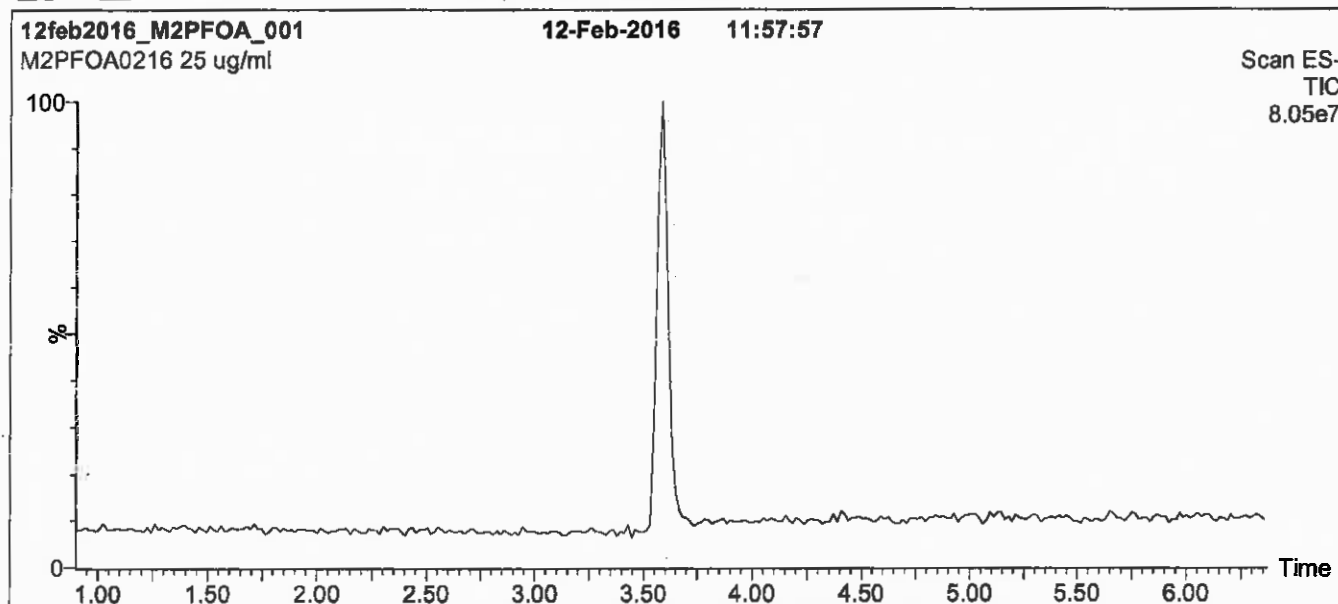
QUALITY MANAGEMENT:

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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

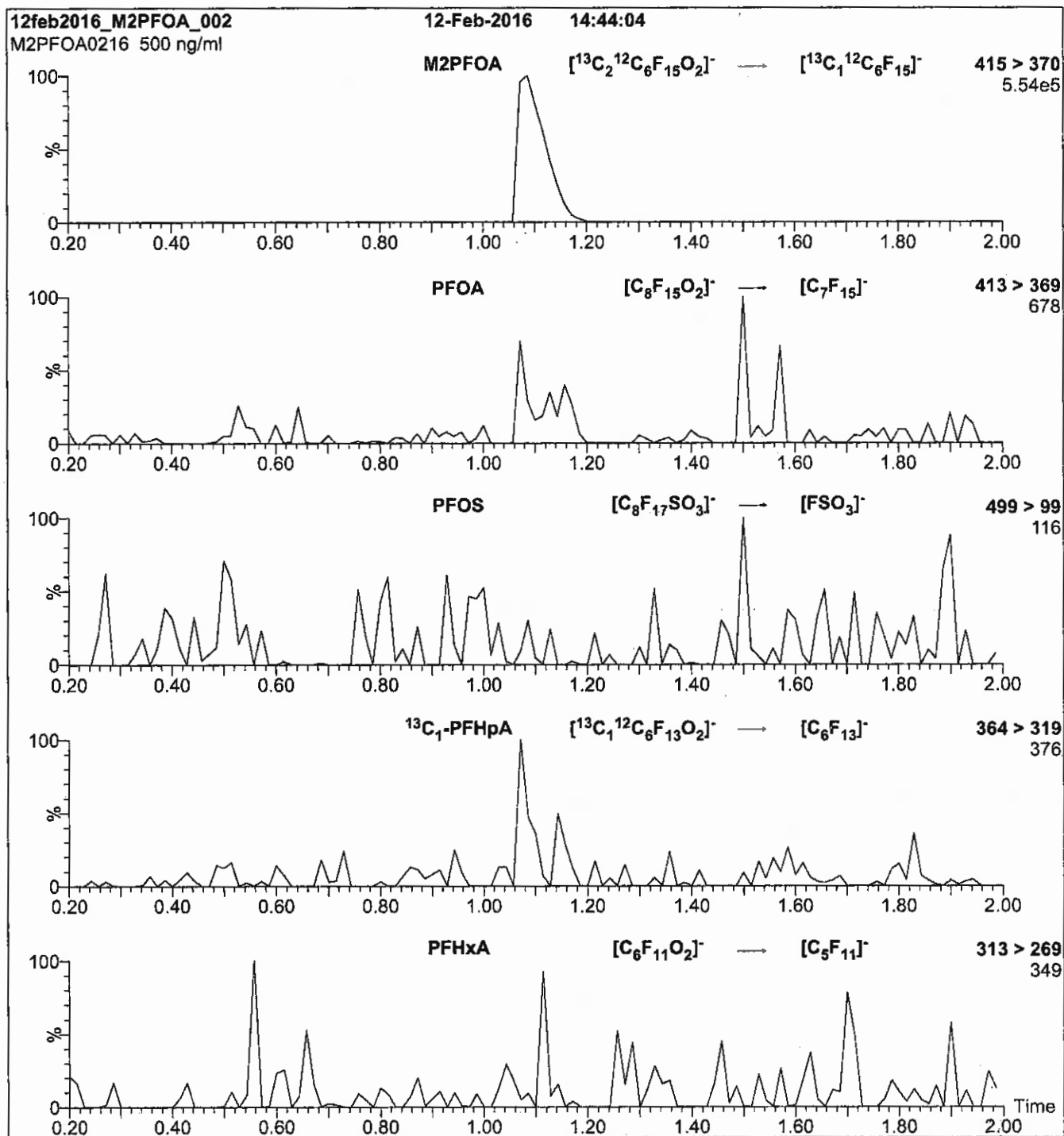
Flow: 300 μ l/min

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 a



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

MPFDA

COMPOUND:

Perfluoro-n-[1,2-¹³C₂]decanoic acid

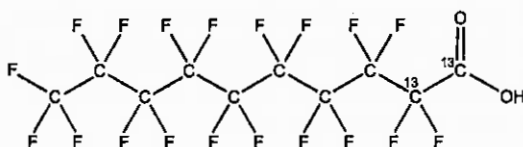
LOT NUMBER:

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

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

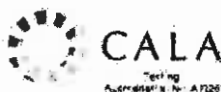
Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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

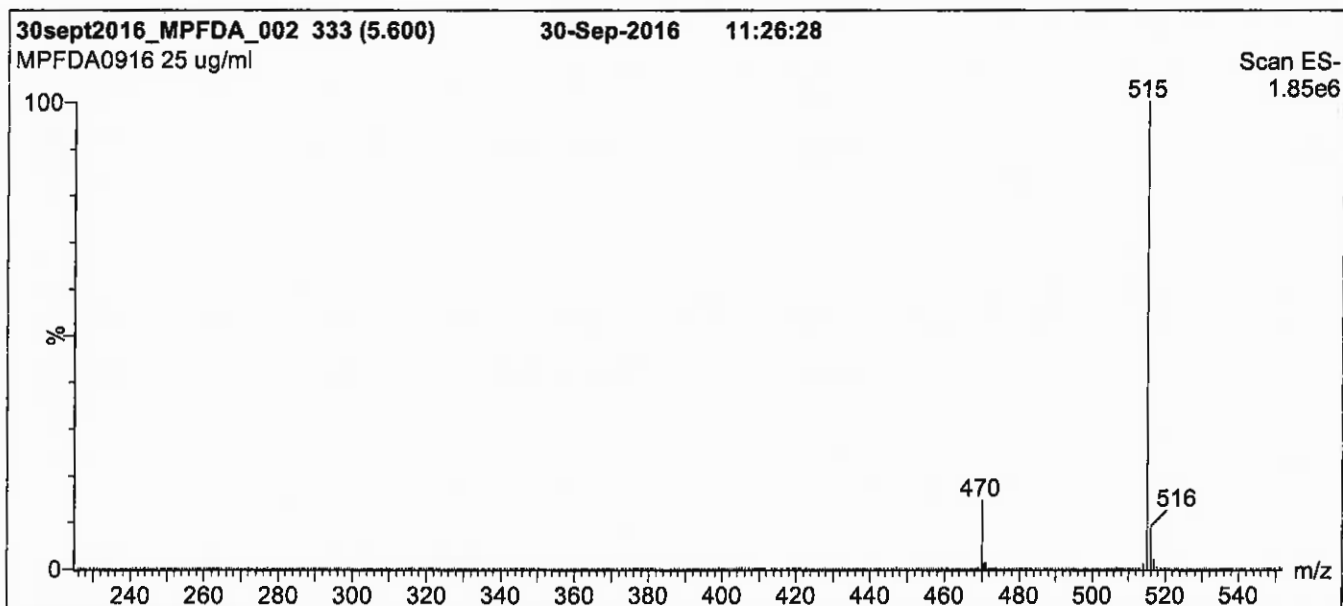
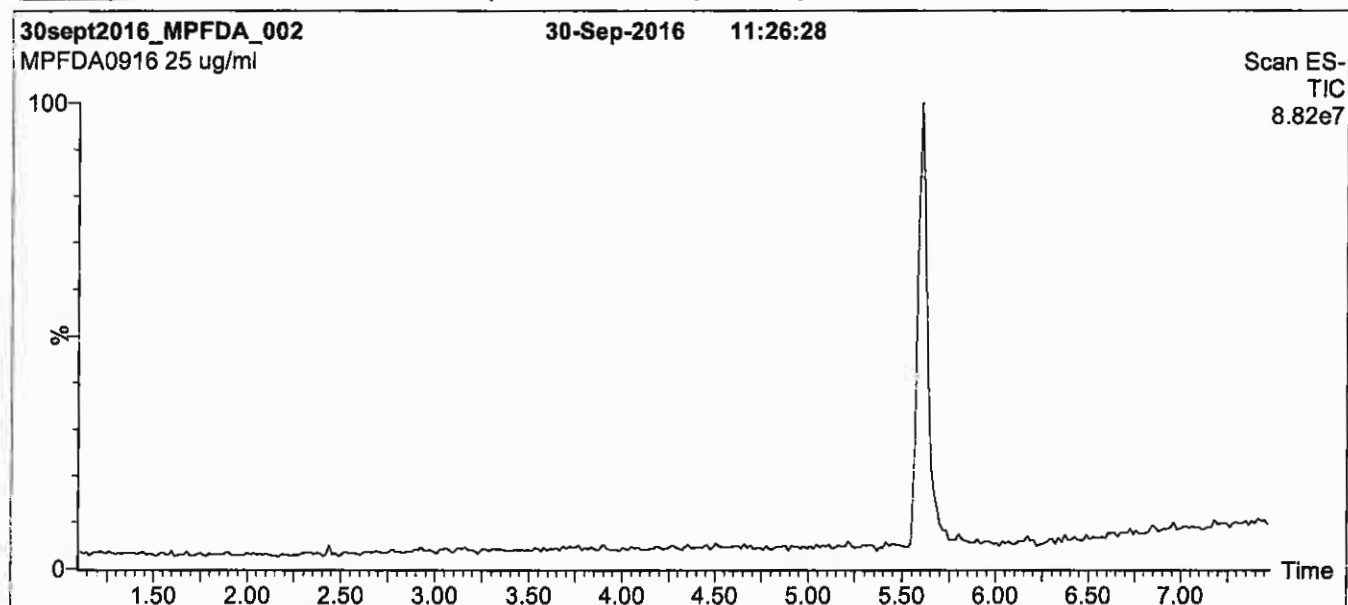
QUALITY MANAGEMENT:

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



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Figure 1: 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

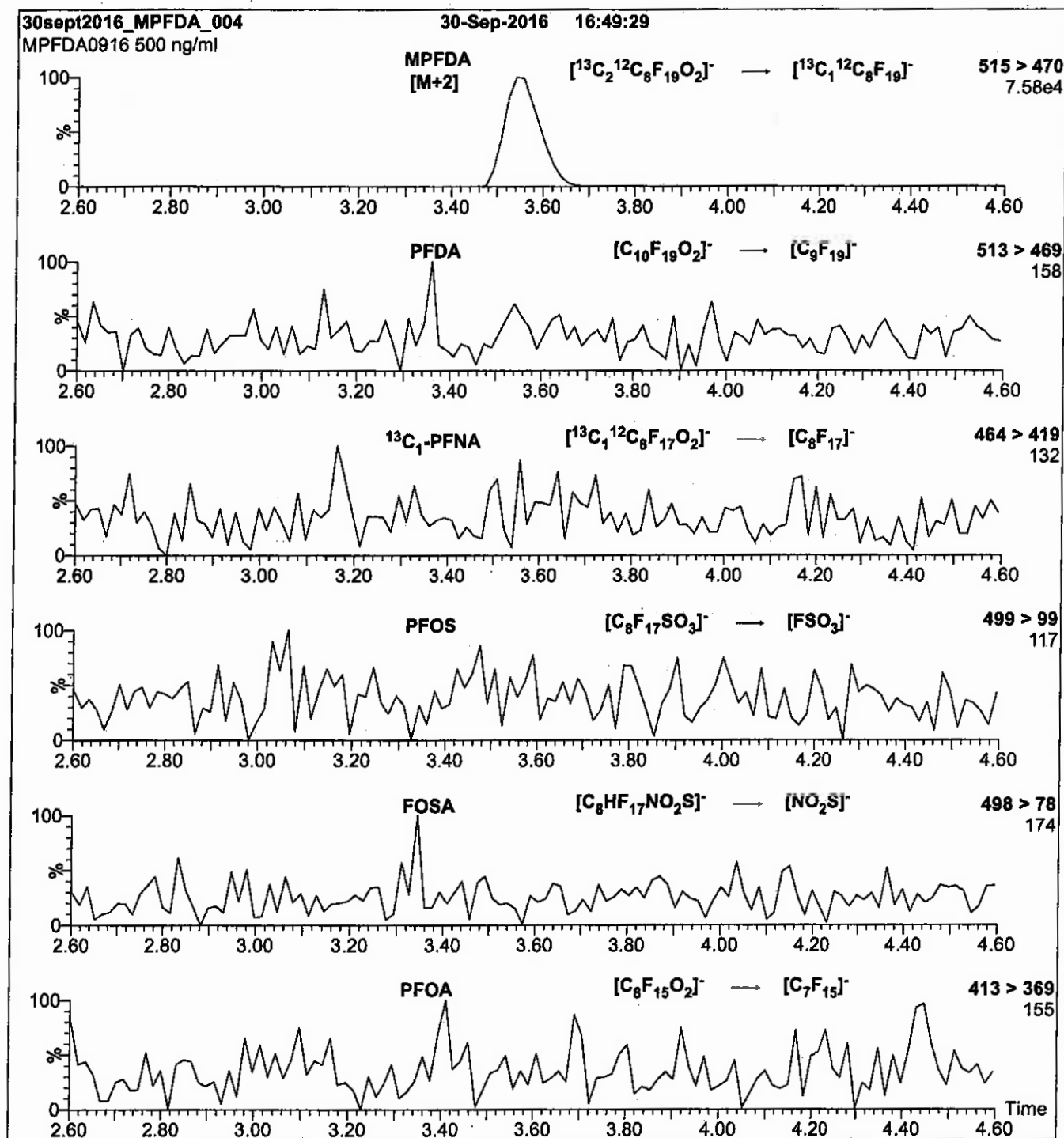
Flow: 300 μ l/min

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:**

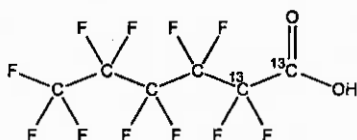
MPFHxA

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

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:

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

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LIMITED WARRANTY:

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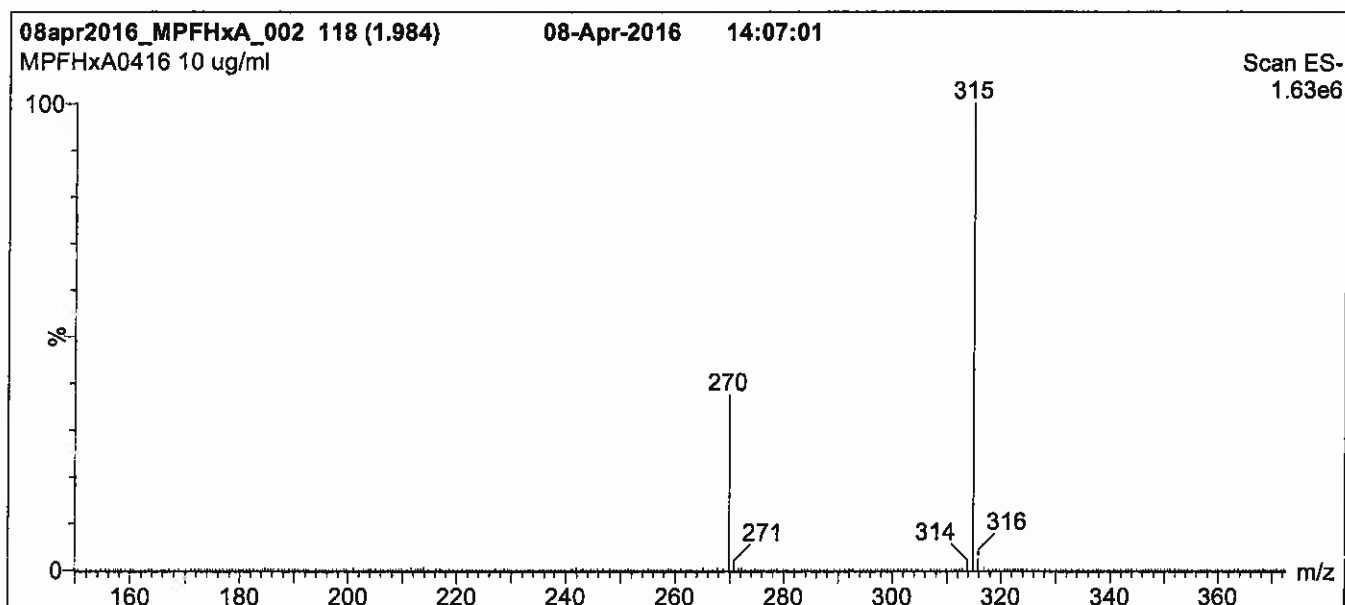
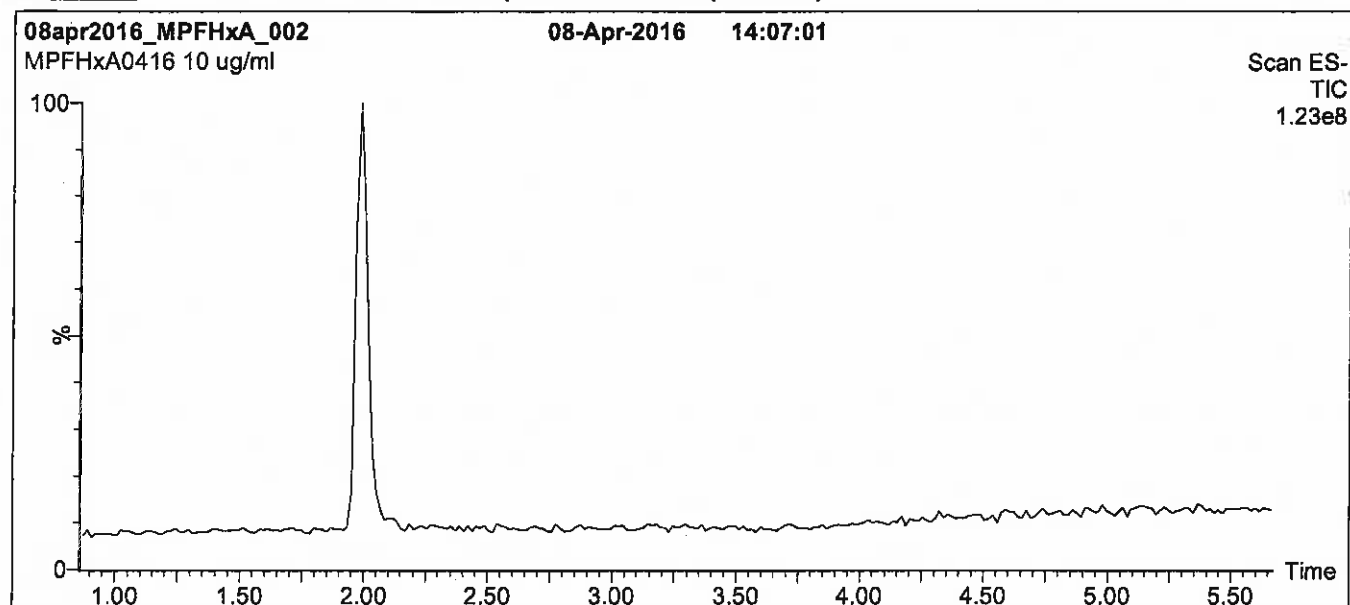
QUALITY MANAGEMENT:

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



Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield 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

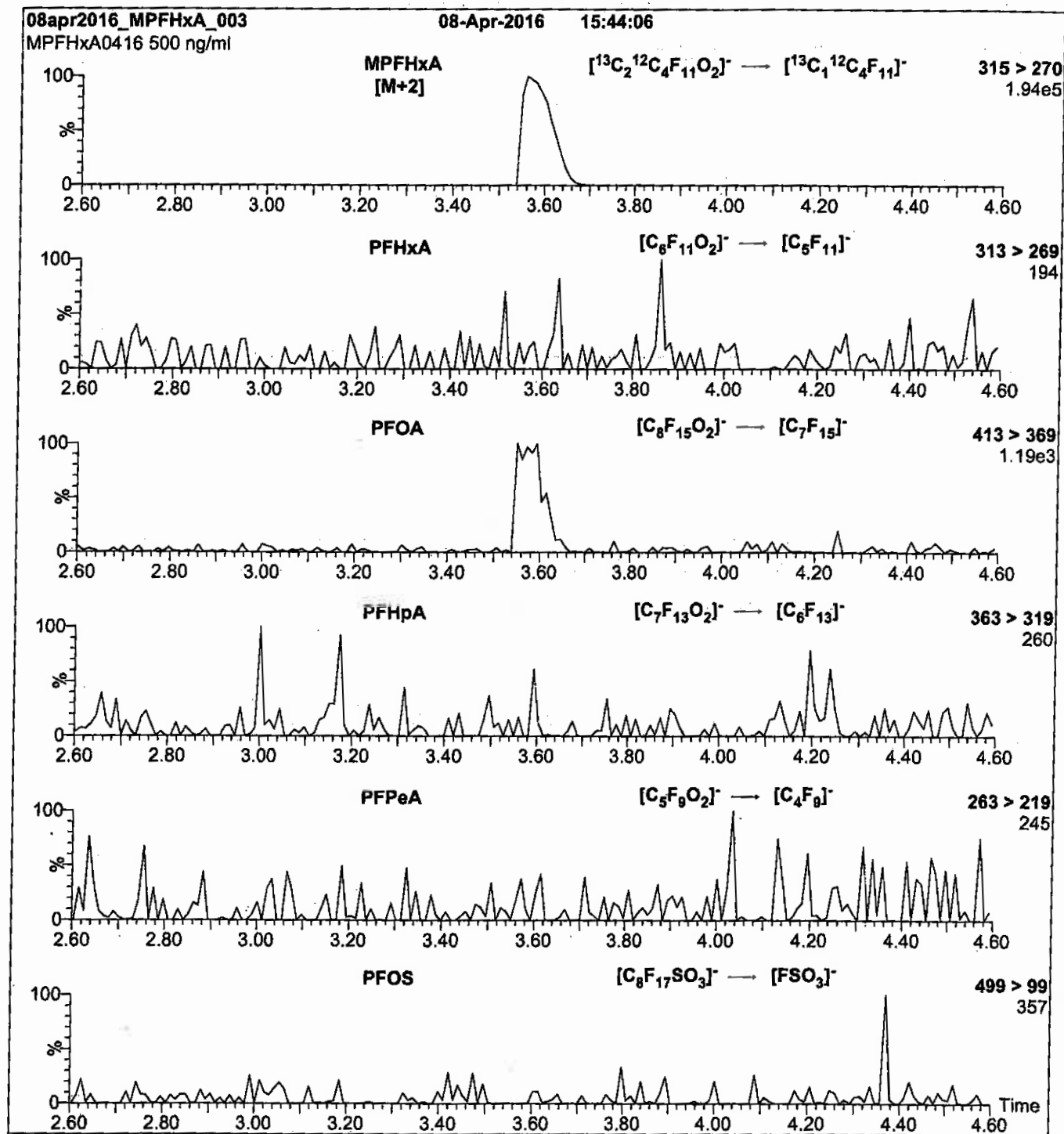
Flow: 300 μ l/min

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

LCMPFHxA_00015

m: 5/6/17 SKJ



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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

LOT NUMBER: MPFHxA1116

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%
LAST TESTED: (mm/dd/yyyy) 11/22/2016
EXPIRY DATE: (mm/dd/yyyy) 11/22/2021

ISOTOPIC PURITY: ≥99% ¹³C
(1,2-¹³C₂)

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:
B.G. Chittim

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

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

INTENDED USE:

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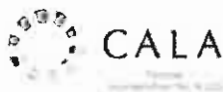
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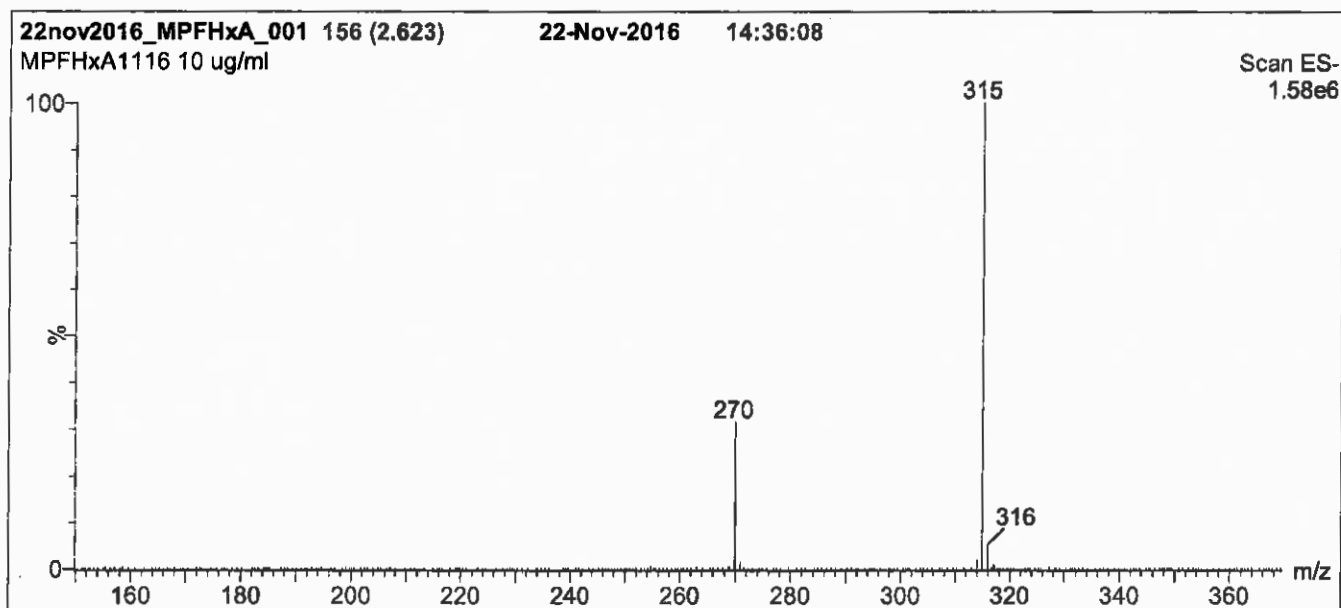
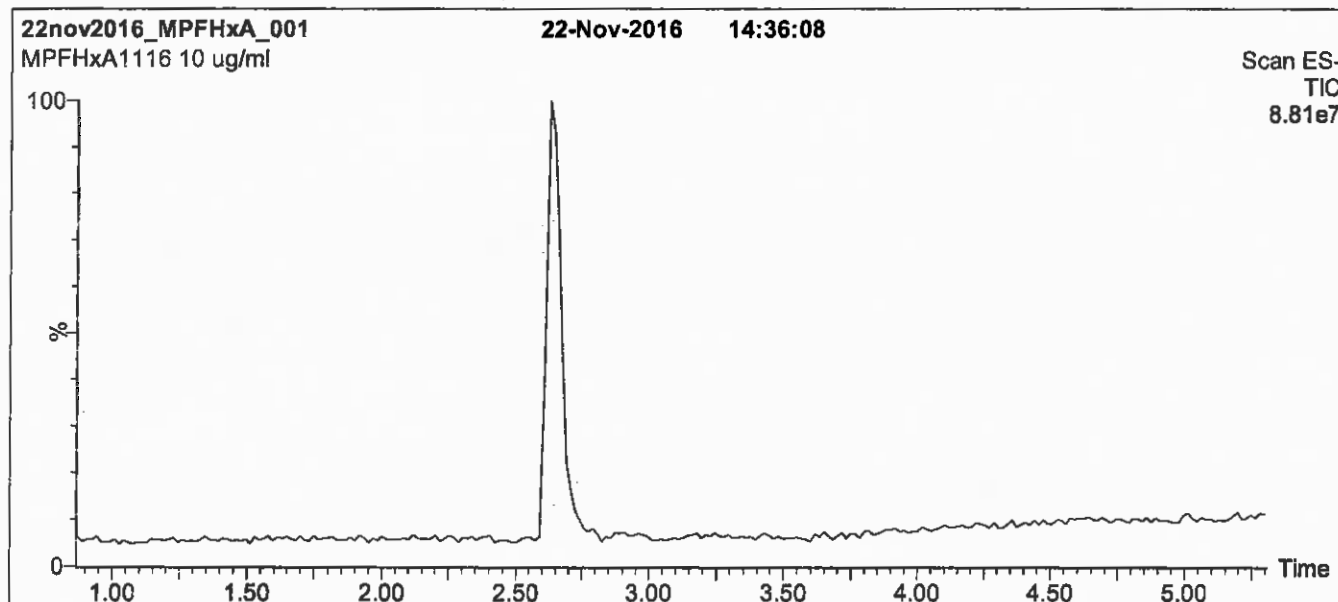
QUALITY MANAGEMENT:

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

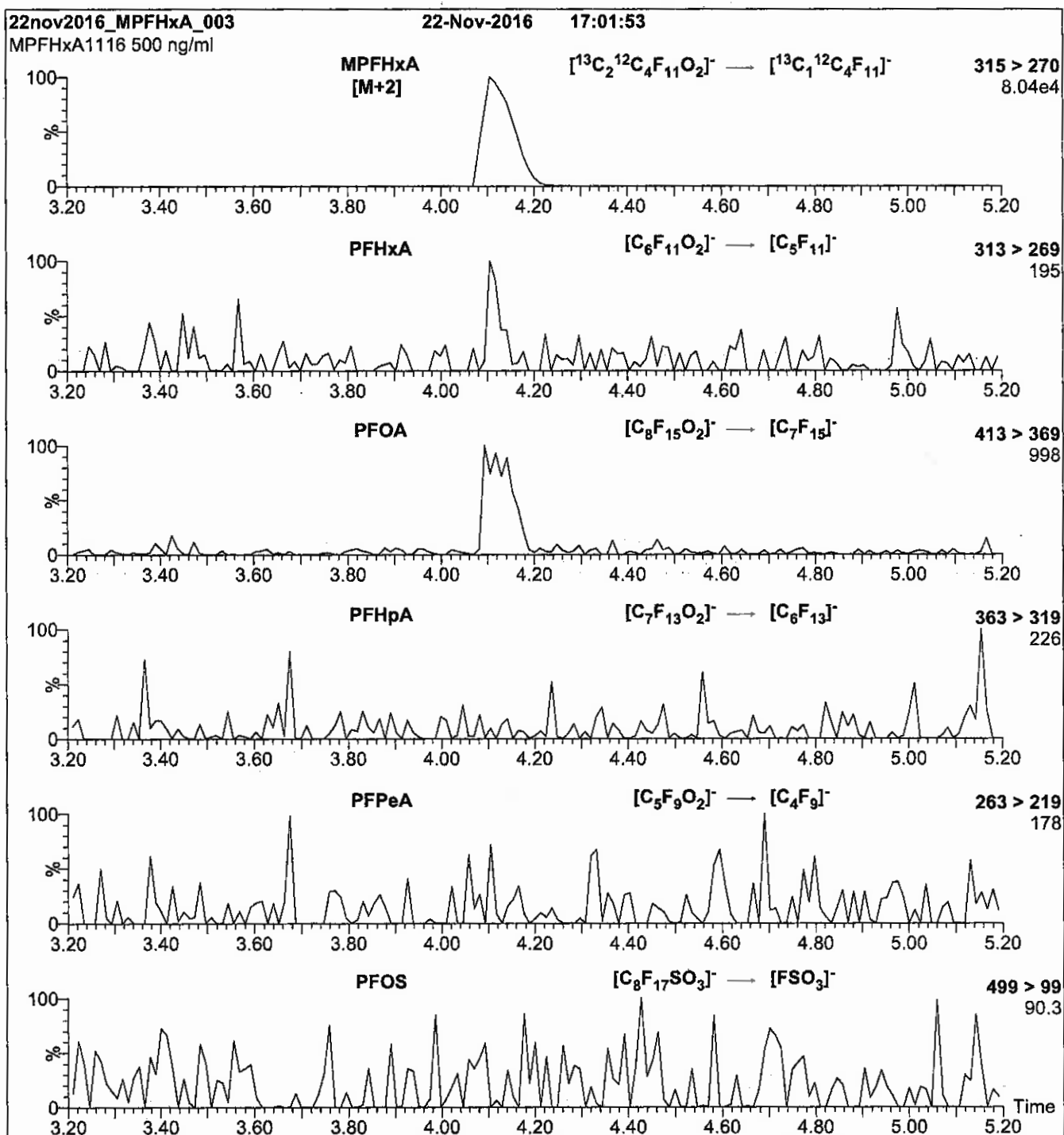
Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions over 0.5 min.
Time: 10 min

Flow: 300 μ l/min

MS Parameters

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

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



Conditions for Figure 2:

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

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

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

MS Parameters

Collision Gas (mbar) = $3.46\text{e-}3$
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:**

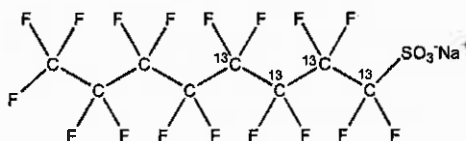
MPFOS

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

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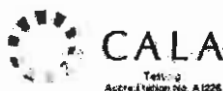
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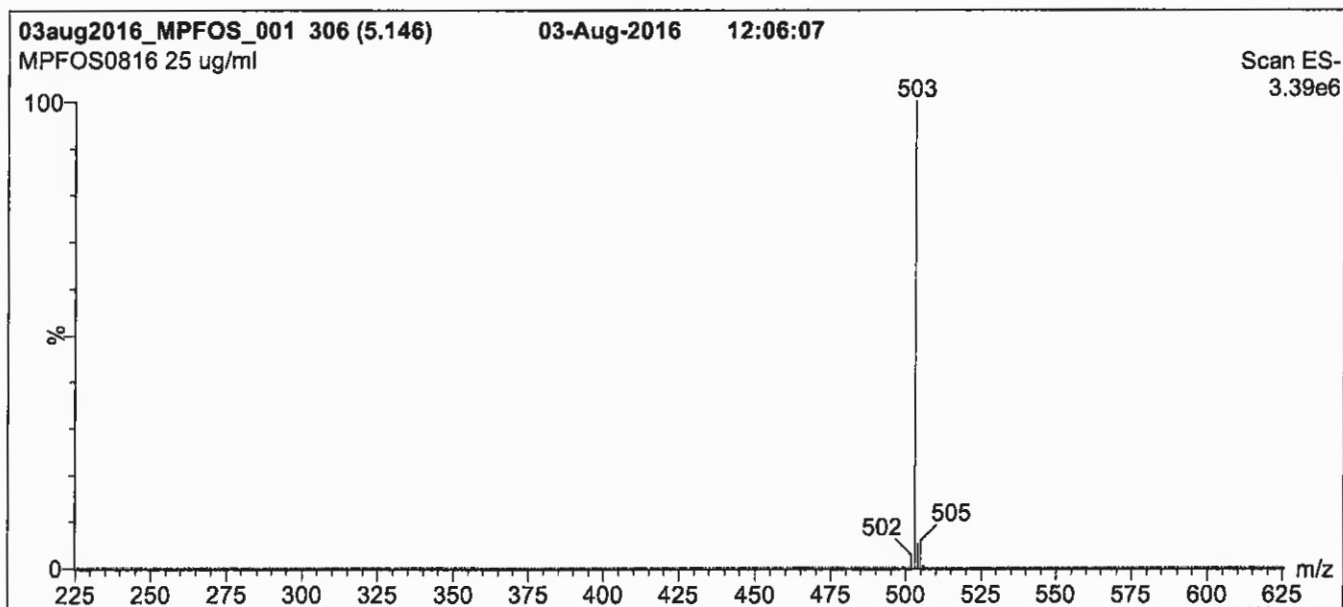
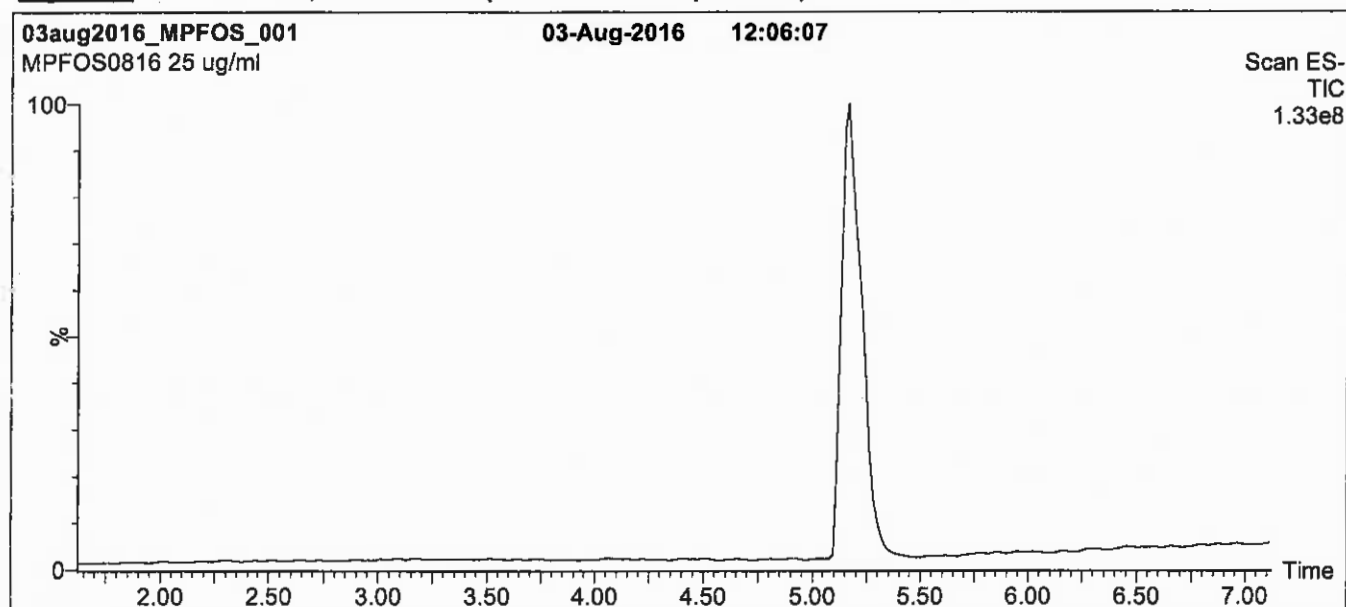
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Conditions for Figure 1:

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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

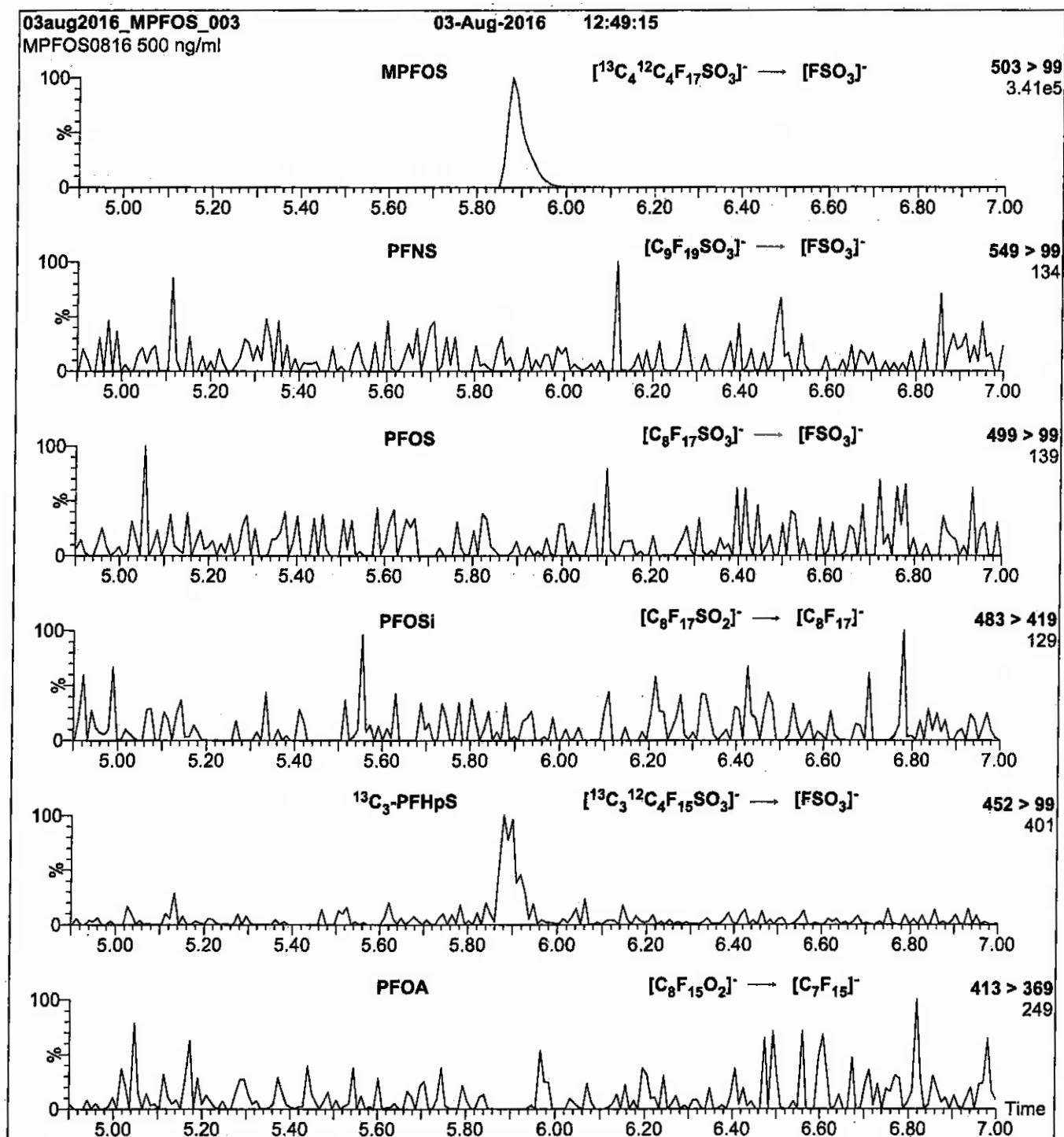
Flow: 300 μ l/min

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

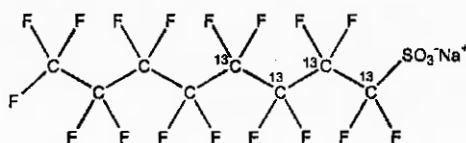
LCMPFOS_00021



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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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

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

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

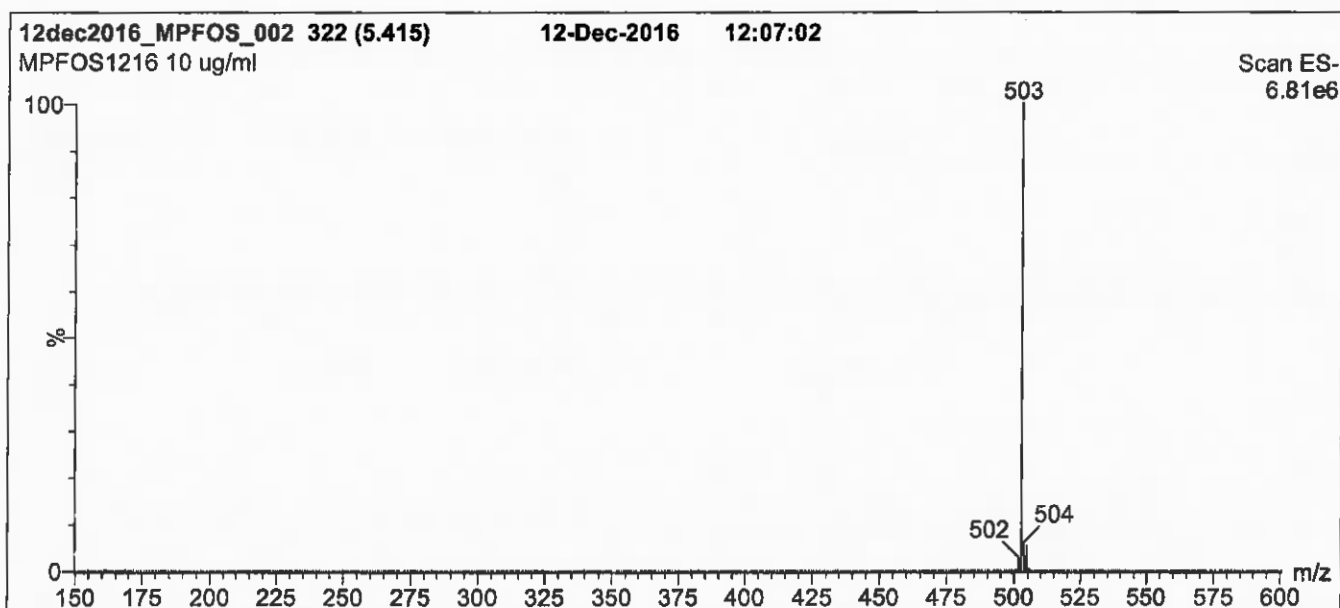
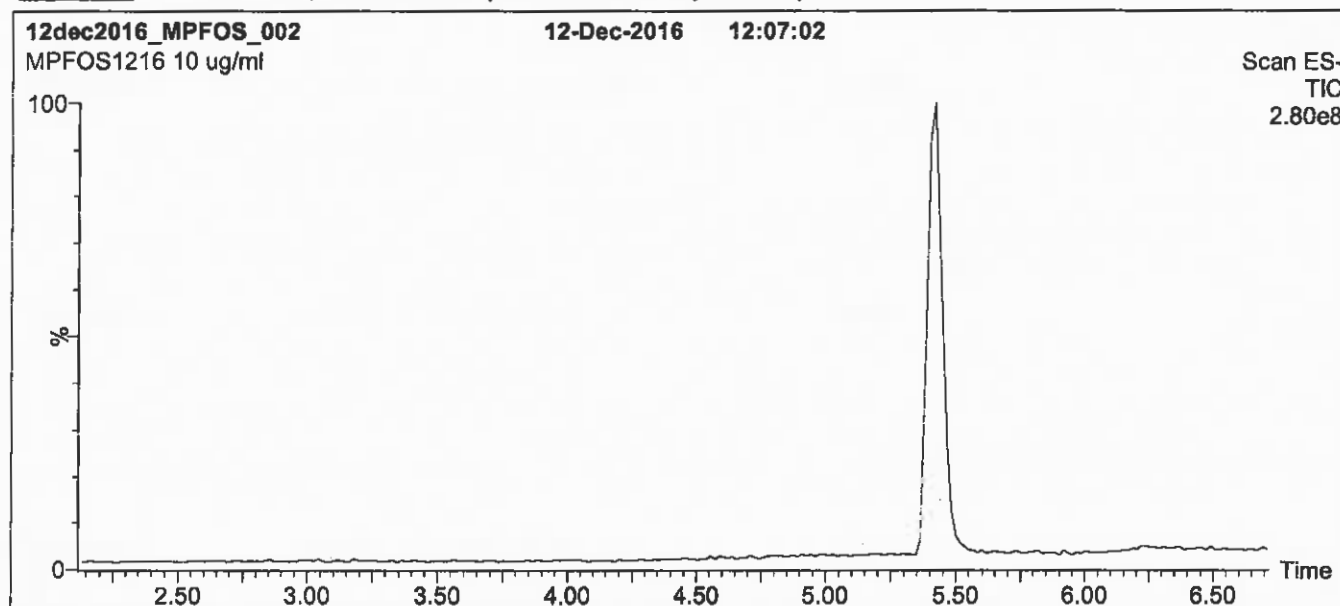
QUALITY MANAGEMENT:

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



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

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



Conditions for Figure 1:

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

Chromatographic Conditions

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

Mobile phase: Gradient

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

Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)

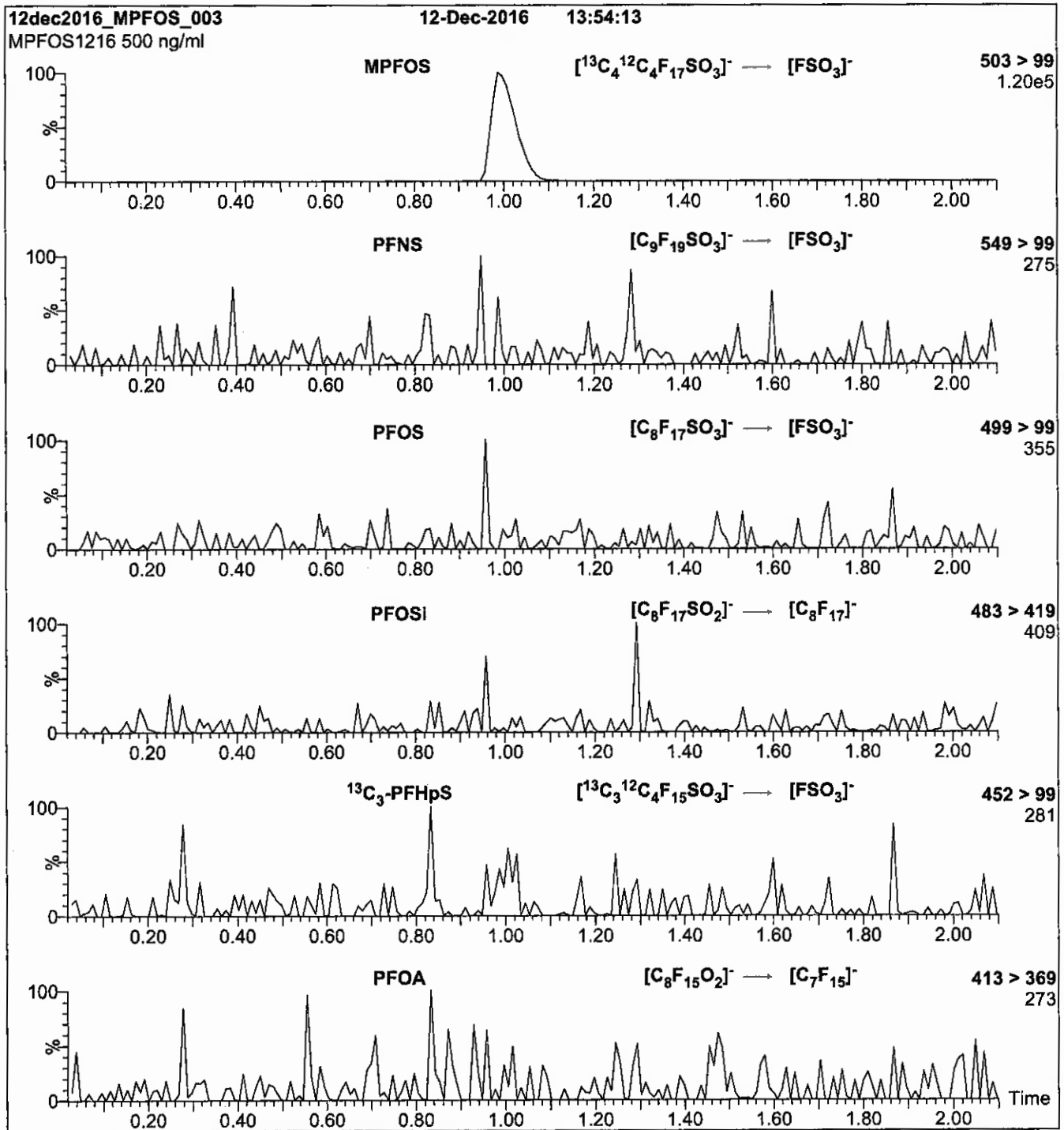
Capillary Voltage (kV) = 3.00

Cone Voltage (V) = 60.00

Cone Gas Flow (l/hr) = 50

Desolvation Gas Flow (l/hr) = 750

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



Conditions for Figure 2:

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

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

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

MS Parameters

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

Method 537 DOD

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

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1

SDG No.: _____

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
WGNA-102417-RW-482 9	320-32676-1	83	96
WGNA-102417-FRB-48 29	320-32676-2	90	97
	MB 320-191373/1-A	90	95
	LLCS 320-191373/2-A	93	98
	LLCSD 320-191373/3-A	86	95

PFHxA = 13C2 PFHxA
PFDA = 13C2 PFDA

QC LIMITS
70-130
70-130

Column to be used to flag recovery values

FORM II 537

FORM III
LCMS LOW LEVEL CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 2017.11.06_537B_004.d
 Lab ID: LLCS 320-191373/2-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LLCS CONCENTRATION (ng/L)	LLCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	40.0	36.7 J	92	50-150	
Perfluorooctanoic acid (PFOA)	20.0	20.2	101	50-150	
Perfluorononanoic acid (PFNA)	20.0	20.9 J	104	50-150	
Perfluorohexanesulfonic acid (PFHxS)	30.0	29.5 J	98	50-150	
Perfluoroheptanoic acid (PFHpA)	10.0	10.6	106	50-150	
Perfluorobutanesulfonic acid (PFBS)	90.0	86.4 J	96	50-150	

Column to be used to flag recovery and RPD values

FORM III
LCMS LOW LEVEL CONTROL STANDARD DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 2017.11.06_537B_005.d
 Lab ID: LLCSD 320-191373/3-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LLCSD CONCENTRATION (ng/L)	LLCSD % REC	% RPD	QC LIMITS		#
					RPD	REC	
Perfluorooctanesulfonic acid (PFOS)	40.0	34.7 J	87	6	50	50-150	
Perfluorooctanoic acid (PFOA)	20.0	18.7 J	94	8	50	50-150	
Perfluorononanoic acid (PFNA)	20.0	19.5 J	98	7	50	50-150	
Perfluorohexanesulfonic acid (PFHxS)	30.0	26.8 J	89	10	50	50-150	
Perfluoroheptanoic acid (PFHpA)	10.0	9.85 J	99	7	50	50-150	
Perfluorobutanesulfonic acid (PFBS)	90.0	81.0 J	90	7	50	50-150	

Column to be used to flag recovery and RPD values

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Lab File ID: 2017.11.06_537B_003.d Lab Sample ID: MB 320-191373/1-A
 Matrix: Water Date Extracted: 10/27/2017 08:32
 Instrument ID: A8_N Date Analyzed: 11/06/2017 09:54
 Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LLCS 320-191373/2-A	2017.11.06_ 537B 004.d	11/06/2017 09:59
	LLCSD 320-191373/3-A	2017.11.06_ 537B 005.d	11/06/2017 10:04
WGNA-102417-RW-4829	320-32676-1	2017.11.06_ 537B 006.d	11/06/2017 10:09
WGNA-102417-FRB-4829	320-32676-2	2017.11.06_ 537B 007.d	11/06/2017 10:13

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Instrument ID: A8_N Calibration Start Date: 11/03/2017 13:37
 GC Column: GeminiC18 3x100 ID: 3 (mm) Calibration End Date: 11/03/2017 14:01
 Calibration ID: 36012

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1535518	1.91	3276559	2.15		
UPPER LIMIT		2303277	2.41	4914839	2.65		
LOWER LIMIT		767759	1.41	1638280	1.65		
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICV 320-192908/13		1512045	1.90	3433628	2.14		
CCV 320-193089/1 CCVIS		1677167	1.93	3457604	2.17		
MB 320-191373/1-A		1611516	1.94	3678207	2.17		
LLCS 320-191373/2-A		1611740	1.93	3712956	2.17		
LLCSD 320-191373/3-A		1657607	1.93	3765246	2.16		
320-32676-1	WGNA-102417-RW-4829	1656288	1.93	3563461	2.16		
320-32676-2	WGNA-102417-FRB-4829	1634672	1.93	3633409	2.16		
CCV 320-193089/8 CCVIS		1614908	1.93	3465963	2.16		

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.: 320-32676-1
 SDG No.: _____
 Sample No.: CCV 320-193089/1 Date Analyzed: 11/06/2017 09:45
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2017.11.06_537B_001 Heated Purge: (Y/N) N
 Calibration ID: 36012

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	1677167	1.93	3457604	2.17		
UPPER LIMIT	2348034	2.43	4840646	2.67		
LOWER LIMIT	1174017	1.43	2420323	1.67		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-191373/1-A		1611516	1.94	3678207	2.17	
LLCS 320-191373/2-A		1611740	1.93	3712956	2.17	
LLCSD 320-191373/3-A		1657607	1.93	3765246	2.16	
320-32676-1	WGNA-102417-RW-4829	1656288	1.93	3563461	2.16	
320-32676-2	WGNA-102417-FRB-4829	1634672	1.93	3633409	2.16	

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.: 320-32676-1
 SDG No.: _____
 Sample No.: CCV 320-193089/8 Date Analyzed: 11/06/2017 10:18
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2017.11.06_537B_008 Heated Purge: (Y/N) N
 Calibration ID: 36012

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	1614908	1.93	3465963	2.16		
UPPER LIMIT	2260871	2.43	4852348	2.66		
LOWER LIMIT	1130436	1.43	2426174	1.66		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-191373/1-A		1611516	1.94	3678207	2.17	
LLCS 320-191373/2-A		1611740	1.93	3712956	2.17	
LLCSD 320-191373/3-A		1657607	1.93	3765246	2.16	
320-32676-1	WGNA-102417-RW-4829	1656288	1.93	3563461	2.16	
320-32676-2	WGNA-102417-FRB-4829	1634672	1.93	3633409	2.16	

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: <u>TestAmerica Sacramento</u>	Job No.: <u>320-32676-1</u>
SDG No.: _____	
Client Sample ID: <u>WGNA-102417-RW-4829</u>	Lab Sample ID: <u>320-32676-1</u>
Matrix: <u>Water</u>	Lab File ID: <u>2017.11.06_537B_006.d</u>
Analysis Method: <u>537</u>	Date Collected: <u>10/24/2017 08:10</u>
Extraction Method: <u>537</u>	Date Extracted: <u>10/27/2017 08:32</u>
Sample wt/vol: <u>235.1 (mL)</u>	Date Analyzed: <u>11/06/2017 10:09</u>
Con. Extract Vol.: <u>1.00 (mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>2 (uL)</u>	GC Column: <u>GeminiC18 3x100 ID: 3 (mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>193089</u>	Units: <u>ng/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	8.9	J M	43	17	7.2
335-67-1	Perfluorooctanoic acid (PFOA)	12	J	21	8.5	3.0
375-95-1	Perfluorononanoic acid (PFNA)	21	U M	26	21	8.5
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	13	U	32	13	5.8
375-85-9	Perfluoroheptanoic acid (PFHpA)	8.0	J	11	4.3	2.0
375-73-5	Perfluorobutanesulfonic acid (PFBS)	38	U	96	38	17

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	83		70-130
STL00996	13C2 PFDA	96		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_006.d
 Lims ID: 320-32676-A-1-A
 Client ID: WGNA-102417-RW-4829
 Sample Type: Client
 Inject. Date: 06-Nov-2017 10:09:01 ALS Bottle#: 4 Worklist Smp#: 6
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-32676-a-1-a
 Misc. Info.: Plate: 1 Rack: 3
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 07-Nov-2017 10:06:51 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK021

First Level Reviewer: barnettj

Date: 07-Nov-2017 10:06:20

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.442	1.444	-0.002	1.000	126090	0.9078		43.1	
298.90 > 99.00	1.442	1.444	-0.002	1.000	88503		1.42(0.00-0.00)	176	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.573	0.005	1.000	1510684	8.29		9757	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.730	1.725	0.005	1.000	226122	1.09		77.8	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.730	1.725	0.005	1.000	291255	1.88		56.7	
* 6 13C2-PFOA									
415.00 > 370.00	1.927	1.913	0.014		1656288	10.0		8004	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.927	1.914	0.013	1.000	450559	2.94		63.9	
413.00 > 169.00	1.927	1.914	0.013	1.000	264019		1.71(0.00-0.00)	205	
* 7 13C4 PFOS									
503.00 > 80.00	2.162	2.151	0.011		3563461	28.7		3248	
9 Perfluorononanoic acid									
463.00 > 419.00	2.170	2.158	0.012	1.000	65329	0.5939		14.7	M
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.162	2.162	0.0	1.000	244125	2.09		63.7	M
499.00 > 99.00	2.162	2.162	0.0	1.000	42072		5.80(0.00-0.00)	70.1	M
\$ 10 13C2 PFDA									
515.00 > 470.00	2.322	2.312	0.010	1.000	1215548	9.59		7651	

QC Flag Legend

Review Flags

M - Manually Integrated

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_006.d

Injection Date: 06-Nov-2017 10:09:01

Instrument ID: A8_N

Lims ID: 320-32676-A-1-A

Lab Sample ID: 320-32676-1

Client ID: WGNA-102417-RW-4829

Operator ID: SACINSTLCMS01

ALS Bottle#: 4

Worklist Smp#: 6

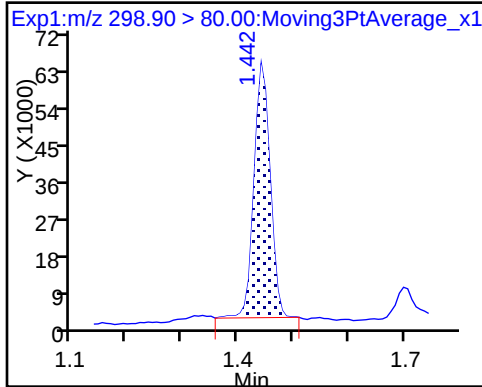
Injection Vol: 2.0 ul

Dil. Factor: 1.0000

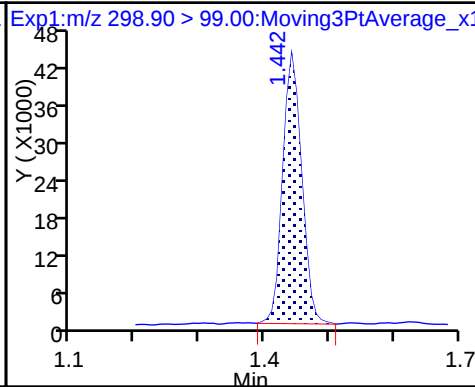
Method: 537_A8_N

Limit Group: LC 537 ICAL

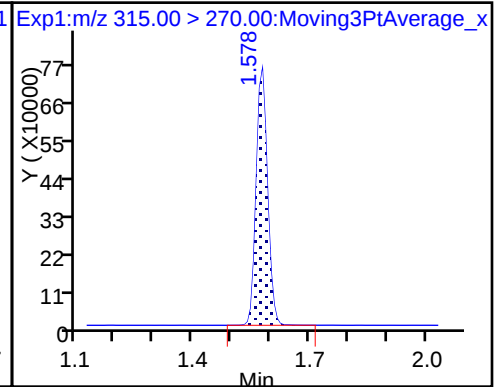
1 Perfluorobutanesulfonic acid



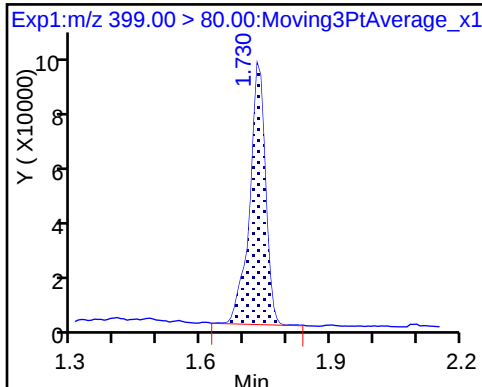
1 Perfluorobutanesulfonic acid



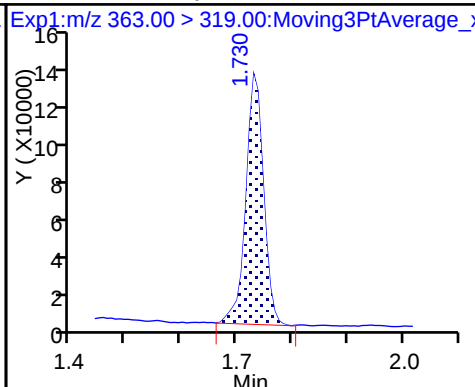
\$ 2 13C2 PFHxA



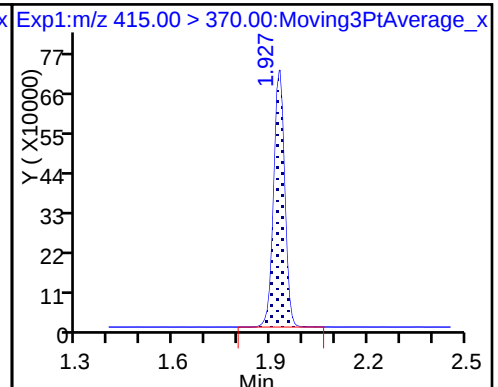
3 Perfluorohexanesulfonic acid



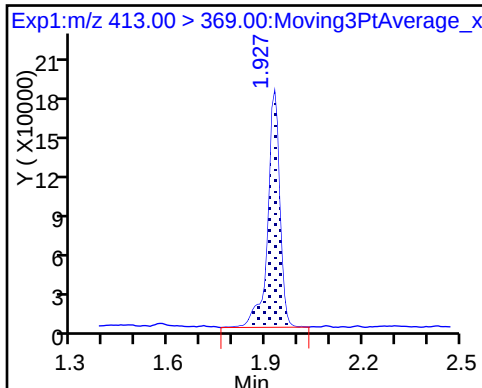
4 Perfluoroheptanoic acid



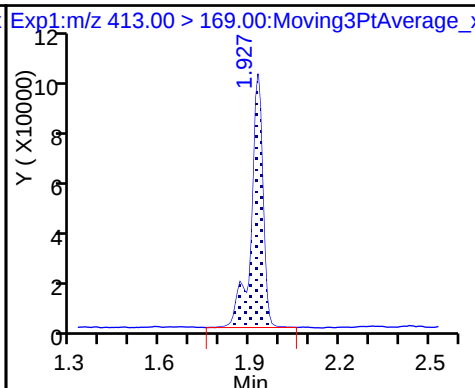
* 6 13C2-PFOA



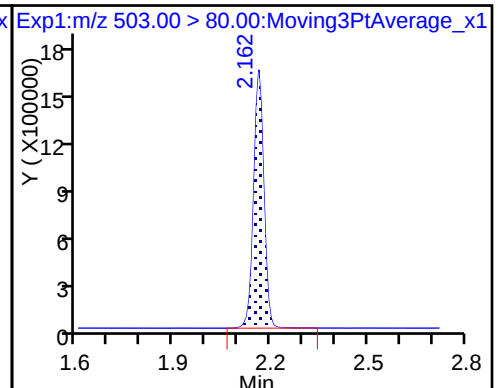
5 Perfluorooctanoic acid



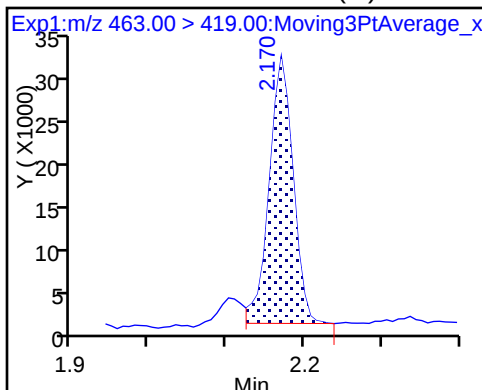
5 Perfluorooctanoic acid



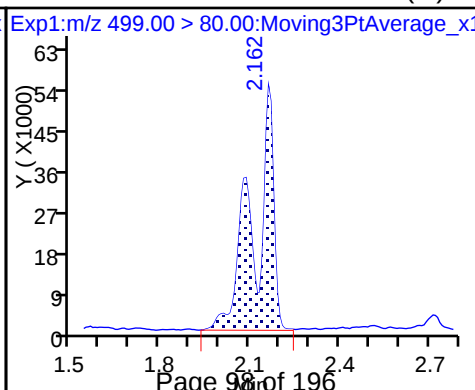
* 7 13C4 PFOS



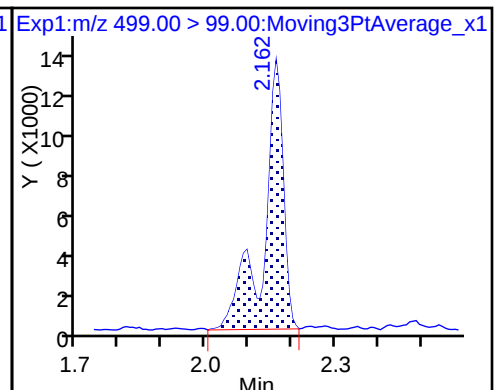
9 Perfluorononanoic acid (M)



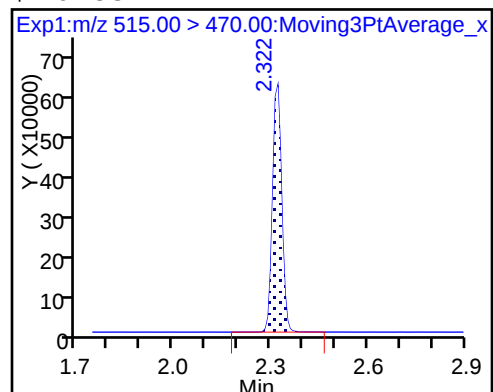
8 Perfluorooctane sulfonic acid (M)



8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_006.d
Lims ID: 320-32676-A-1-A
Client ID: WGNA-102417-RW-4829
Sample Type: Client
Inject. Date: 06-Nov-2017 10:09:01 ALS Bottle#: 4 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-32676-a-1-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Method: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 07-Nov-2017 10:06:51 Calib Date: 03-Nov-2017 14:01:24
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d
Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj

Date: 07-Nov-2017 10:06:20

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	8.29	82.90
\$ 10 13C2 PFDA	10.0	9.59	95.91

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_006.d
Injection Date: 06-Nov-2017 10:09:01 Instrument ID: A8_N
Lims ID: 320-32676-A-1-A Lab Sample ID: 320-32676-1
Client ID: WGNA-102417-RW-4829
Operator ID: SACINSTLCMS01 ALS Bottle#: 4 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

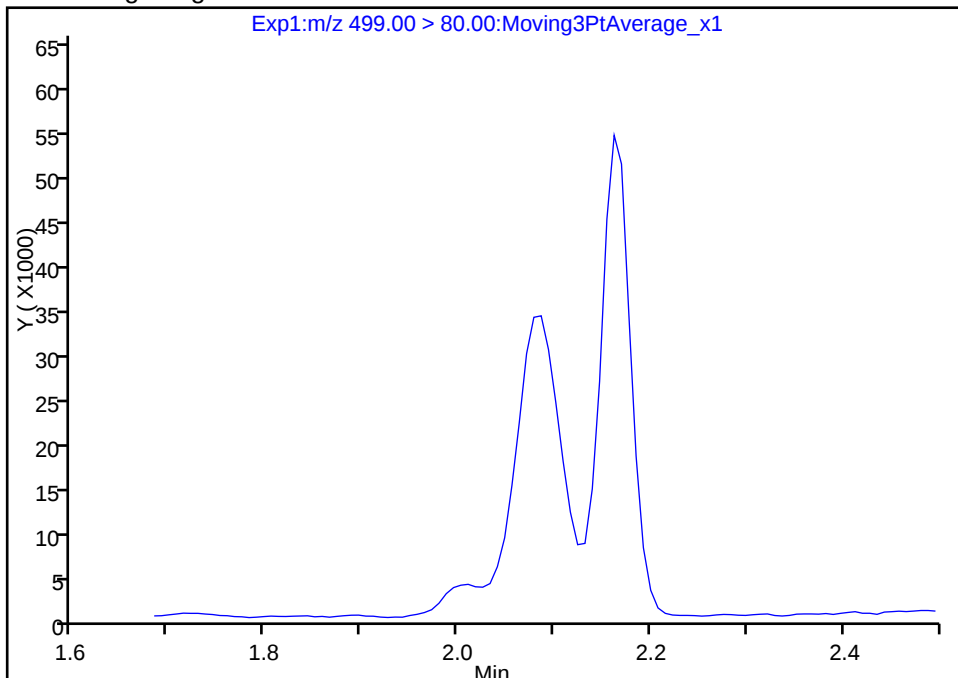
8 Perfluorooctane sulfonic acid, CAS: 1763-23-1

Signal: 1

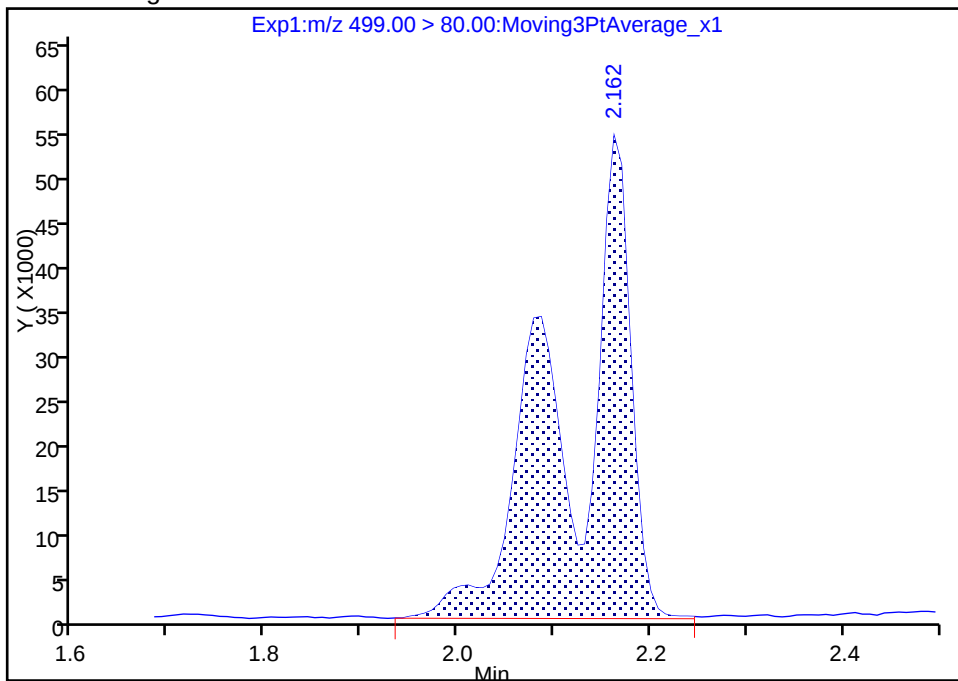
Not Detected

Expected RT: 2.16

Processing Integration Results



Manual Integration Results



RT: 2.16
Area: 244125
Amount: 2.092558
Amount Units: ng/ml

Reviewer: barnettj, 07-Nov-2017 10:05:22

Audit Action: Assigned Compound ID

Audit Reason: Baseline

TestAmerica Sacramento

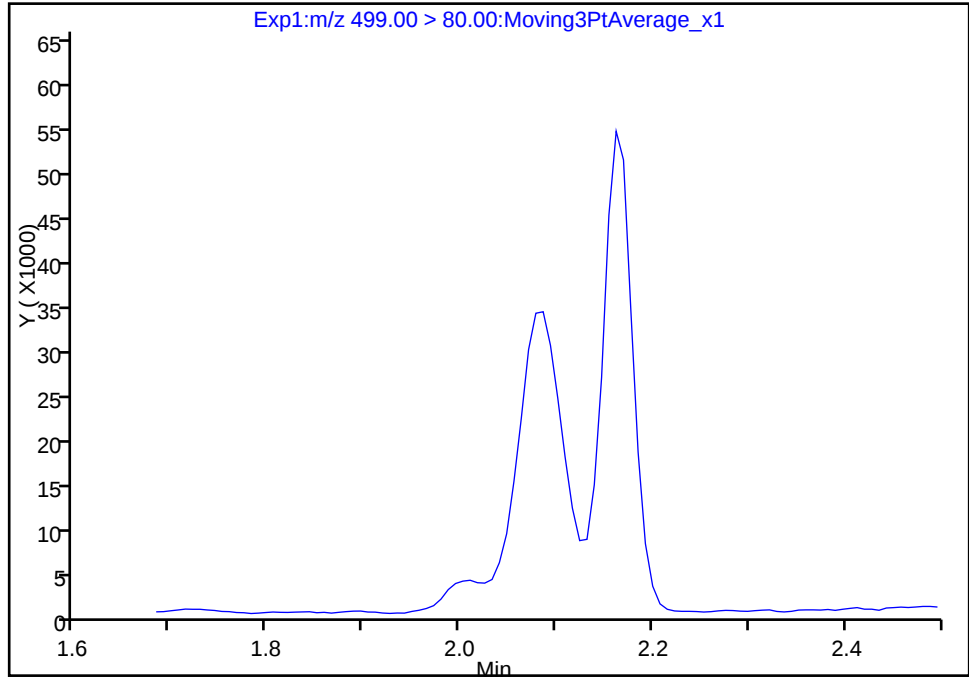
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_006.d
Injection Date: 06-Nov-2017 10:09:01 Instrument ID: A8_N
Lims ID: 320-32676-A-1-A Lab Sample ID: 320-32676-1
Client ID: WGNA-102417-RW-4829
Operator ID: SACINSTLCMS01 ALS Bottle#: 4 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

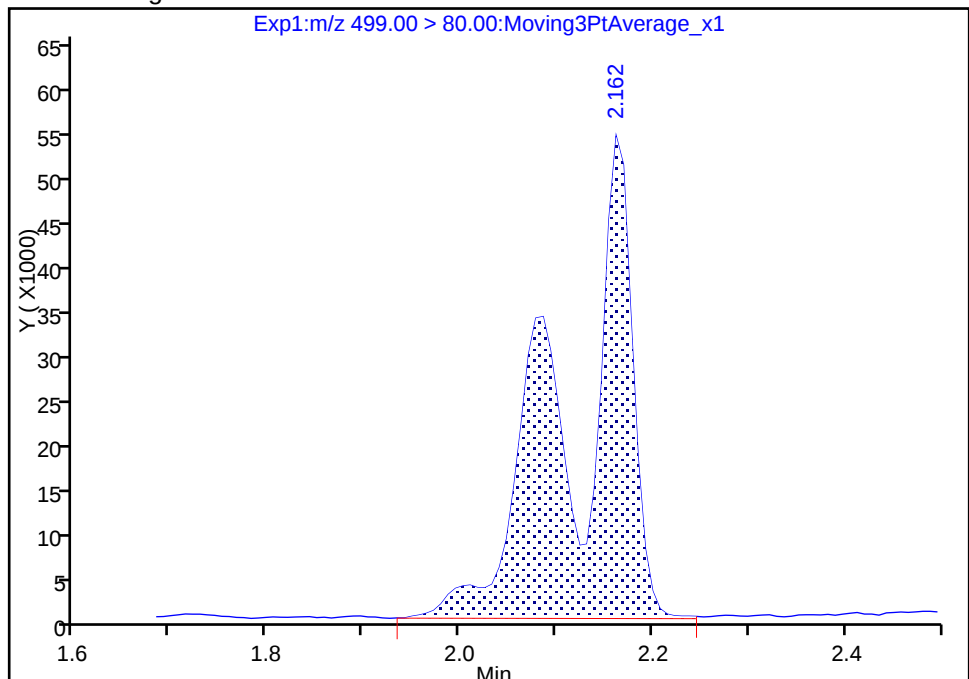
Signal: 1

Not Detected
Expected RT: 2.16

Processing Integration Results



Manual Integration Results



RT: 2.16
Area: 244125
Amount: 2.092558
Amount Units: ng/ml

Reviewer: barnettj, 07-Nov-2017 10:05:39

Audit Action: Manually Integrated

Audit Reason: Baseline

TestAmerica Sacramento

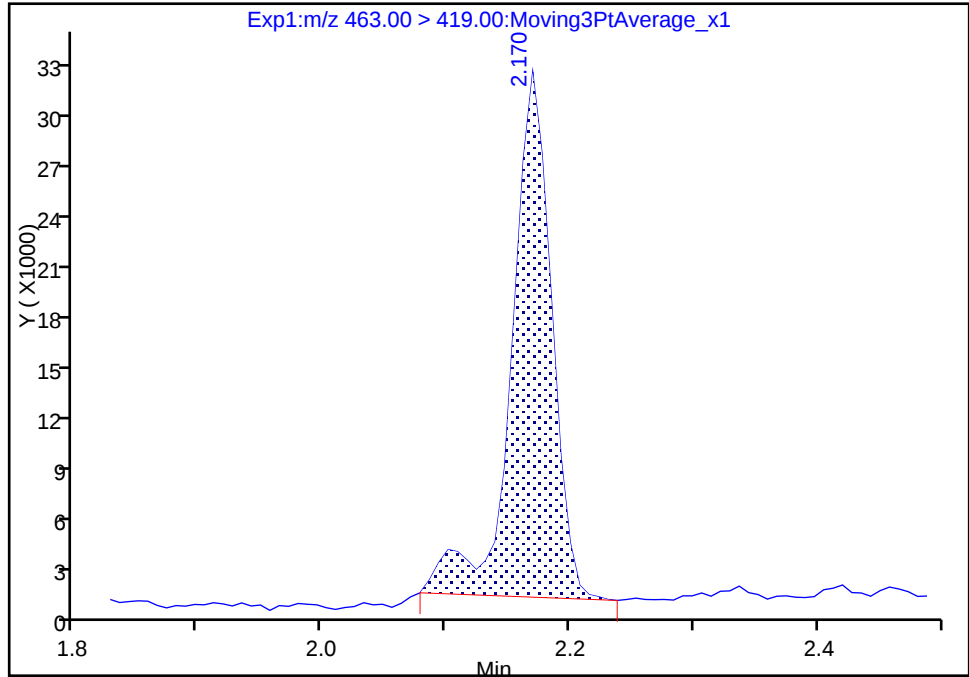
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_006.d
Injection Date: 06-Nov-2017 10:09:01 Instrument ID: A8_N
Lims ID: 320-32676-A-1-A Lab Sample ID: 320-32676-1
Client ID: WGNA-102417-RW-4829
Operator ID: SACINSTLCMS01 ALS Bottle#: 4 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

9 Perfluorononanoic acid, CAS: 375-95-1

Signal: 1

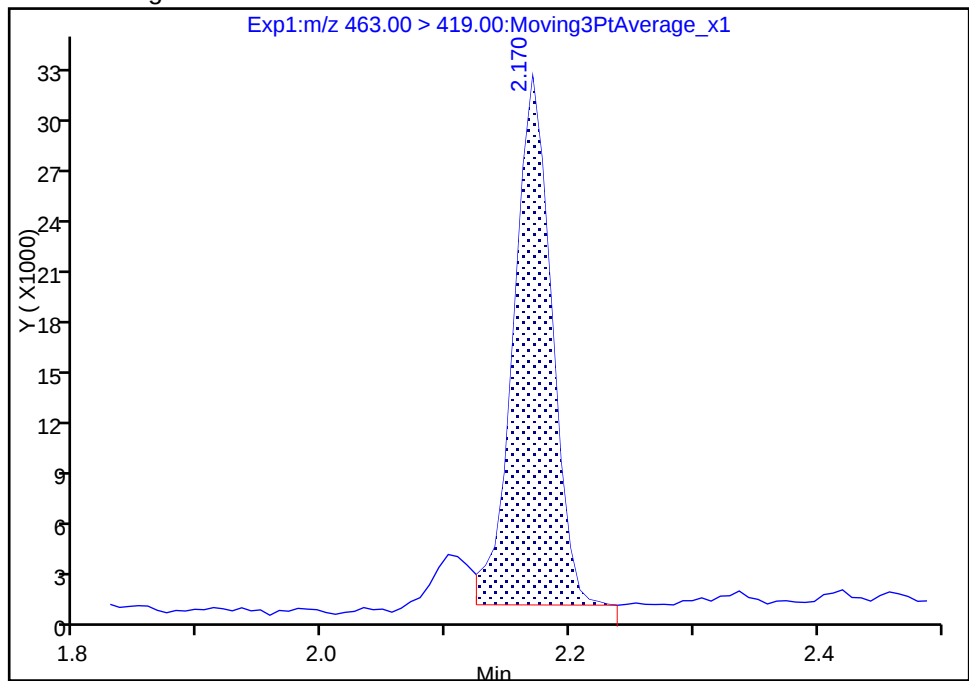
RT: 2.17
Area: 69080
Amount: 0.627977
Amount Units: ng/ml

Processing Integration Results



RT: 2.17
Area: 65329
Amount: 0.593878
Amount Units: ng/ml

Manual Integration Results



Reviewer: barnettj, 07-Nov-2017 10:06:11
Audit Action: Manually Integrated

Audit Reason: Split Peak

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-32676-1</u>
SDG No.: _____	
Client Sample ID: <u>WGNA-102417-FRB-4829</u>	Lab Sample ID: <u>320-32676-2</u>
Matrix: <u>Water</u>	Lab File ID: <u>2017.11.06_537B_007.d</u>
Analysis Method: <u>537</u>	Date Collected: <u>10/24/2017 08:05</u>
Extraction Method: <u>537</u>	Date Extracted: <u>10/27/2017 08:32</u>
Sample wt/vol: <u>260.2 (mL)</u>	Date Analyzed: <u>11/06/2017 10:13</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>193089</u>	Units: <u>ng/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	38	15	6.5
335-67-1	Perfluorooctanoic acid (PFOA)	7.7	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)	3.8	U	9.6	3.8	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	86	35	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	90		70-130
STL00996	13C2 PFDA	97		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_007.d
 Lims ID: 320-32676-A-2-A
 Client ID: WGNA-102417-FRB-4829
 Sample Type: Client
 Inject. Date: 06-Nov-2017 10:13:43 ALS Bottle#: 5 Worklist Smp#: 7
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: 320-32676-a-2-a
 Misc. Info.: Plate: 1 Rack: 3
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 07-Nov-2017 10:06:51 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK021

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.573	0.005	1.000	1618215	9.00		10244	
* 6 13C2-PFOA									
415.00 > 370.00	1.927	1.913	0.014		1634672	10.0		7205	
* 7 13C4 PFOS									
503.00 > 80.00	2.162	2.151	0.011		3633409	28.7		5186	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.322	2.312	0.010	1.000	1209016	9.67		7510	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_007.d

Injection Date: 06-Nov-2017 10:13:43

Instrument ID: A8_N

Lims ID: 320-32676-A-2-A

Lab Sample ID: 320-32676-2

Client ID: WGNA-102417-FRB-4829

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 7

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

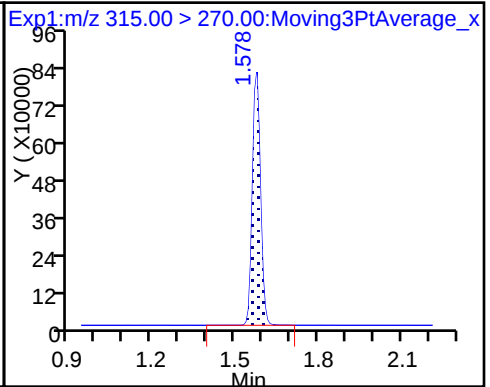
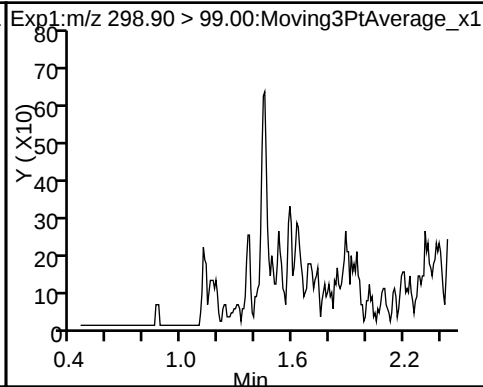
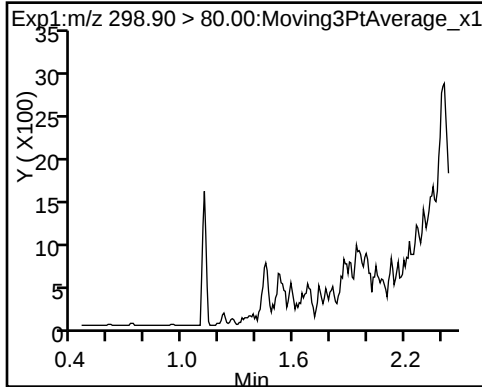
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid (ND)

1 Perfluorobutanesulfonic acid (ND)

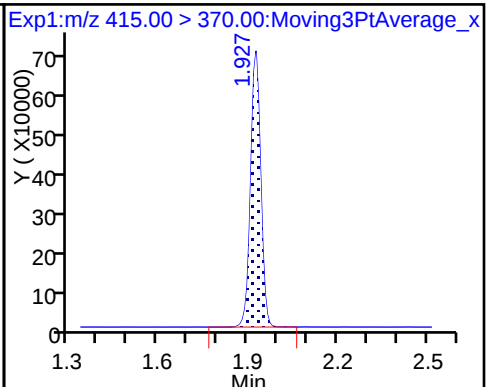
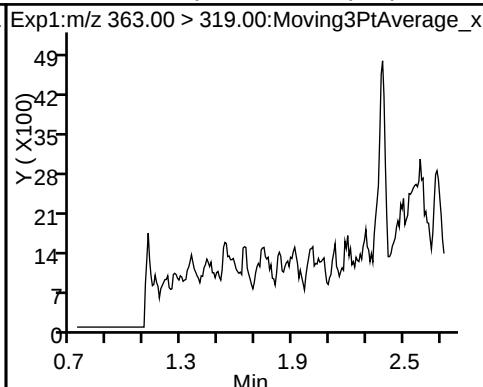
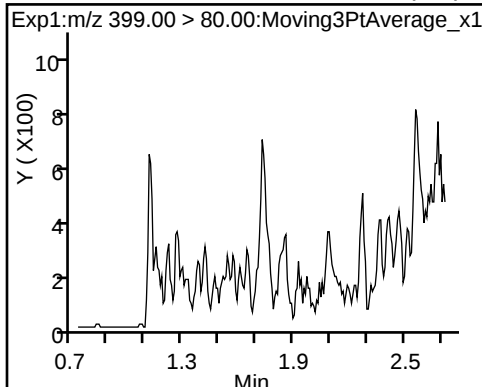
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid (ND)

4 Perfluoroheptanoic acid (ND)

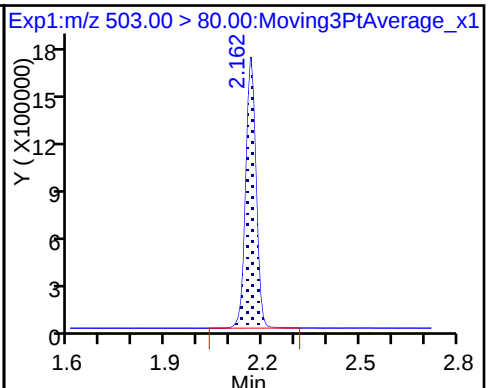
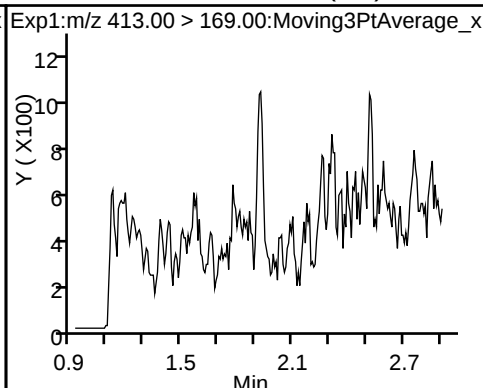
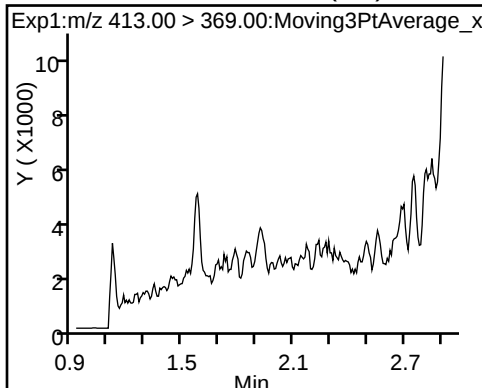
* 6 13C2-PFOA



5 Perfluorooctanoic acid (ND)

5 Perfluorooctanoic acid (ND)

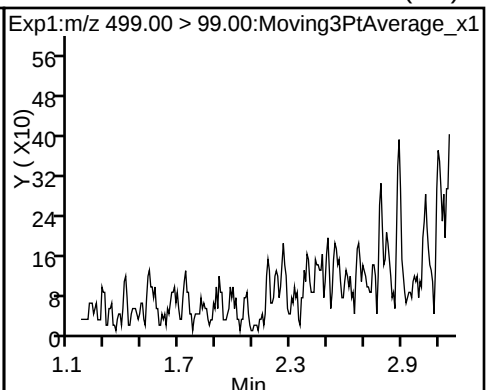
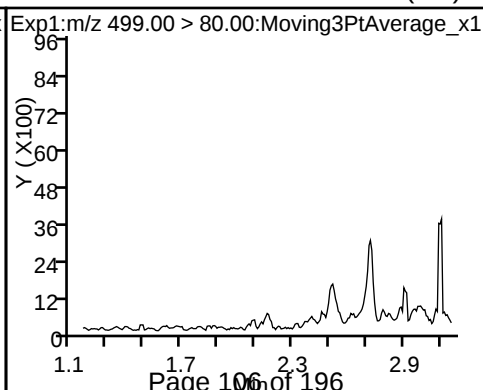
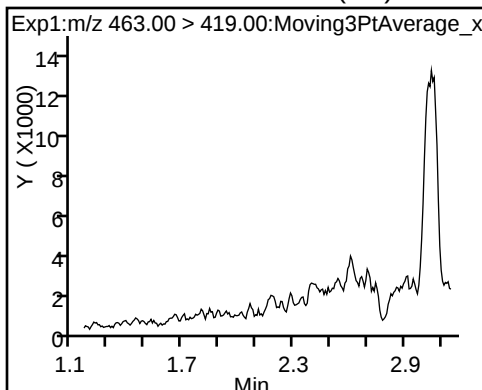
* 7 13C4 PFOS



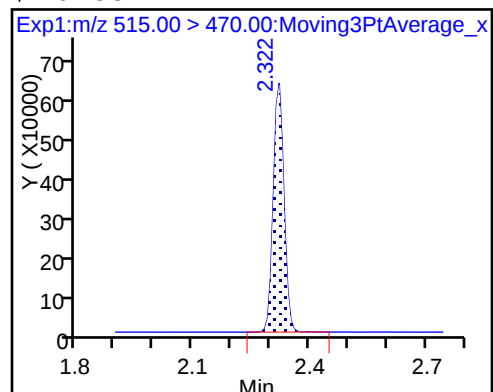
9 Perfluorononanoic acid (ND)

8 Perfluorooctane sulfonic acid (ND)

8 Perfluorooctane sulfonic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_007.d
Lims ID: 320-32676-A-2-A
Client ID: WGNA-102417-FRB-4829
Sample Type: Client
Inject. Date: 06-Nov-2017 10:13:43 ALS Bottle#: 5 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-32676-a-2-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Method: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 07-Nov-2017 10:06:51 Calib Date: 03-Nov-2017 14:01:24
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK021

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.00	89.97
\$ 10 13C2 PFDA	10.0	9.67	96.65

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

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1 Analy Batch No.: 192908

SDG No.: _____

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

Calibration Start Date: 11/03/2017 13:37 Calibration End Date: 11/03/2017 14:01 Calibration ID: 36012

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-192908/4	2017.11.03_537XICAL_004.d
Level 2	IC 320-192908/5	2017.11.03_537XICAL_005.d
Level 3	IC 320-192908/6	2017.11.03_537XICAL_006.d
Level 4	IC 320-192908/7	2017.11.03_537XICAL_007.d
Level 5	IC 320-192908/8	2017.11.03_537XICAL_008.d
Level 6	IC 320-192908/9	2017.11.03_537XICAL_009.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanesulfonic acid (PFBS)	1.0397 0.8468	1.0767	1.0898	0.9577	0.9303	QuaF		1.1193	-0.001498						0.9990		0.9600
Perfluoroheptanoic acid (PFHpA)	0.9433 0.9848	0.9187	0.9551	0.9185	0.9011	Ave		0.9369				3.2		30.0			
Perfluorohexanesulfonic acid (PFHxS)	1.6459 1.6841	1.6355	1.7405	1.6631	1.6755	Ave		1.6741				2.2		30.0			
Perfluorooctanoic acid (PFOA)	0.9757 0.9799	0.8919	0.9000	0.8953	0.9117	Ave		0.9258				4.4		30.0			
Perfluorooctanesulfonic acid (PFOS)	0.8958 0.9902	0.9213	0.9281	0.9268	0.9715	Ave		0.9389				3.7		30.0			
Perfluorononanoic acid (PFNA)	0.6610 0.7042	0.6285	0.6624	0.6810	0.6478	Ave		0.6642				3.9		30.0			
13C2 PFHxA	1.0891 1.1664	1.0526	1.1042	1.1123	1.0772	Ave		1.1003				3.5		30.0			
13C2 PFDA	0.7748 0.8159	0.7295	0.7569	0.7811	0.7330	Ave		0.7652				4.3		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.: 320-32676-1 Analy Batch No.: 192908

SDG No.: _____

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

Calibration Start Date: 11/03/2017 13:37 Calibration End Date: 11/03/2017 14:01 Calibration ID: 36012

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-192908/4	2017.11.03_537XICAL_004.d
Level 2	IC 320-192908/5	2017.11.03_537XICAL_005.d
Level 3	IC 320-192908/6	2017.11.03_537XICAL_006.d
Level 4	IC 320-192908/7	2017.11.03_537XICAL_007.d
Level 5	IC 320-192908/8	2017.11.03_537XICAL_008.d
Level 6	IC 320-192908/9	2017.11.03_537XICAL_009.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5
Perfluorobutanesulfonic acid (PFBS)	PFOS	QuaF	1076553 16699152	2591121	5461974	10142530	14011858	9.00 180	20.0	45.0	90.0	135
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	143455 2810797	331548	736034	1420703	2102676	1.00 20.0	2.22	5.00	10.0	15.0
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	568156 11071993	1312135	2908204	5871843	8413133	3.00 60.0	6.67	15.0	30.0	45.0
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	296934 5597122	644149	1388033	2771271	4257225	2.00 40.0	4.45	10.0	20.0	30.0
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	412315 8679676	985487	2067792	4363079	6504279	4.00 80.0	8.89	20.0	40.0	60.0
Perfluorononanoic acid (PFNA)	13PF OA	Ave	201053 4019666	453612	1020851	2106479	3023088	2.00 40.0	4.45	10.0	20.0	30.0
13C2 PFHxA	13PF OA	Ave	1655691 1664260	1708988	1701491	1719911	1675220	10.0 10.0	10.0	10.0	10.0	10.0
13C2 PFDA	13PF OA	Ave	1177922 1164156	1184358	1166275	1207887	1139992	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.: 320-32676-1 Analy Batch No.: 192908

SDG No.: _____

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

Calibration Start Date: 11/03/2017 13:37 Calibration End Date: 11/03/2017 14:01 Calibration ID: 36012

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-192908/4	2017.11.03_537XICAL_004.d
Level 2	IC 320-192908/5	2017.11.03_537XICAL_005.d
Level 3	IC 320-192908/6	2017.11.03_537XICAL_006.d
Level 4	IC 320-192908/7	2017.11.03_537XICAL_007.d
Level 5	IC 320-192908/8	2017.11.03_537XICAL_008.d
Level 6	IC 320-192908/9	2017.11.03_537XICAL_009.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanesulfonic acid (PFBS)	-6.0	-1.2	3.9	-3.1	1.9	-0.5	50	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	0.7	-1.9	1.9	-2.0	-3.8	5.1	50	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	-1.7	-2.3	4.0	-0.7	0.1	0.6	50	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	5.4	-3.7	-2.8	-3.3	-1.5	5.8	50	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	-4.6	-1.9	-1.2	-1.3	3.5	5.5	50	30	30	30	30	30
Perfluorononanoic acid (PFNA)	-0.5	-5.4	-0.3	2.5	-2.5	6.0	50	30	30	30	30	30
13C2 PFHxA	-1.0	-4.3	0.4	1.1	-2.1	6.0	30	30	30	30	30	30
13C2 PFDA	1.3	-4.7	-1.1	2.1	-4.2	6.6	30	30	30	30	30	30

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_004.d
 Lims ID: IC L1
 Client ID:
 Sample Type: IC Calib Level: 1
 Inject. Date: 03-Nov-2017 13:37:59 ALS Bottle#: 1 Worklist Smp#: 4
 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\20171106-49975.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 07-Nov-2017 15:52:07 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK021

First Level Reviewer: phomsophat

Date: 06-Nov-2017 07:18:01

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.449	1.444	0.005	1.000	1076553	8.46		654	
298.90 > 99.00	1.449	1.444	0.005	1.000	763262		1.41(0.00-0.00)	2025	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.573	0.005	1.000	1655691	9.90		8732	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.730	1.725	0.005	1.000	568156	2.95		1122	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.730	1.725	0.005	1.000	143455	1.01		42.2	
* 6 13C2-PFOA									
415.00 > 370.00	1.920	1.913	0.007		1520258	10.0		6863	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.920	1.914	0.006	1.000	296934	2.11		53.5	
413.00 > 169.00	1.920	1.914	0.006	1.000	149720		1.98(0.00-0.00)	184	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.155	2.147	0.008	1.000	412315	3.82		235	M
499.00 > 99.00	2.155	2.147	0.008	1.000	85347		4.83(0.00-0.00)	209	M
* 7 13C4 PFOS									
503.00 > 80.00	2.155	2.151	0.004		3298877	28.7		5279	
9 Perfluorononanoic acid									
463.00 > 419.00	2.162	2.158	0.004	1.000	201053	1.99		67.8	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.314	2.312	0.002	1.000	1177922	10.1		7012	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LC537-L1_00020

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_004.d

Injection Date: 03-Nov-2017 13:37:59

Instrument ID: A8_N

Lims ID: IC L1

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 1

Worklist Smp#: 4

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

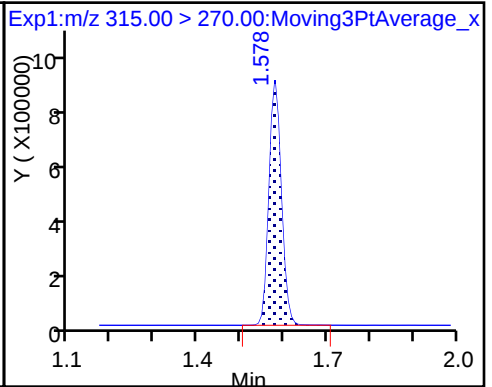
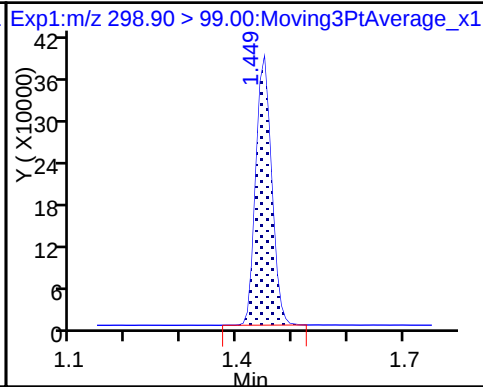
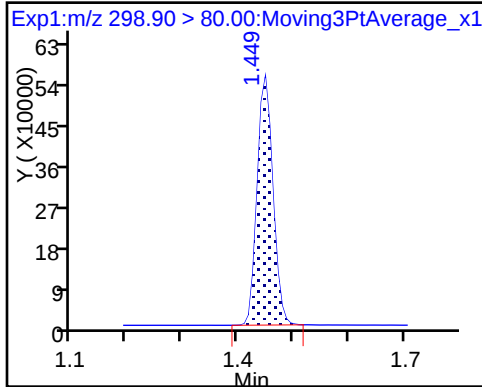
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

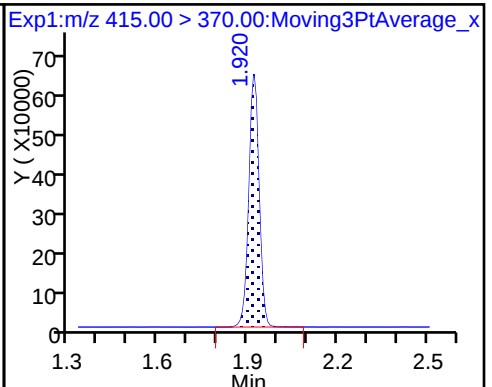
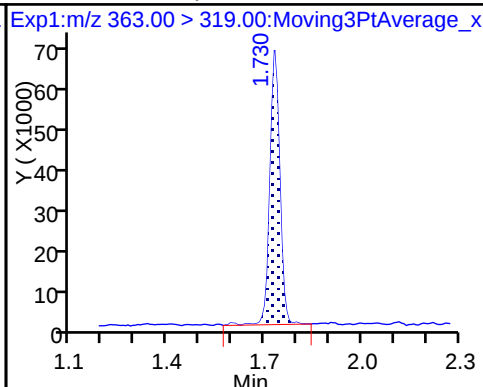
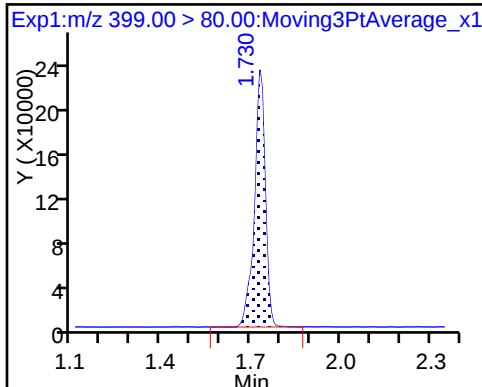
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

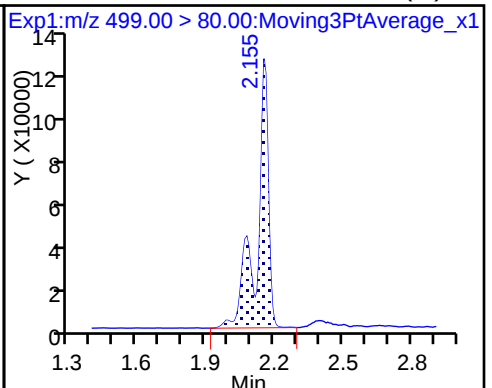
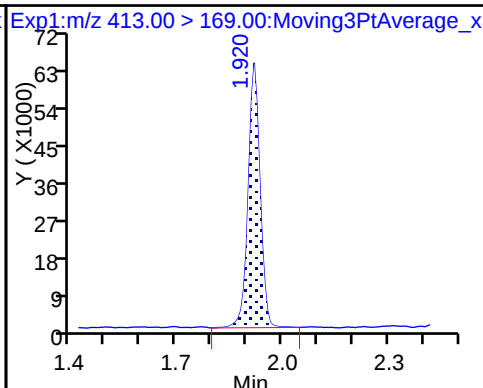
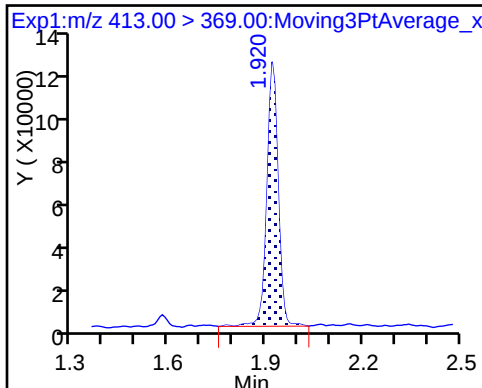
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

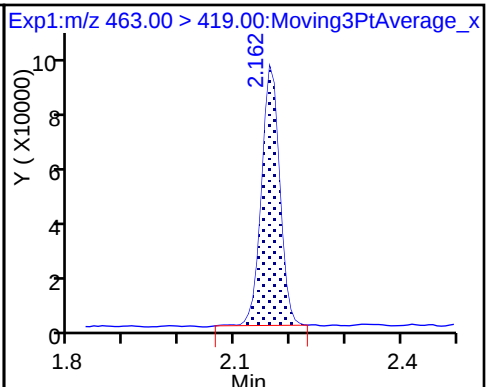
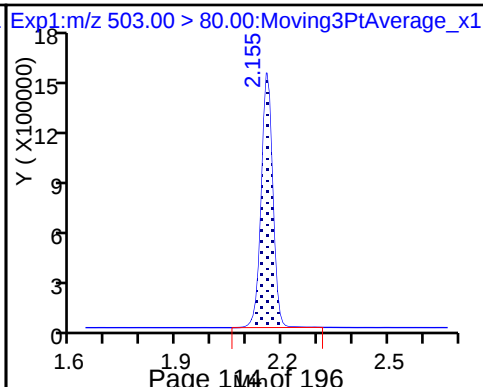
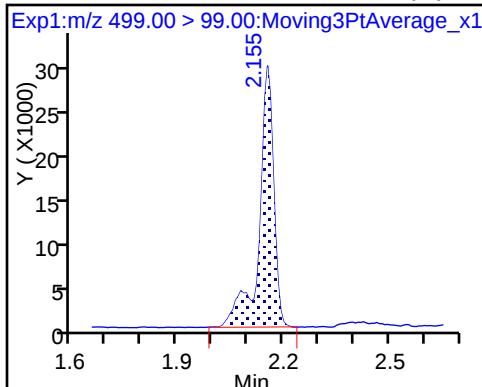
8 Perfluorooctane sulfonic acid (M)



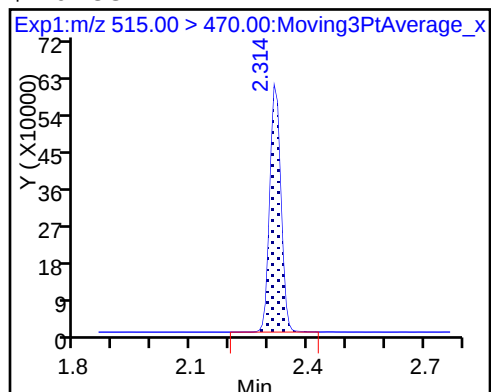
8 Perfluorooctane sulfonic acid (M)

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

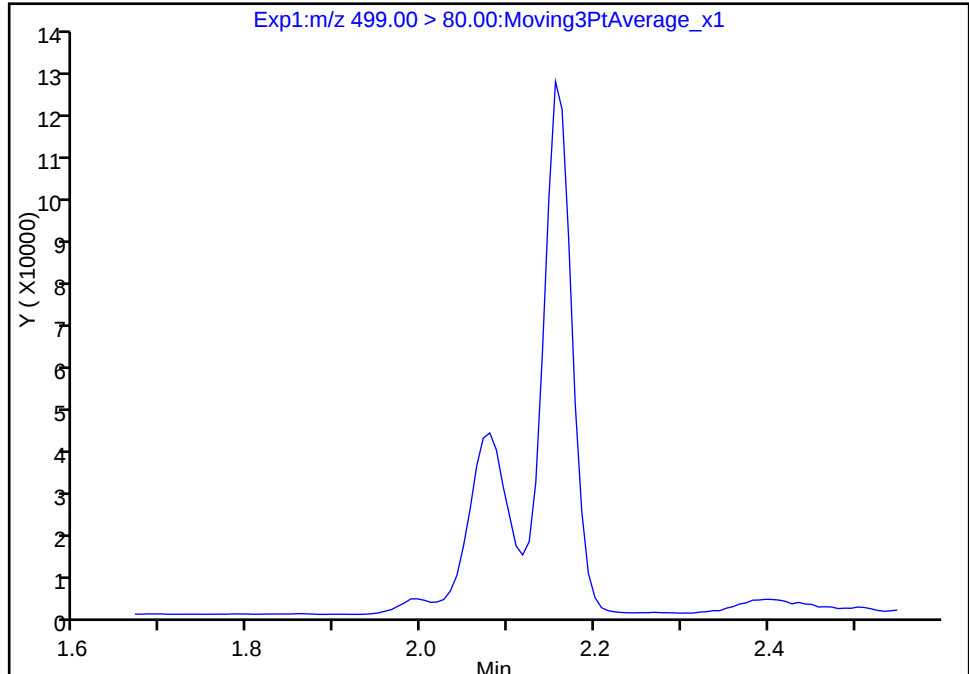
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_004.d
Injection Date: 03-Nov-2017 13:37:59 Instrument ID: A8_N
Lims ID: IC L1
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

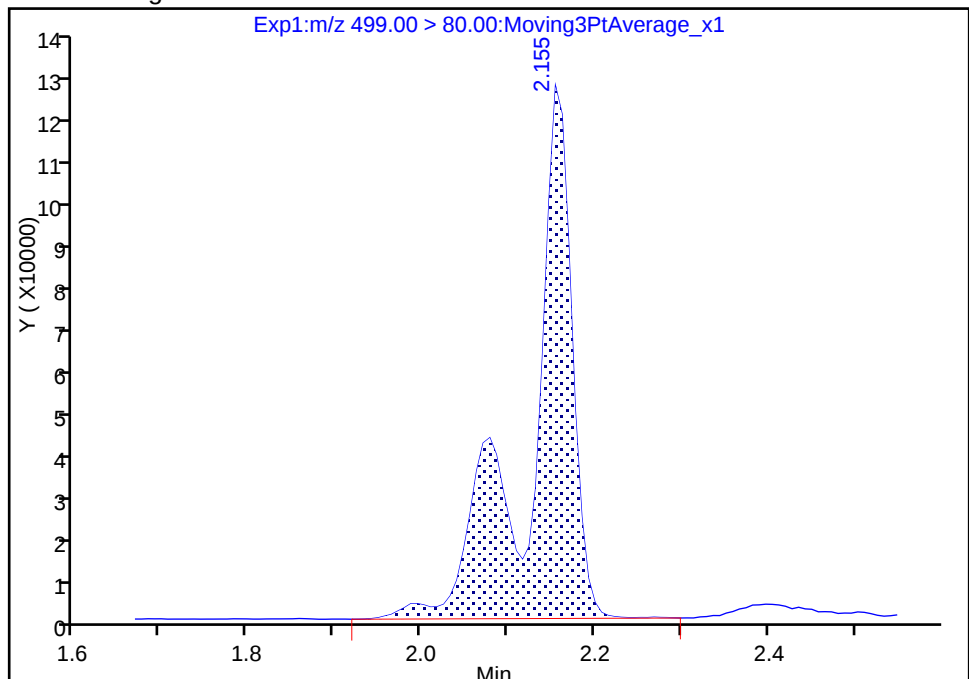
Not Detected
Expected RT: 2.15

Processing Integration Results



Manual Integration Results

RT: 2.15
Area: 412315
Amount: 3.817687
Amount Units: ng/ml



Reviewer: phomsophat, 06-Nov-2017 07:17:28

Audit Action: Assigned Compound ID

Audit Reason: Assign Peak

TestAmerica Sacramento

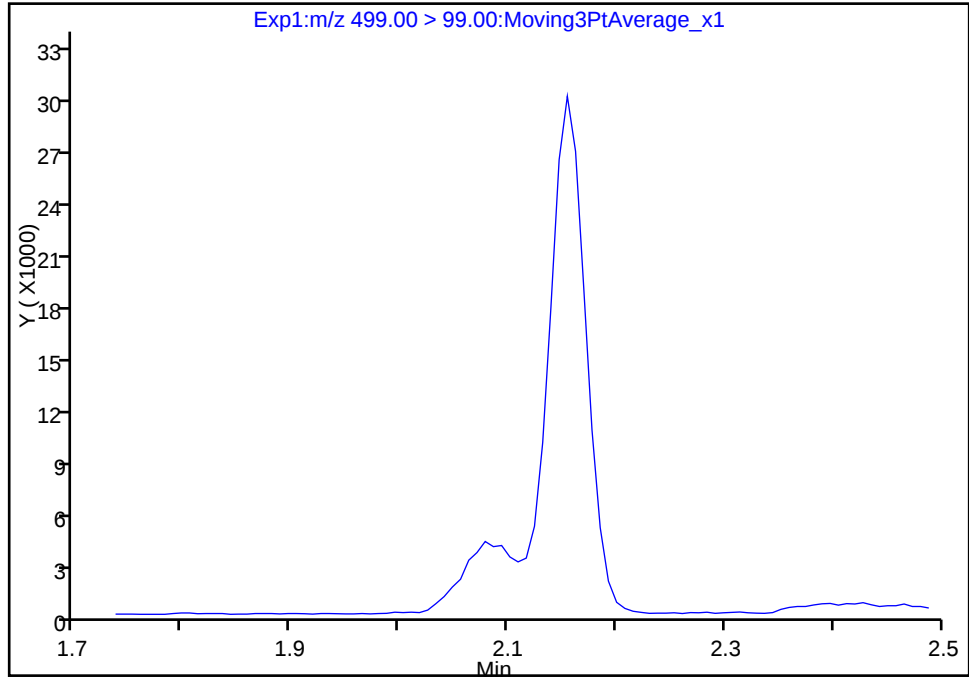
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_004.d
Injection Date: 03-Nov-2017 13:37:59 Instrument ID: A8_N
Lims ID: IC L1
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 2

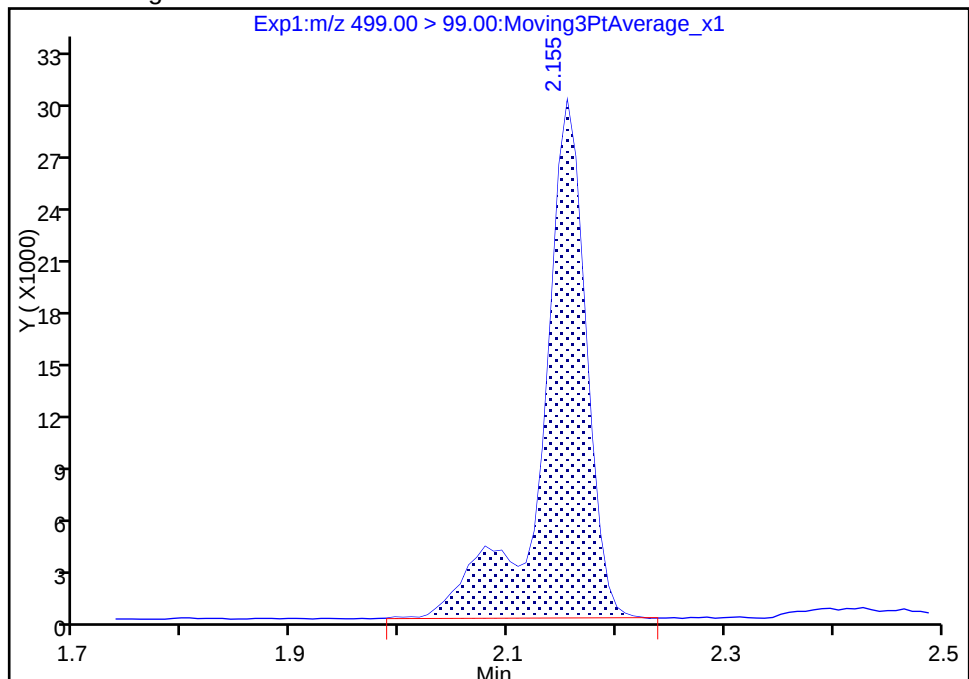
Not Detected
Expected RT: 2.15

Processing Integration Results



Manual Integration Results

RT: 2.15
Area: 85347
Amount: 3.817687
Amount Units: ng/ml



Reviewer: phomsophat, 06-Nov-2017 07:17:37

Audit Action: Manually Integrated

Audit Reason: Assign Peak

TestAmerica Sacramento

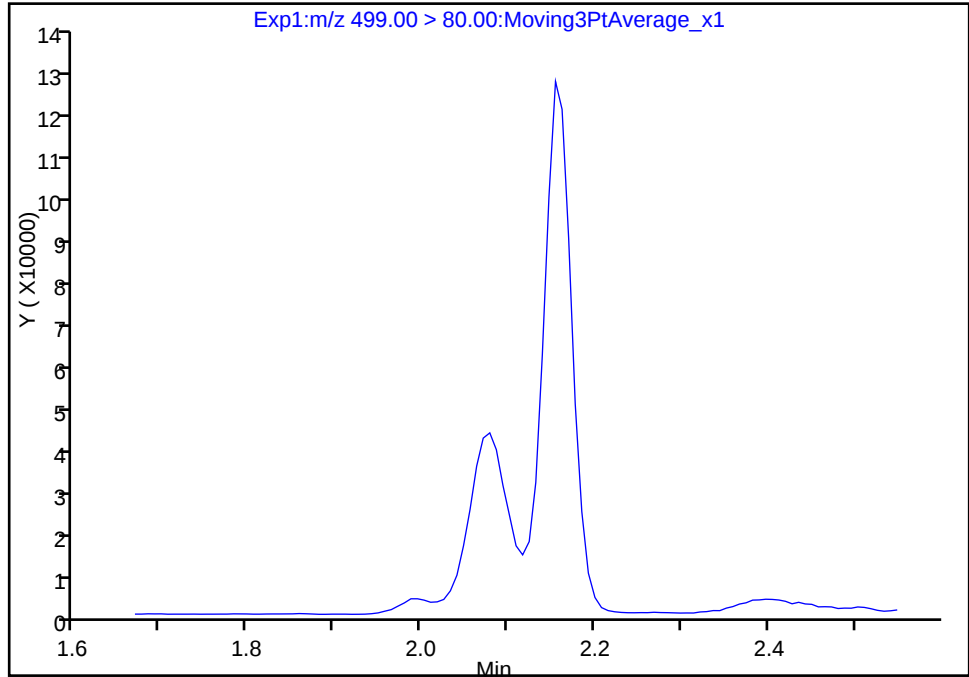
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Injection Date: 03-Nov-2017 13:37:59 Instrument ID: A8_N
Lims ID: IC L1
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

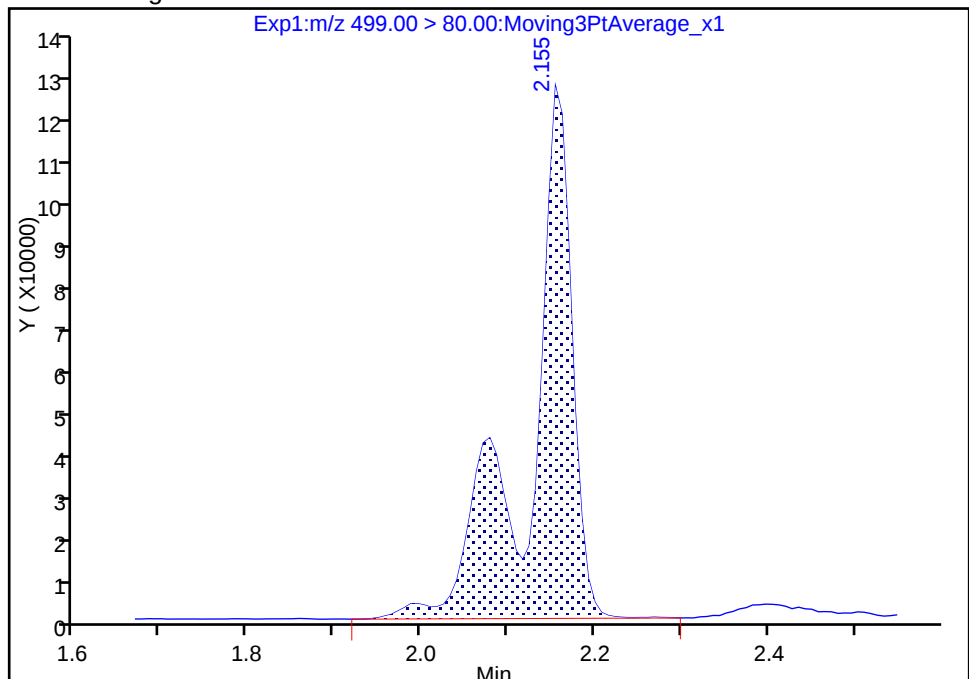
Not Detected
Expected RT: 2.15

Processing Integration Results



Manual Integration Results

RT: 2.15
Area: 412315
Amount: 3.817687
Amount Units: ng/ml



Reviewer: phomsophat, 06-Nov-2017 07:17:37

Audit Action: Manually Integrated

Audit Reason: Assign Peak

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_005.d
 Lims ID: IC L2
 Client ID:
 Sample Type: IC Calib Level: 2
 Inject. Date: 03-Nov-2017 13:42:39 ALS Bottle#: 2 Worklist Smp#: 5
 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\20171106-49975.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 07-Nov-2017 15:52:08 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK021

First Level Reviewer: phomsophat

Date: 06-Nov-2017 07:18:56

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.449	1.444	0.005	1.000	2591121	19.8		1479	
298.90 > 99.00	1.442	1.444	-0.002	0.995	1874928		1.38(0.00-0.00)	4315	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.573	0.005	1.000	1708988	9.57		8562	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.730	1.725	0.005	1.000	331548	2.18		87.8	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.730	1.725	0.005	1.000	1312135	6.51		2317	
* 6 13C2-PFOA									
415.00 > 370.00	1.920	1.913	0.007		1623614	10.0		6970	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.920	1.914	0.006	1.000	644149	4.29		113	
413.00 > 169.00	1.920	1.914	0.006	1.000	329479		1.96(0.00-0.00)	459	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.155	2.147	0.008	1.000	985487	8.72		578	M
499.00 > 99.00	2.155	2.147	0.008	1.000	200739		4.91(0.00-0.00)	449	M
* 7 13C4 PFOS									
503.00 > 80.00	2.155	2.151	0.004		3450592	28.7		5334	
9 Perfluorononanoic acid									
463.00 > 419.00	2.162	2.158	0.004	1.000	453612	4.21		136	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.314	2.312	0.002	1.000	1184358	9.53		7573	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LC537-L2_00020

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_005.d

Injection Date: 03-Nov-2017 13:42:39

Instrument ID: A8_N

Lims ID: IC L2

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 5

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

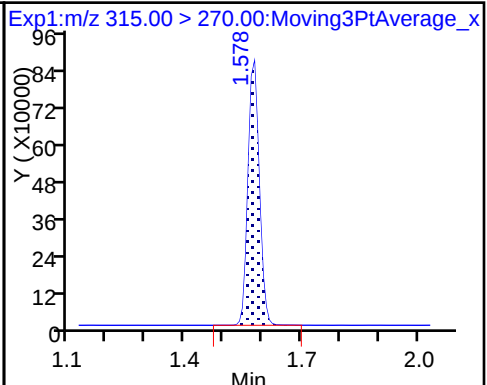
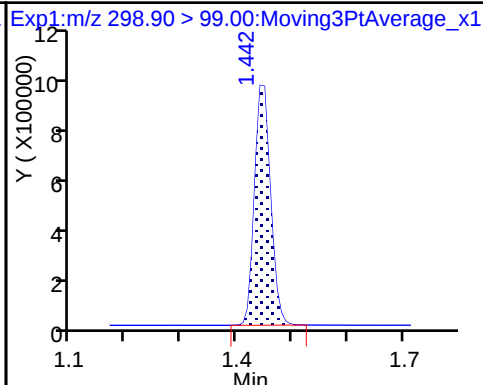
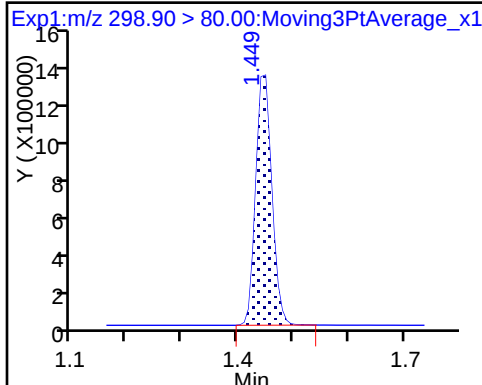
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

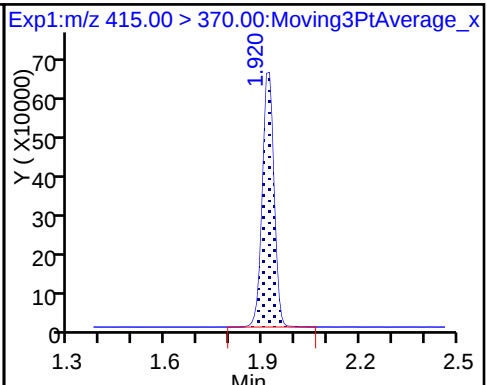
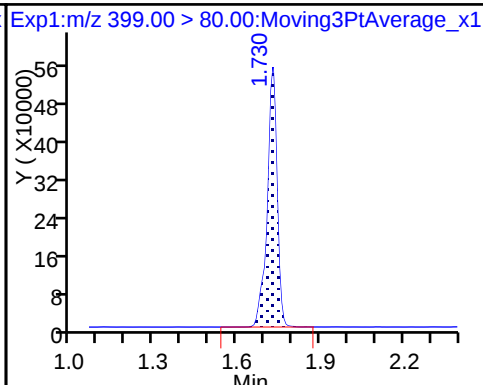
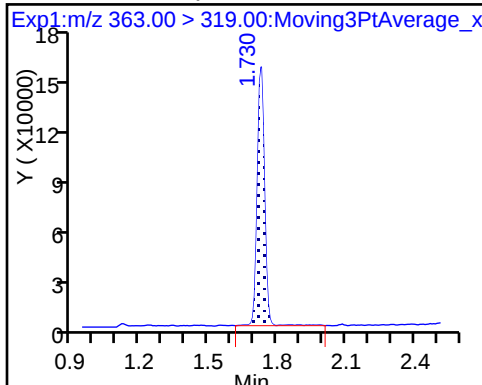
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

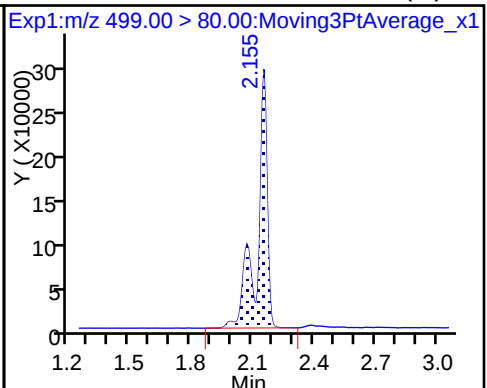
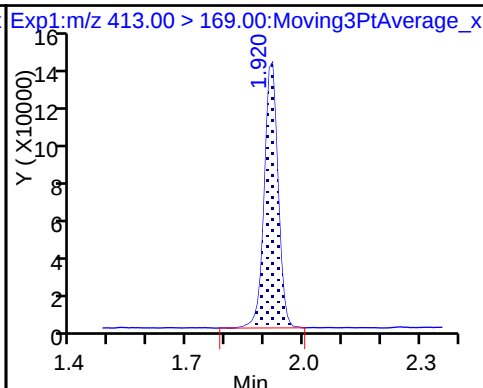
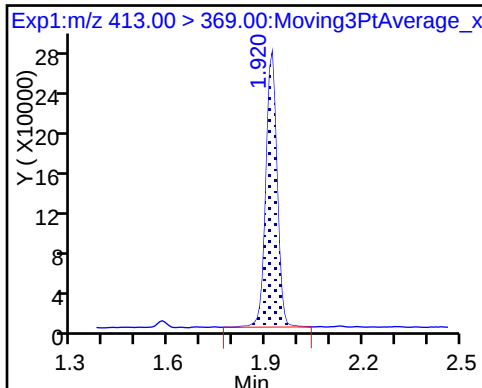
* 6 13C2-PFOA



5 Perfluorooctanoic acid

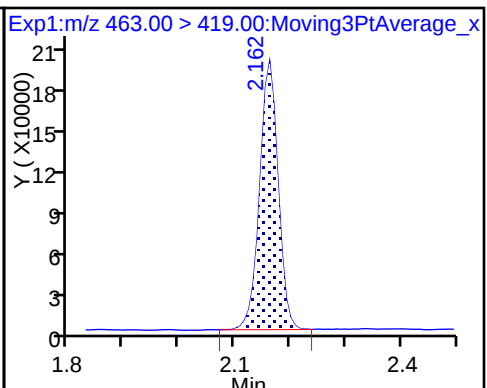
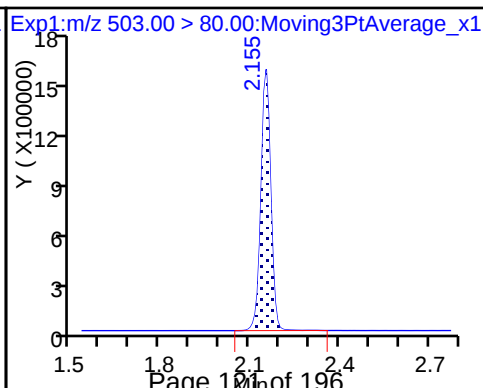
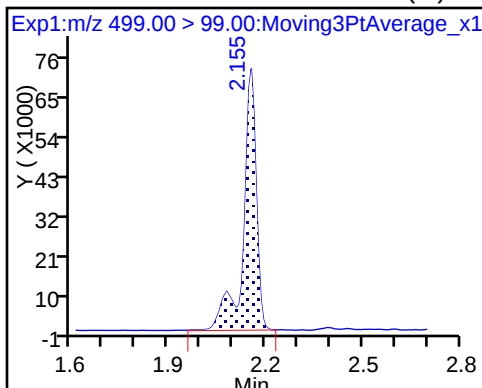
5 Perfluorooctanoic acid

8 Perfluorooctane sulfonic acid (M)

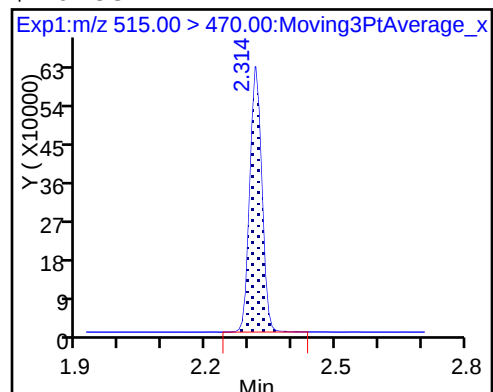


8 Perfluorooctane sulfonic acid (M) * 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

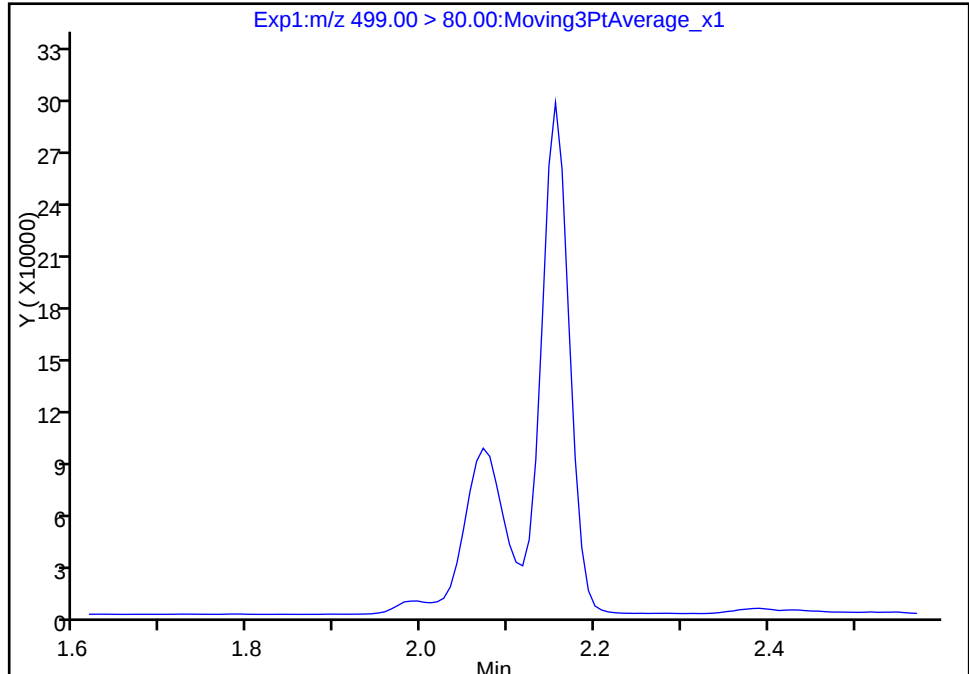
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Injection Date: 03-Nov-2017 13:42:39 Instrument ID: A8_N
Lims ID: IC L2
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

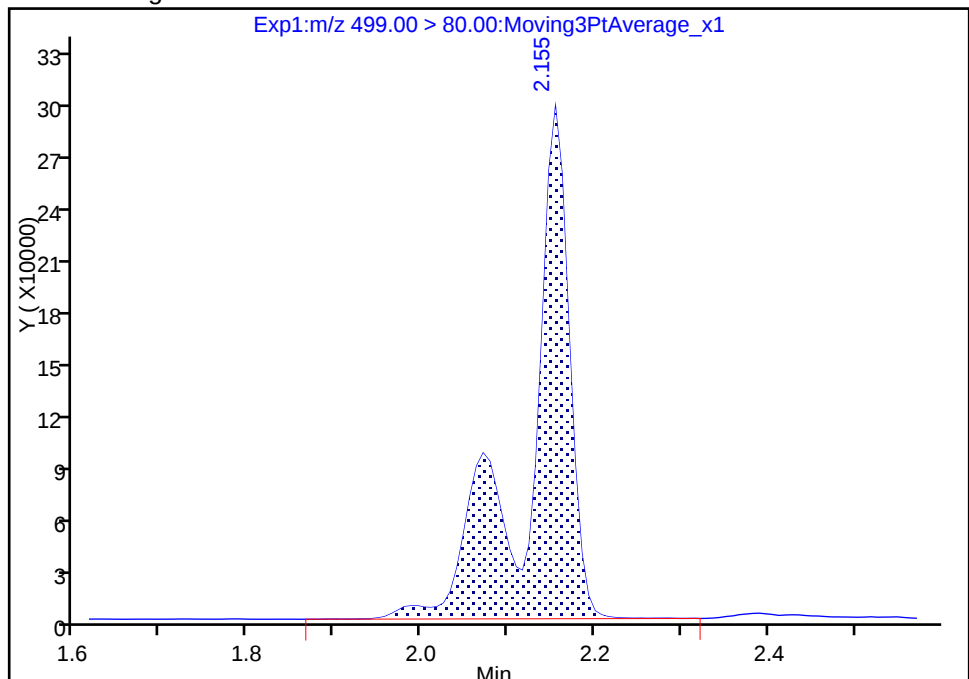
Not Detected
Expected RT: 2.15

Processing Integration Results



RT: 2.15
Area: 985487
Amount: 8.723576
Amount Units: ng/ml

Manual Integration Results



Reviewer: phomsophat, 06-Nov-2017 07:18:13

Audit Action: Assigned Compound ID

Audit Reason: Assign Peak

TestAmerica Sacramento

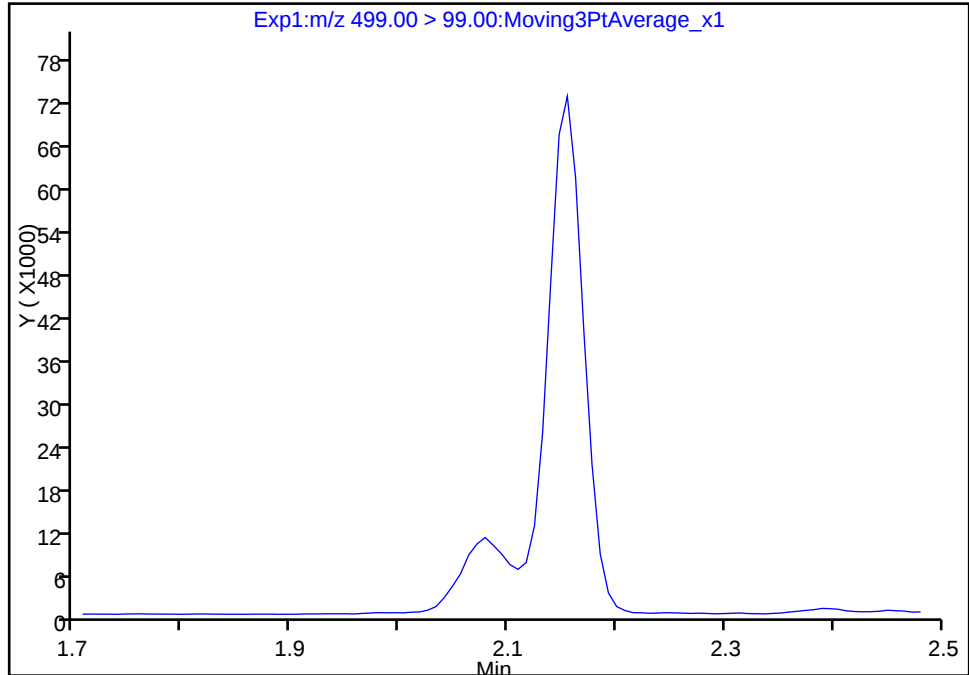
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_005.d
Injection Date: 03-Nov-2017 13:42:39 Instrument ID: A8_N
Lims ID: IC L2
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 2

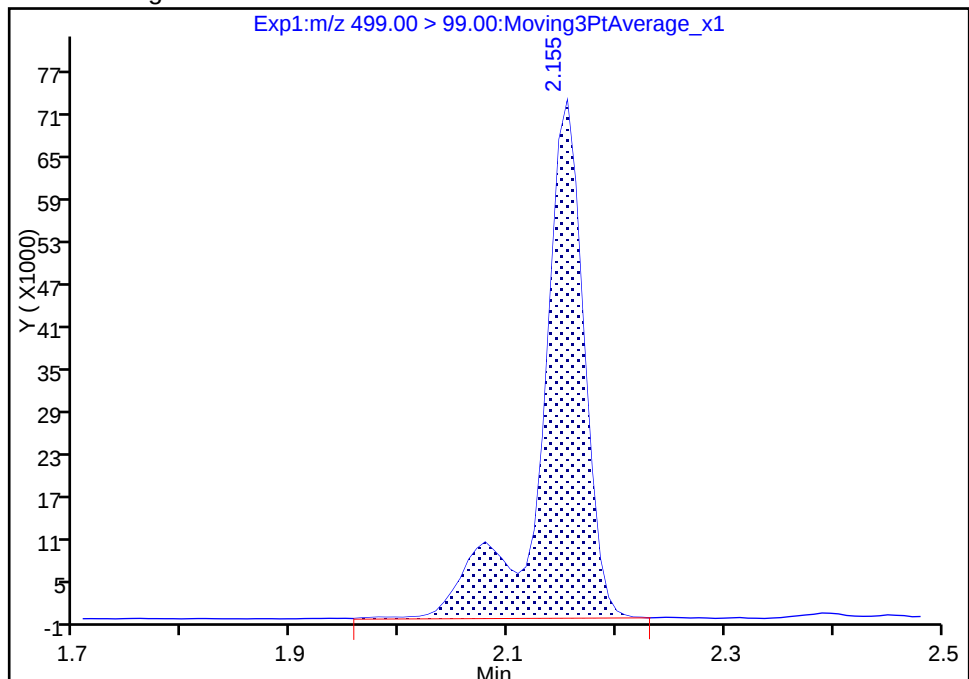
Not Detected
Expected RT: 2.15

Processing Integration Results



Manual Integration Results

RT: 2.15
Area: 200739
Amount: 8.723576
Amount Units: ng/ml



Reviewer: phomsophat, 06-Nov-2017 07:18:24

Audit Action: Manually Integrated

Audit Reason: Assign Peak

TestAmerica Sacramento

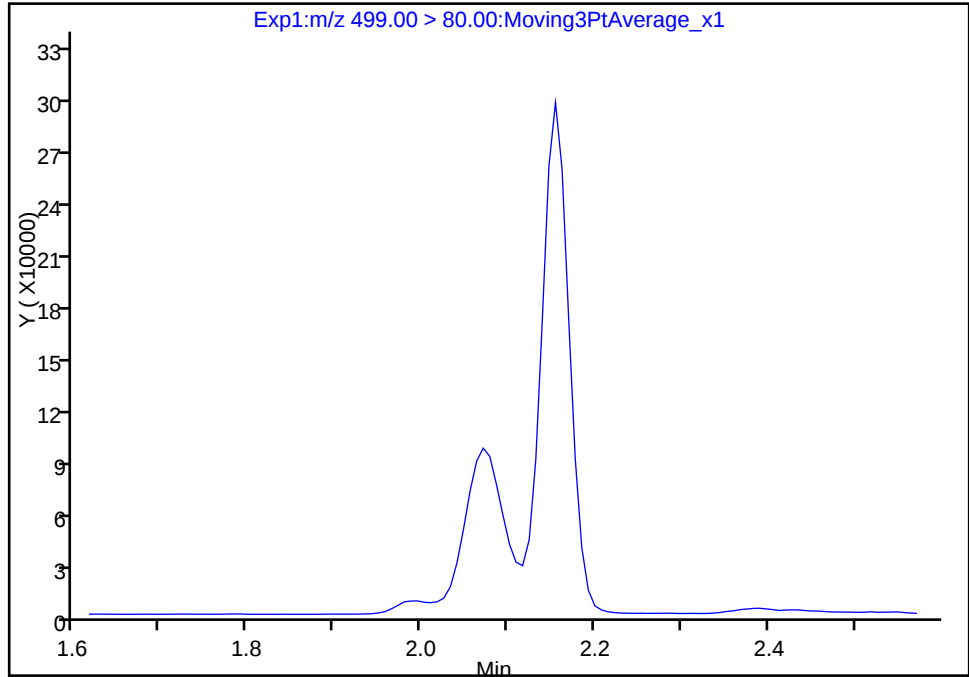
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_005.d
Injection Date: 03-Nov-2017 13:42:39 Instrument ID: A8_N
Lims ID: IC L2
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

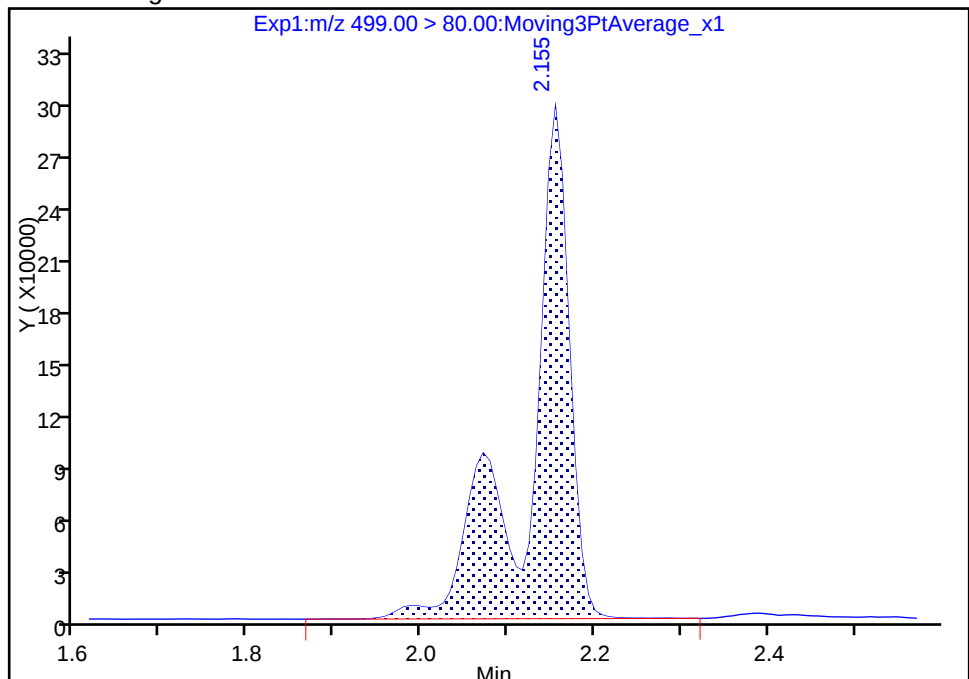
Not Detected
Expected RT: 2.15

Processing Integration Results



Manual Integration Results

RT: 2.15
Area: 985487
Amount: 8.723576
Amount Units: ng/ml



Reviewer: phomsophat, 06-Nov-2017 07:18:24

Audit Action: Manually Integrated

Audit Reason: Assign Peak

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_006.d
 Lims ID: IC L3
 Client ID:
 Sample Type: IC Calib Level: 3
 Inject. Date: 03-Nov-2017 13:47:20 ALS Bottle#: 3 Worklist Smp#: 6
 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\20171106-49975.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 07-Nov-2017 15:52:09 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK021

First Level Reviewer: phomsophat

Date: 06-Nov-2017 07:20:04

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	1.444	-0.002	1.000	5461974	46.7		3220	
298.90 > 99.00	1.442	1.444	-0.002	1.000	3903438		1.40(0.00-0.00)	8589	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.571	1.573	-0.003	1.000	1701491	10.0		9021	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.722	1.725	-0.003	1.000	2908204	15.6		5000	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.722	1.725	-0.003	1.000	736034	5.10		208	
* 6 13C2-PFOA									
415.00 > 370.00	1.912	1.913	-0.001		1540946	10.0		6787	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.912	1.914	-0.002	1.000	1388033	9.73		256	
413.00 > 169.00	1.912	1.914	-0.002	1.000	715399		1.94(0.00-0.00)	904	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.147	2.147	0.0	1.000	2067792	19.8		2001	
499.00 > 99.00	2.147	2.147	0.0	1.000	431075		4.80(0.00-0.00)	922	
* 7 13C4 PFOS									
503.00 > 80.00	2.147	2.151	-0.004		3194016	28.7		4956	
9 Perfluorononanoic acid									
463.00 > 419.00	2.155	2.158	-0.003	1.000	1020851	9.97		302	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.306	2.312	-0.006	1.000	1166275	9.89		6310	

Reagents:

LC537-L3_00023

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_006.d

Injection Date: 03-Nov-2017 13:47:20

Instrument ID: A8_N

Lims ID: IC L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 6

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

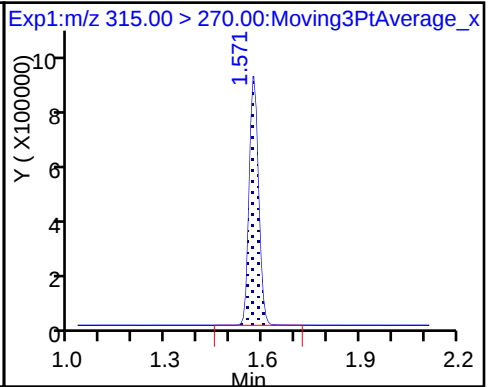
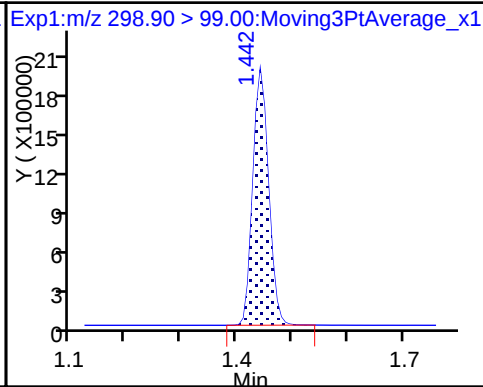
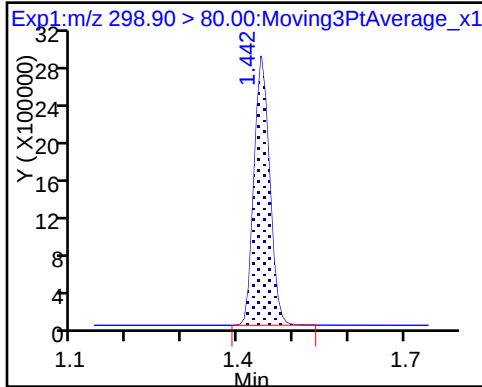
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

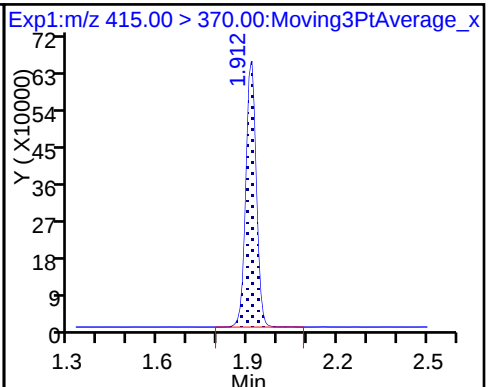
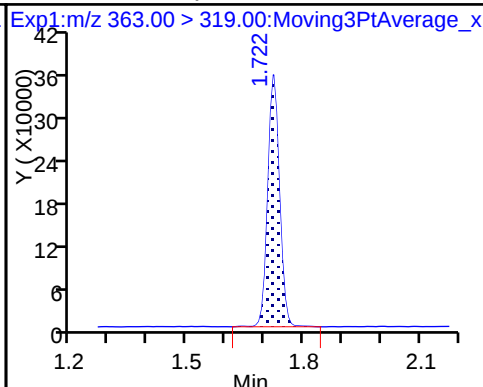
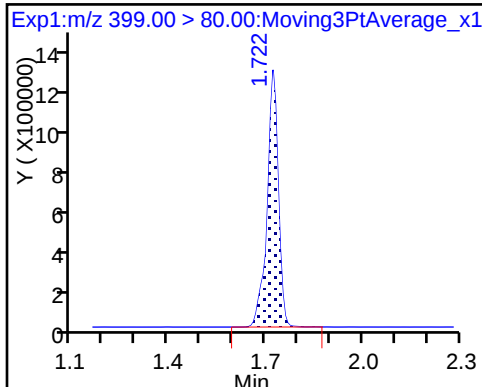
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

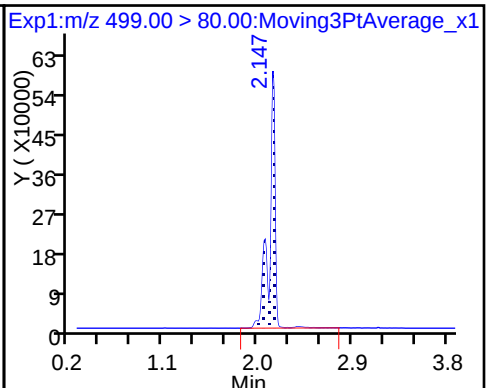
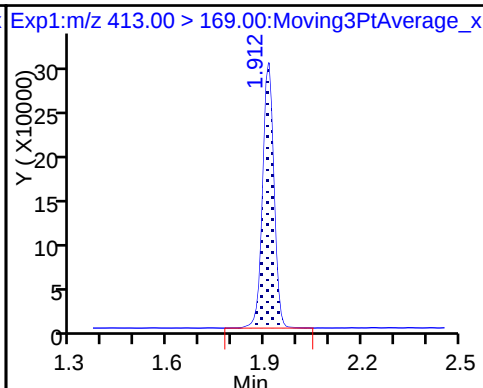
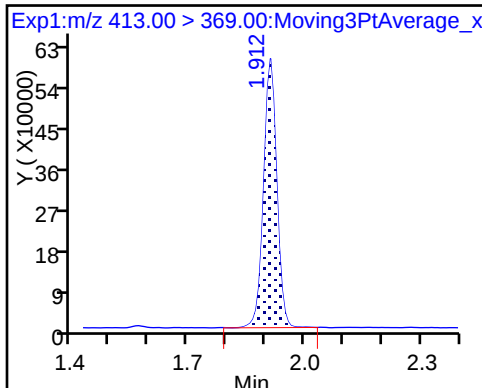
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

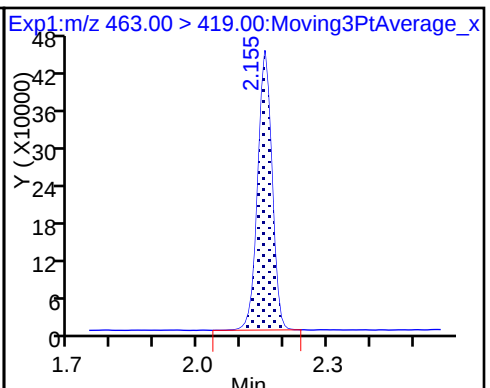
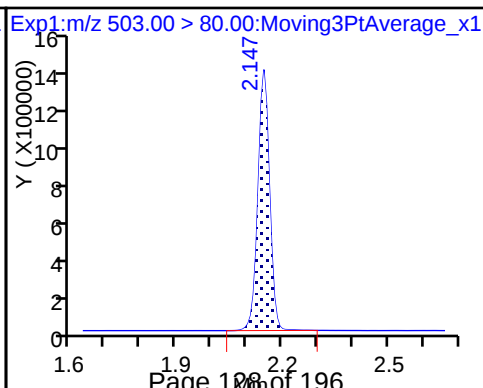
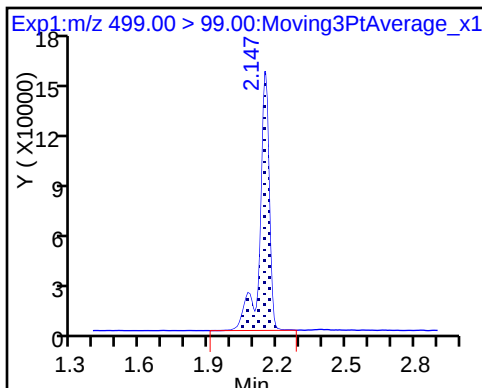
8 Perfluorooctane sulfonic acid



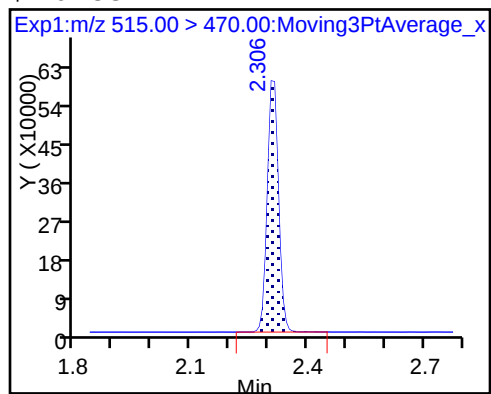
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_007.d
 Lims ID: IC L4
 Client ID:
 Sample Type: ICISAV Calib Level: 4
 Inject. Date: 03-Nov-2017 13:52:00 ALS Bottle#: 4 Worklist Smp#: 7
 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\20171106-49975.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 07-Nov-2017 15:52:10 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK021

First Level Reviewer: phomsophat

Date: 06-Nov-2017 07:20:46

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.442	1.444	-0.002	1.000	10142530	87.2		5274	
298.90 > 99.00	1.442	1.444	-0.002	1.000	7408390		1.37(0.00-0.00)	12862	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.571	1.573	-0.003	1.000	1719911	10.1		8503	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.722	1.725	-0.003	1.000	1420703	9.81		399	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.722	1.725	-0.003	1.000	5871843	29.8		7622	
* 6 13C2-PFOA									
415.00 > 370.00	1.912	1.913	-0.001		1546307	10.0		6563	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.912	1.914	-0.002	1.000	2771271	19.4		505	
413.00 > 169.00	1.912	1.914	-0.002	1.000	1520933		1.82(0.00-0.00)	1919	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.155	2.147	0.008	1.000	4363079	39.5		3896	M
499.00 > 99.00	2.155	2.147	0.008	1.000	902486		4.83(0.00-0.00)	1588	M
* 7 13C4 PFOS									
503.00 > 80.00	2.155	2.151	0.004		3374600	28.7		5331	
9 Perfluorononanoic acid									
463.00 > 419.00	2.162	2.158	0.004	1.000	2106479	20.5		638	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.314	2.312	0.002	1.000	1207887	10.2		7165	

QC Flag Legend

Review Flags

M - Manually Integrated

Reagents:

LC537-L4_00020

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_007.d

Injection Date: 03-Nov-2017 13:52:00

Instrument ID: A8_N

Lims ID: IC L4

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 4

Worklist Smp#: 7

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

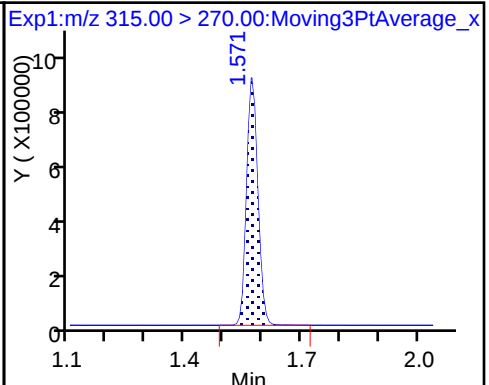
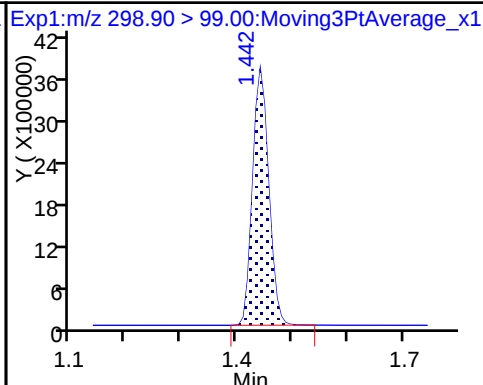
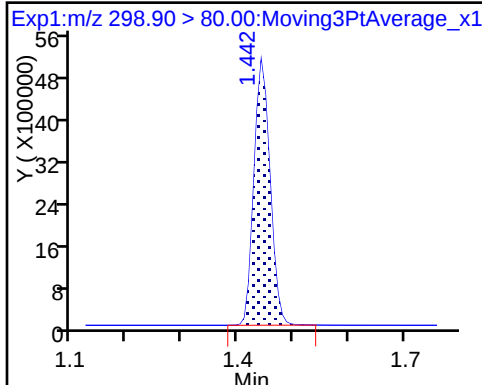
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

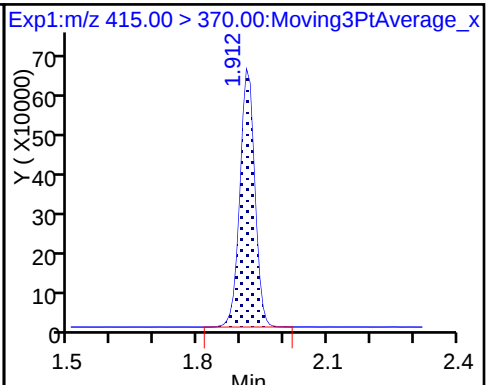
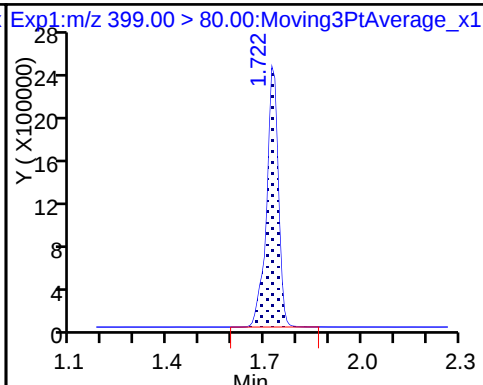
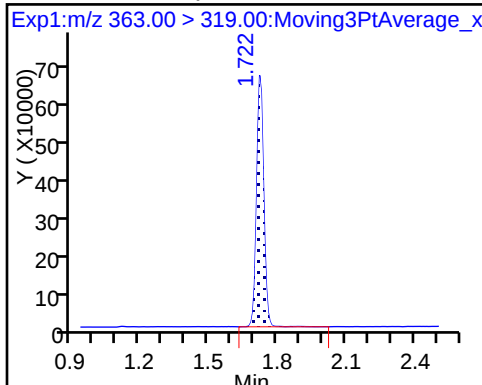
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

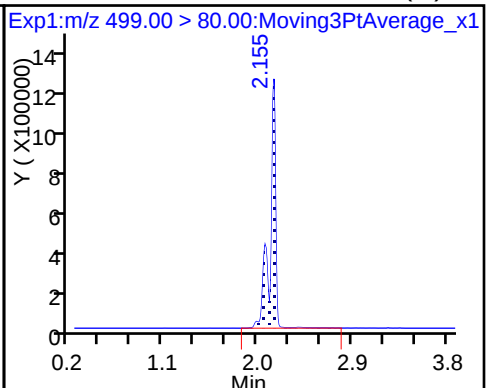
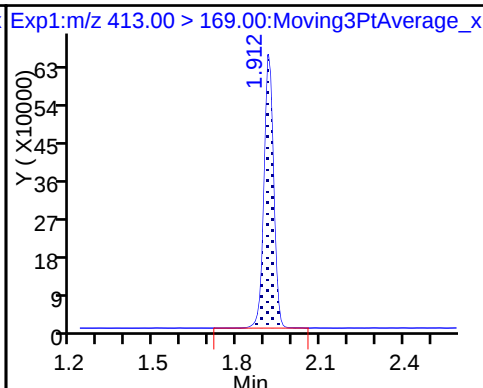
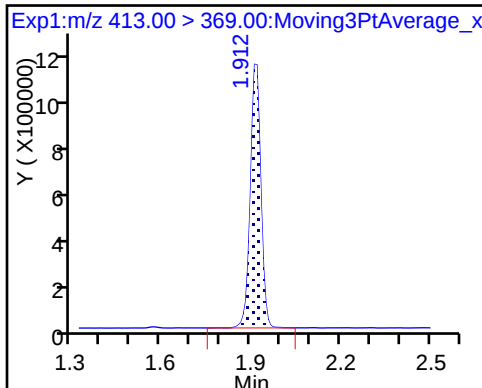
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

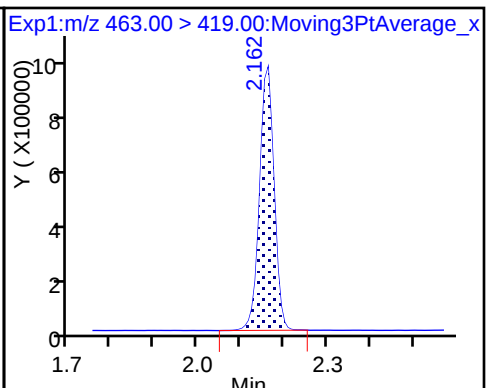
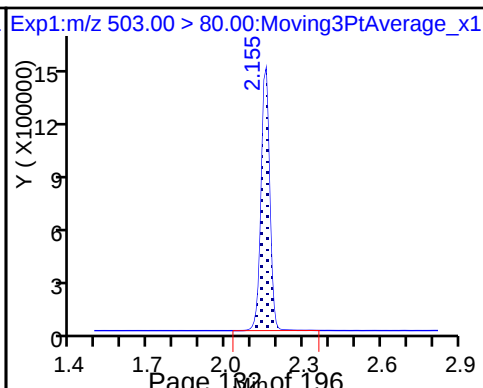
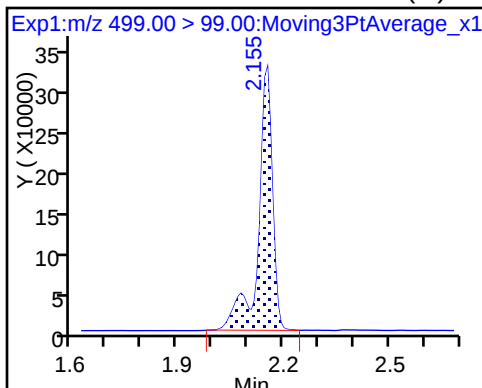
8 Perfluorooctane sulfonic acid (M)



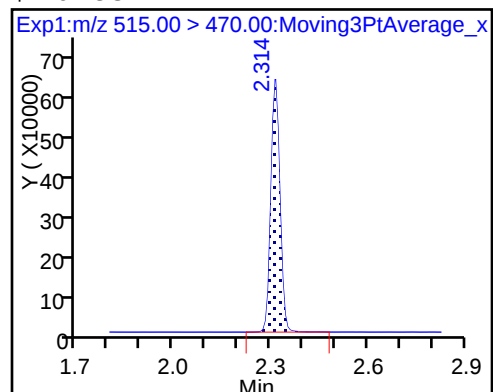
8 Perfluorooctane sulfonic acid (M)

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento

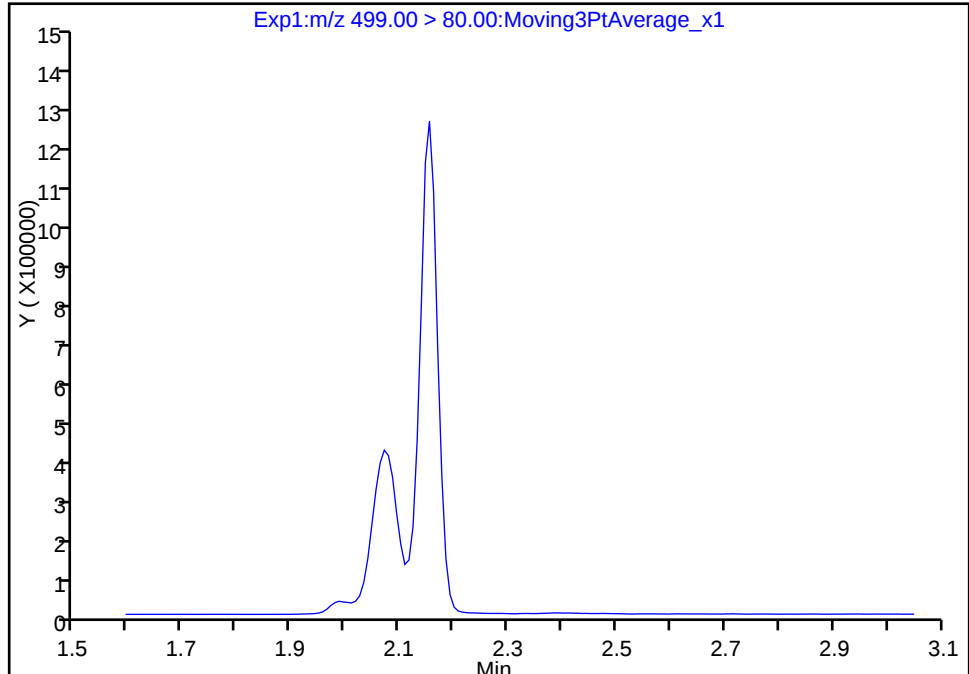
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_007.d
Injection Date: 03-Nov-2017 13:52:00 Instrument ID: A8_N
Lims ID: IC L4
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 4 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

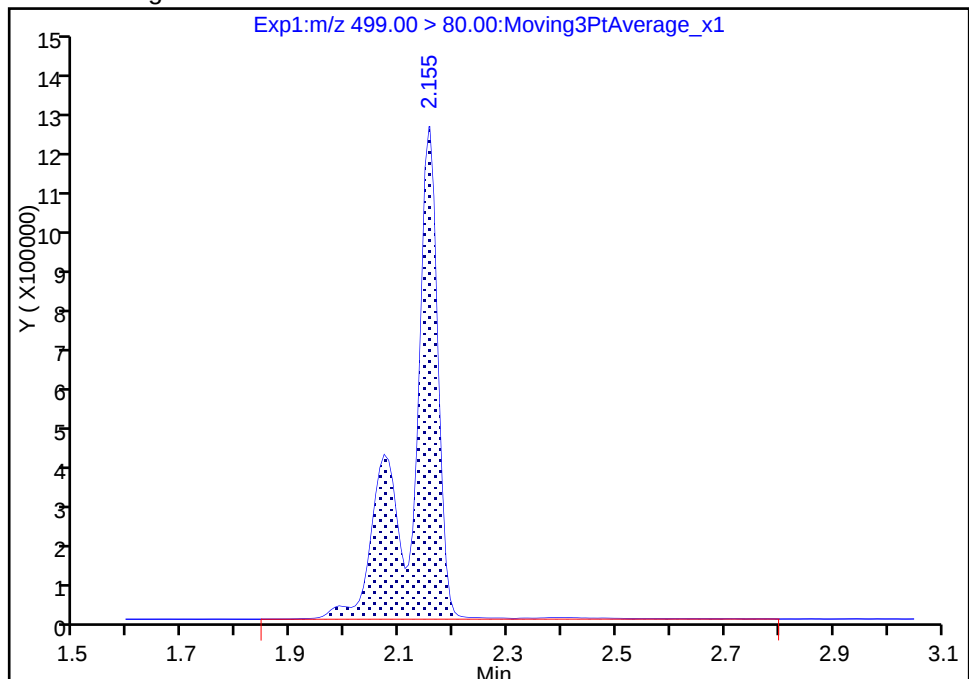
Not Detected
Expected RT: 2.15

Processing Integration Results



RT: 2.15
Area: 4363079
Amount: 39.491903
Amount Units: ng/ml

Manual Integration Results



Reviewer: phomsophat, 06-Nov-2017 07:20:12

Audit Action: Assigned Compound ID

Audit Reason: Assign Peak

TestAmerica Sacramento

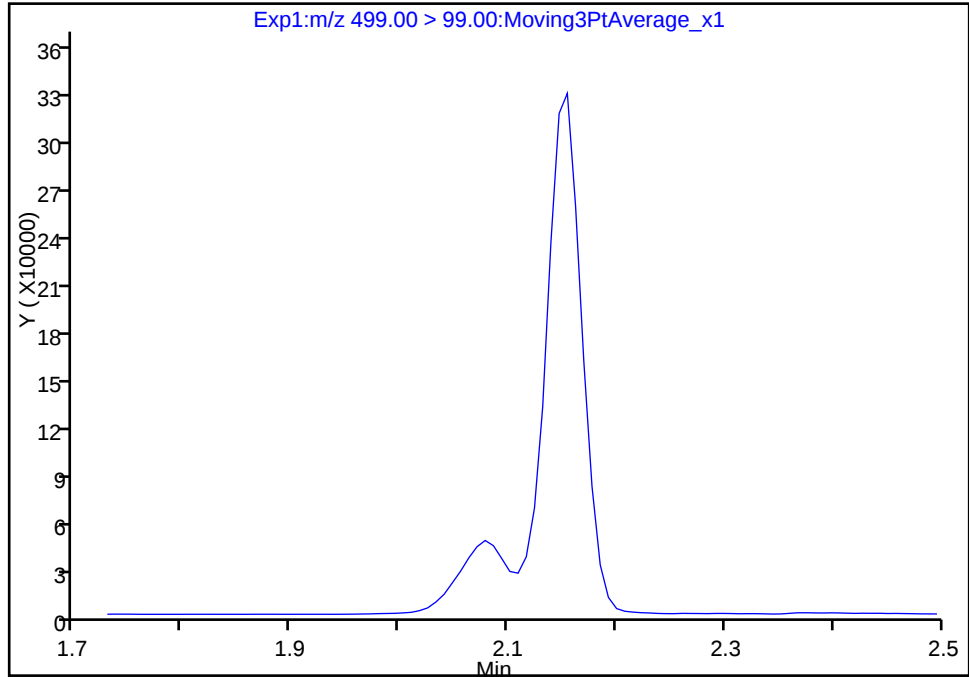
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Injection Date: 03-Nov-2017 13:52:00 Instrument ID: A8_N
Lims ID: IC L4
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 4 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 2

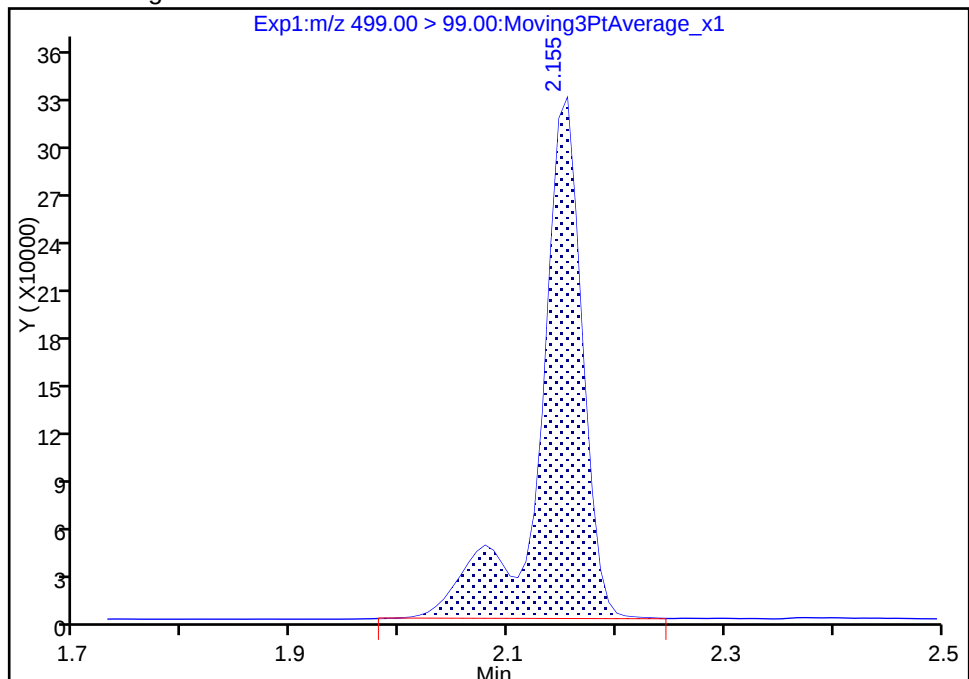
Not Detected
Expected RT: 2.15

Processing Integration Results



Manual Integration Results

RT: 2.15
Area: 902486
Amount: 39.491903
Amount Units: ng/ml



Reviewer: phomsophat, 06-Nov-2017 07:20:20

Audit Action: Manually Integrated

Audit Reason: Assign Peak

TestAmerica Sacramento

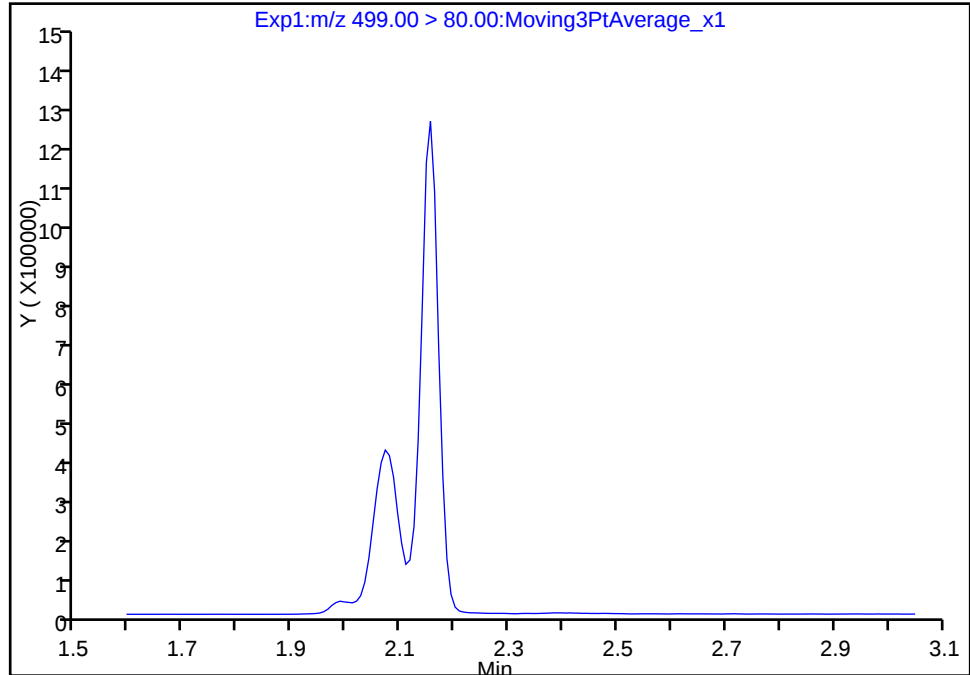
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Injection Date: 03-Nov-2017 13:52:00 Instrument ID: A8_N
Lims ID: IC L4
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 4 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

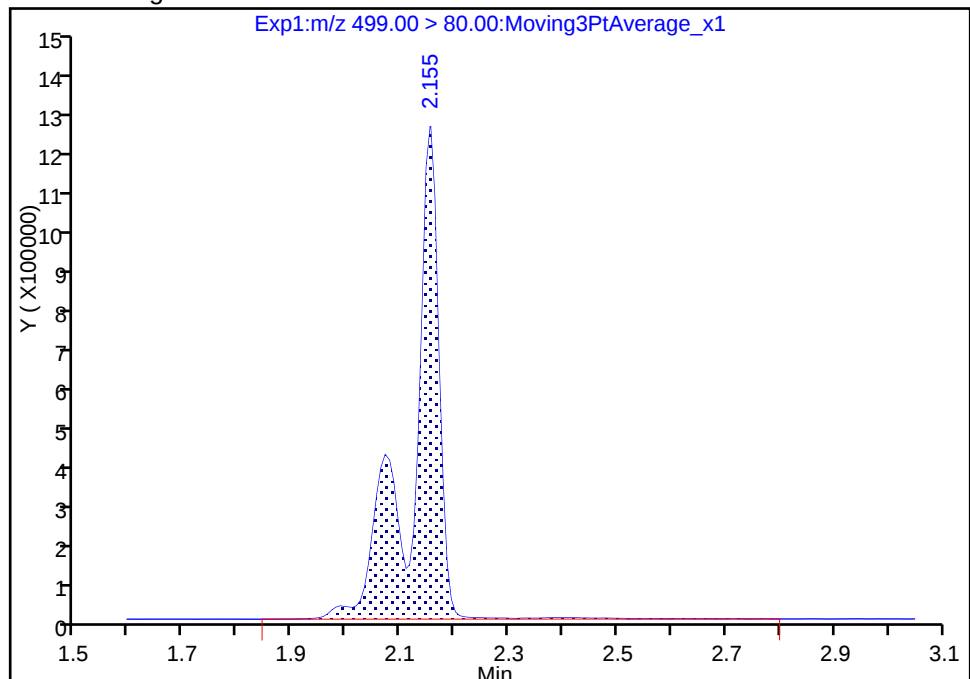
Not Detected
Expected RT: 2.15

Processing Integration Results



Manual Integration Results

RT: 2.15
Area: 4363079
Amount: 39.491903
Amount Units: ng/ml



Reviewer: phomsophat, 06-Nov-2017 07:20:20

Audit Action: Manually Integrated

Audit Reason: Assign Peak

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_008.d
 Lims ID: IC L5
 Client ID:
 Sample Type: IC Calib Level: 5
 Inject. Date: 03-Nov-2017 13:56:41 ALS Bottle#: 5 Worklist Smp#: 8
 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\20171106-49975.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 07-Nov-2017 15:52:11 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK021

First Level Reviewer: phomsophat

Date: 06-Nov-2017 07:21:19

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.442	1.444	-0.002	1.000	14011858	137.5		6452	
298.90 > 99.00	1.442	1.444	-0.002	1.000	10411479		1.35(0.00-0.00)	14800	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.571	1.573	-0.003	1.000	1675220	9.79		9525	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.722	1.725	-0.003	1.000	8413133	45.0		9078	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.722	1.725	-0.003	1.000	2102676	14.4		562	
* 6 13C2-PFOA									
415.00 > 370.00	1.912	1.913	-0.001		1555174	10.0		6769	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.912	1.914	-0.002	1.000	4257225	29.6		800	
413.00 > 169.00	1.912	1.914	-0.002	1.000	2294552		1.86(0.00-0.00)	2838	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.147	2.147	0.0	1.000	6504279	62.1		5682	
499.00 > 99.00	2.147	2.147	0.0	1.000	1339120		4.86(0.00-0.00)	2329	
* 7 13C4 PFOS									
503.00 > 80.00	2.147	2.151	-0.004		3199479	28.7		4946	
9 Perfluorononanoic acid									
463.00 > 419.00	2.155	2.158	-0.003	1.000	3023088	29.3		870	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.314	2.312	0.002	1.000	1139992	9.58		5885	

Reagents:

LC537-L5_00024

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_008.d

Injection Date: 03-Nov-2017 13:56:41

Instrument ID: A8_N

Lims ID: IC L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 8

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

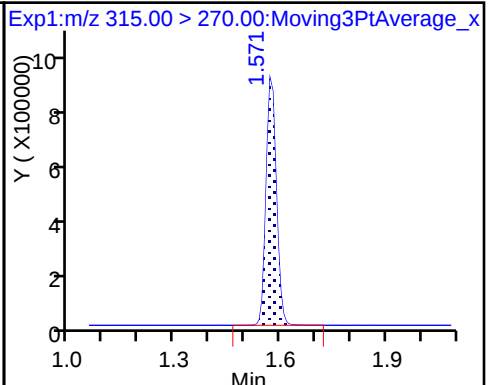
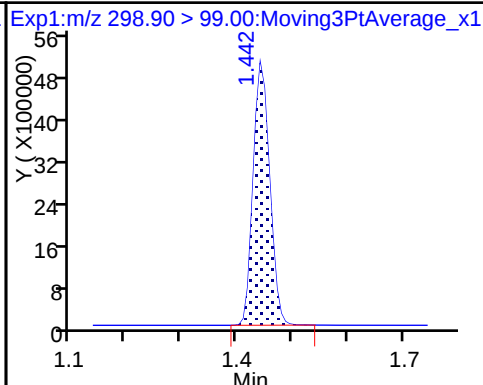
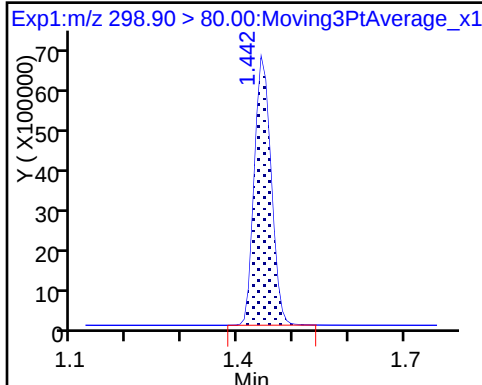
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

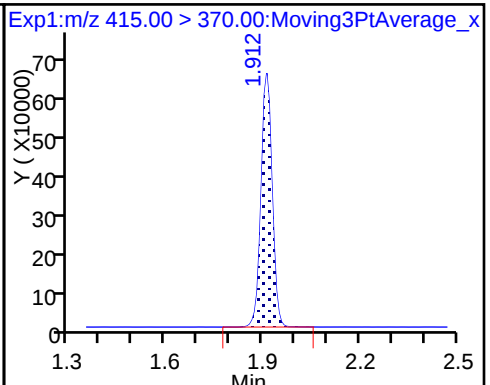
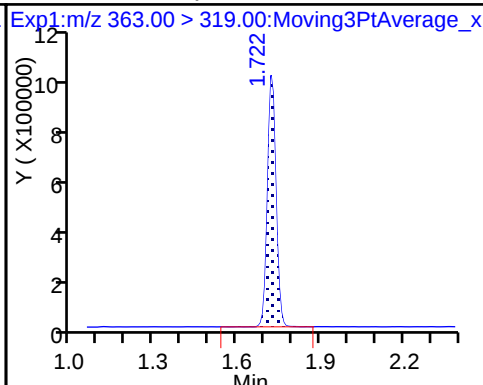
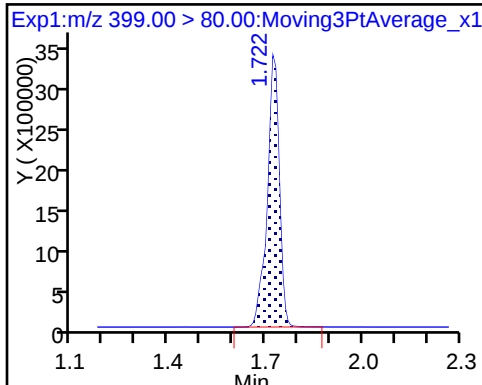
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

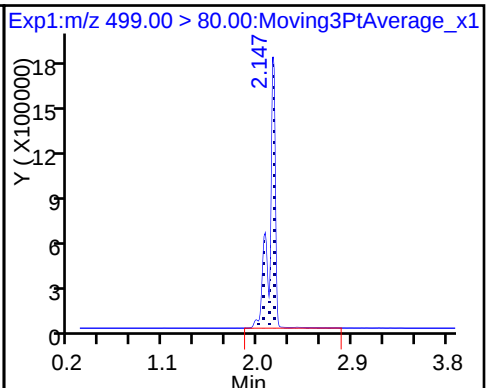
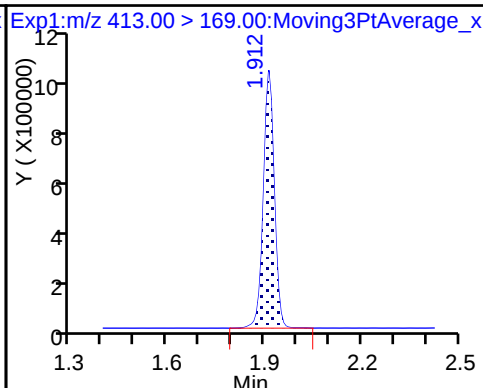
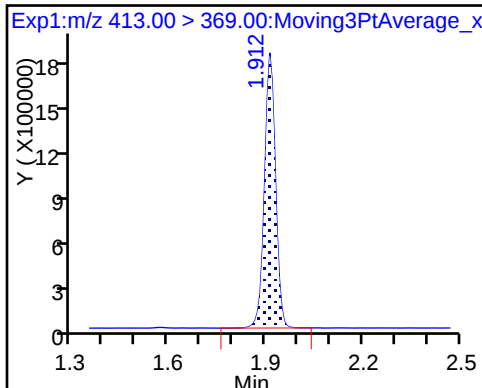
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

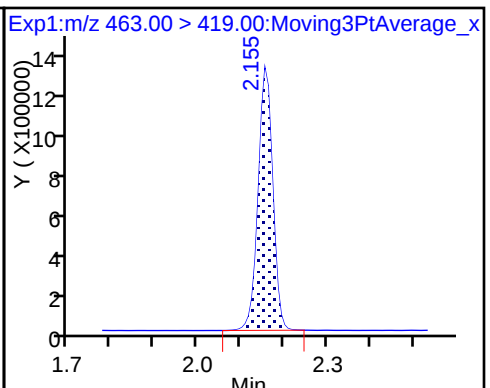
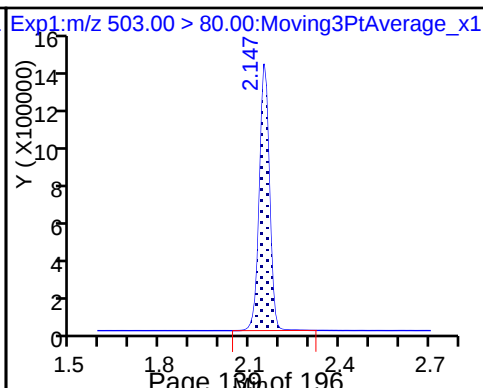
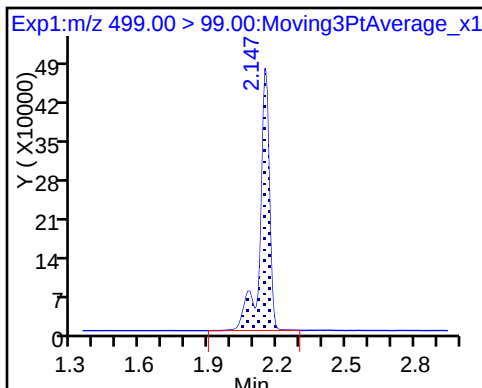
8 Perfluorooctane sulfonic acid



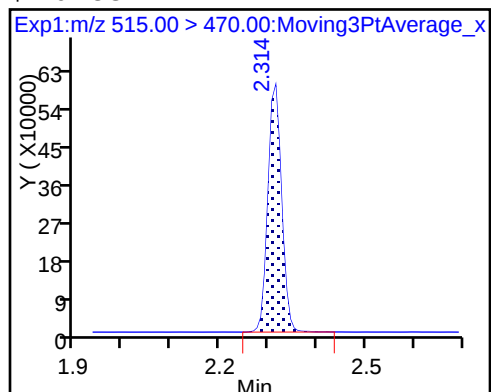
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d
 Lims ID: IC L6
 Client ID:
 Sample Type: IC Calib Level: 6
 Inject. Date: 03-Nov-2017 14:01:24 ALS Bottle#: 6 Worklist Smp#: 9
 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\20171106-49975.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 07-Nov-2017 15:52:12 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK021

First Level Reviewer: phomsophat

Date: 06-Nov-2017 07:25:41

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.442	1.444	-0.002	1.000	16699152	179.1		7089	
298.90 > 99.00	1.442	1.444	-0.002	1.000	12929978		1.29(0.00-0.00)	15608	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.571	1.573	-0.003	1.000	1664260	10.6		9116	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.722	1.725	-0.003	1.000	2810797	21.0		763	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.722	1.725	-0.003	1.000	11071993	60.4		10884	
* 6 13C2-PFOA									
415.00 > 370.00	1.904	1.913	-0.009		1426806	10.0		5446	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.912	1.914	-0.002	1.000	5597122	42.4		962	
413.00 > 169.00	1.904	1.914	-0.010	0.996	3028676		1.85(0.00-0.00)	3704	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.147	2.147	0.0	1.000	8679676	84.4		6114	
499.00 > 99.00	2.147	2.147	0.0	1.000	1807143		4.80(0.00-0.00)	2991	
* 7 13C4 PFOS									
503.00 > 80.00	2.147	2.151	-0.004		3141787	28.7		4961	
9 Perfluorononanoic acid									
463.00 > 419.00	2.155	2.158	-0.003	1.000	4019666	42.4		1149	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.306	2.312	-0.006	1.000	1164156	10.7		6124	

Reagents:

LC537-L6_00020

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Injection Date: 03-Nov-2017 14:01:24

Instrument ID: A8_N

Lims ID: IC L6

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 6

Worklist Smp#: 9

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

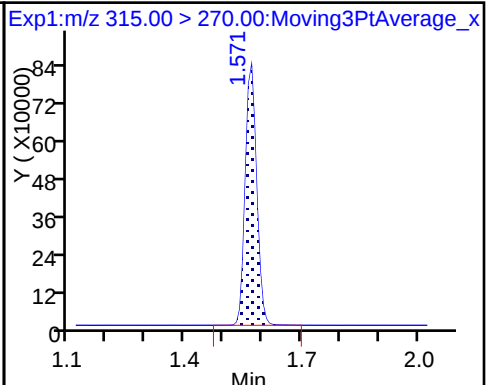
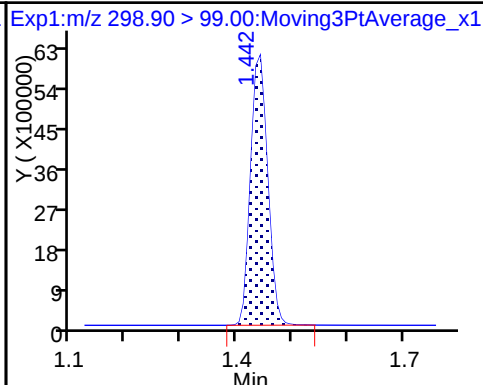
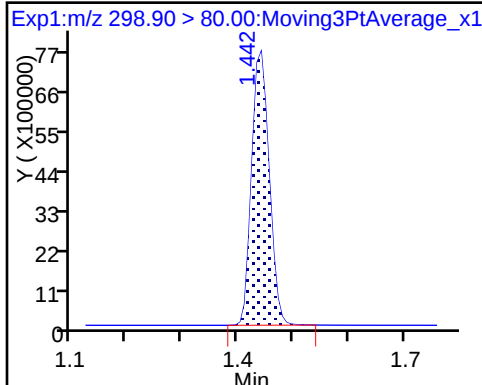
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

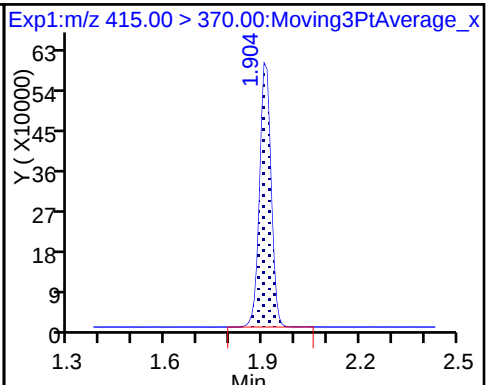
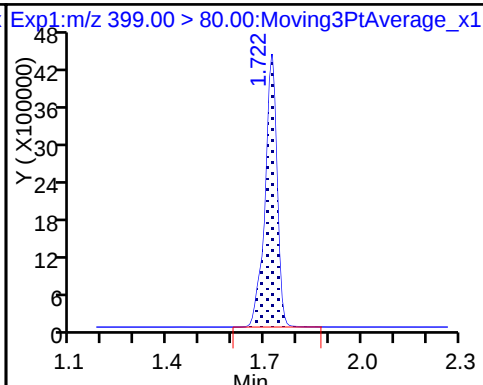
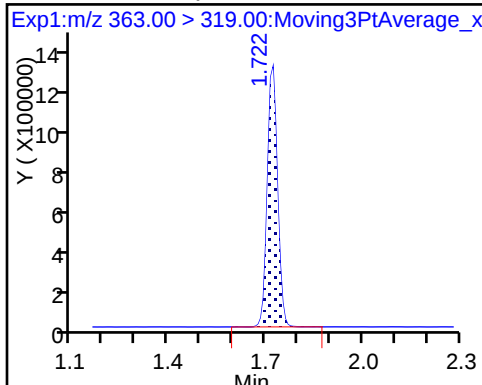
\$ 2 13C2 PFHxA



4 Perfluoroheptanoic acid

3 Perfluorohexanesulfonic acid

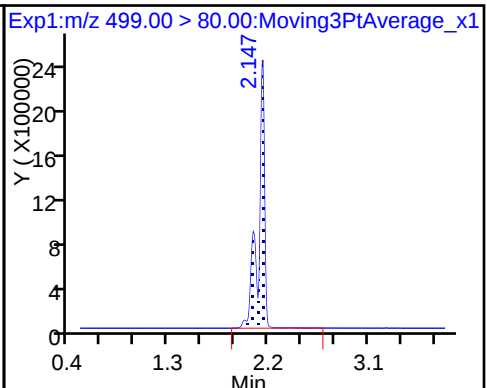
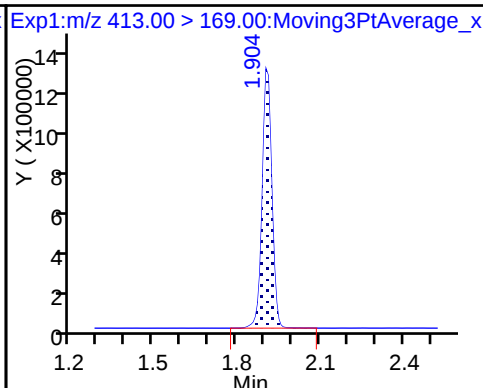
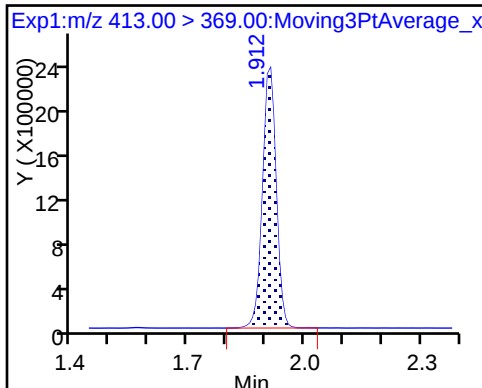
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

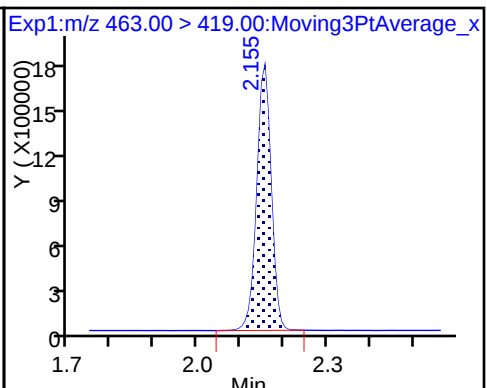
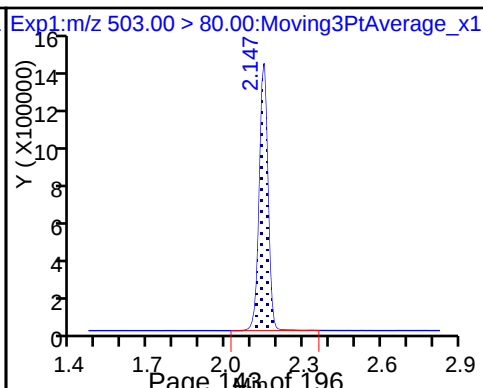
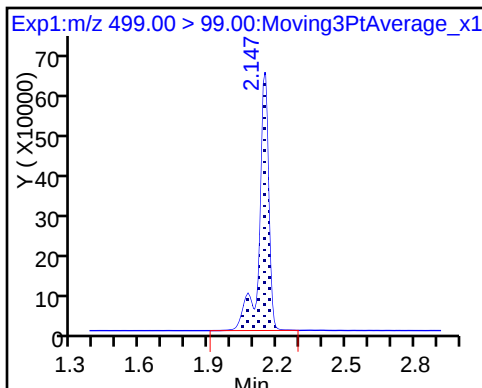
8 Perfluorooctane sulfonic acid



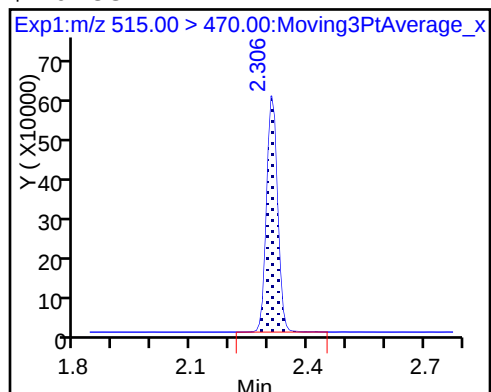
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Lab Sample ID: ICV 320-192908/13 Calibration Date: 11/03/2017 14:20
 Instrument ID: A8_N Calib Start Date: 11/03/2017 13:37
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 11/03/2017 14:01
 Lab File ID: 2017.11.03_537XICAL_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		0.8310		83.7	100	-16.4	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.9369	0.8136		8.68	10.0	-13.2	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.674	1.463		17.5	20.1	-12.6	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9258	0.7995		17.7	20.5	-13.6	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9389	0.8637		18.1	19.7	-8.0	30.0
Perfluorononanoic acid (PFNA)	Ave	0.6642	0.6428		19.5	20.1	-3.2	30.0
13C2 PFHxA	Ave	1.100	1.039		9.44	10.0	-5.6	30.0
13C2 PFDA	Ave	0.7652	0.7391		9.66	10.0	-3.4	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_013.d
 Lims ID: ICV
 Client ID:
 Sample Type: ICV
 Inject. Date: 03-Nov-2017 14:20:03 ALS Bottle#: 7 Worklist Smp#: 13
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: ICV
 Misc. Info.: Plate: 1 Rack: 1
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Sublist:
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 07-Nov-2017 15:39:08 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last Ical File: \\ChromNA\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK021

First Level Reviewer: phomsophat

Date: 06-Nov-2017 07:27:24

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.442	1.444	-0.002	1.000	9960387	83.7		4998	
298.90 > 99.00	1.442	1.444	-0.002	1.000	7235967		1.38(0.00-0.00)	13514	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.571	1.573	-0.003	1.000	1570629	9.44		8393	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.722	1.725	-0.003	1.000	3517469	17.5		5659	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.722	1.725	-0.003	1.000	1229696	8.68		345	
* 6 13C2-PFOA									
415.00 > 370.00	1.904	1.913	-0.009		1512045	10.0		7643	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.904	1.914	-0.010	1.000	2476221	17.7		475	
413.00 > 169.00	1.904	1.914	-0.010	1.000	1327388		1.87(0.00-0.00)	1724	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.140	2.147	-0.007	1.000	2036944	18.1		2323	
499.00 > 99.00	2.140	2.147	-0.007	1.000	389736		5.23(0.00-0.00)	830	
* 7 13C4 PFOS									
503.00 > 80.00	2.140	2.151	-0.011		3433628	28.7		5334	
9 Perfluorononanoic acid									
463.00 > 419.00	2.147	2.158	-0.011	1.000	1956116	19.5		652	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.306	2.312	-0.006	1.000	1117553	9.66		6230	

Reagents:

LC537-ICV_00028

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_013.d

Injection Date: 03-Nov-2017 14:20:03

Instrument ID: A8_N

Lims ID: ICV

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 7

Worklist Smp#: 13

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

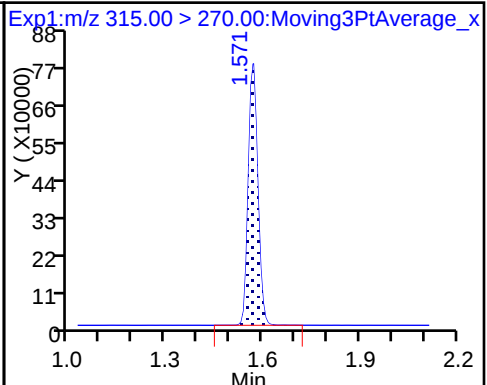
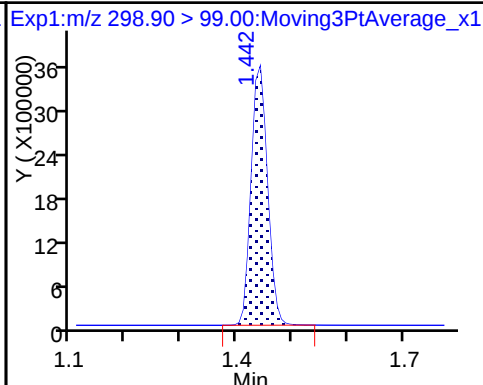
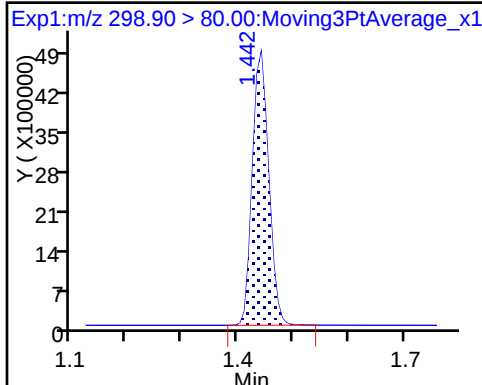
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

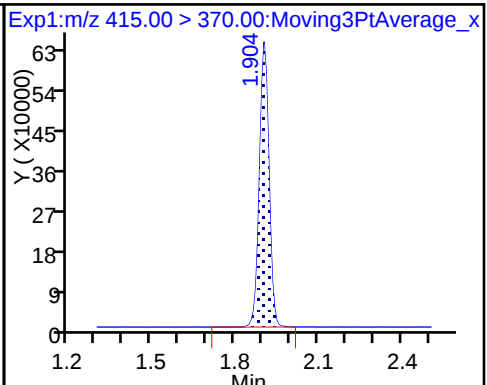
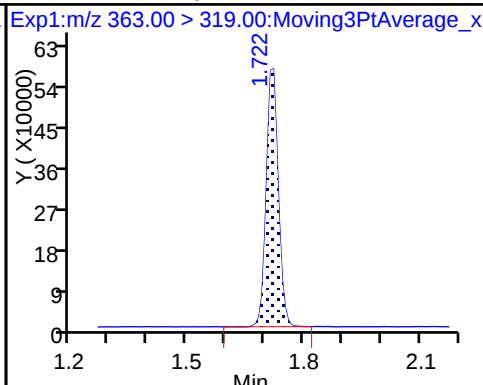
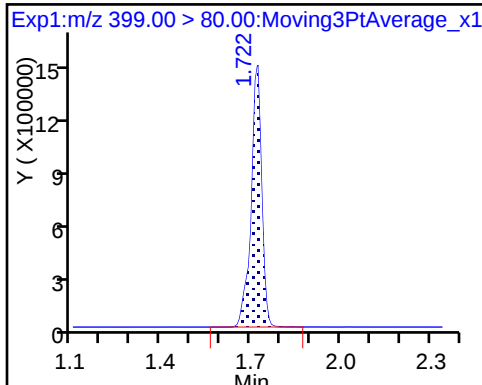
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

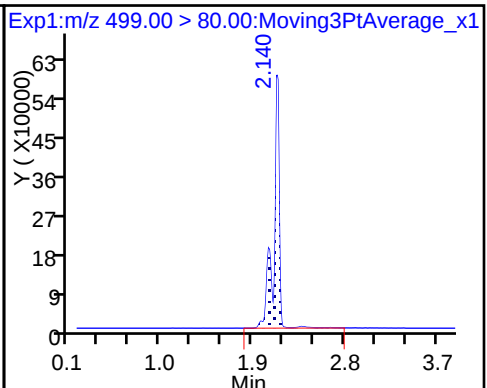
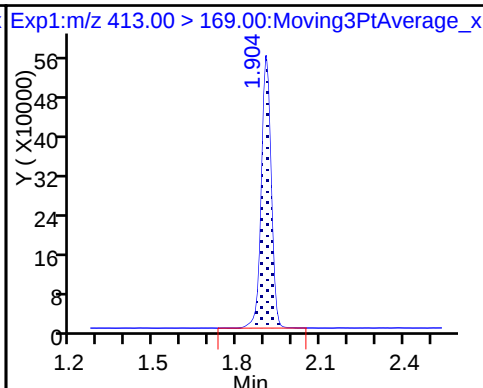
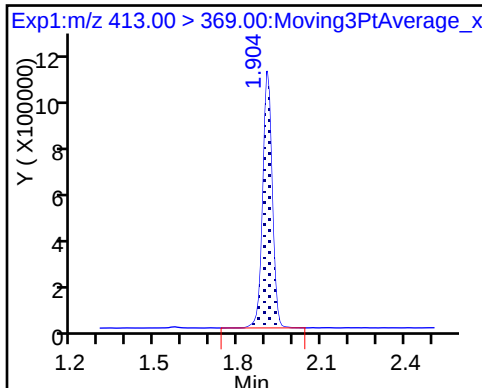
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

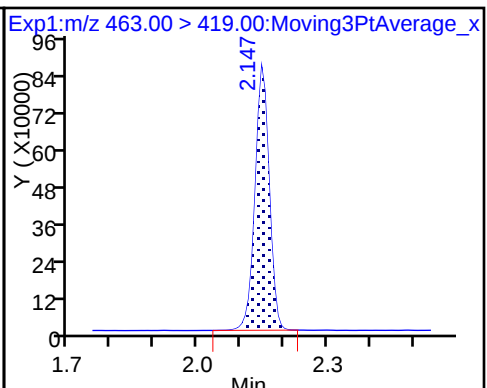
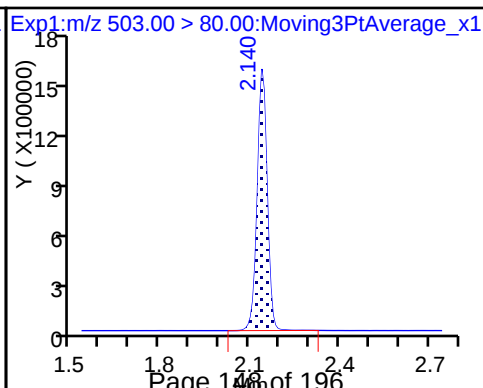
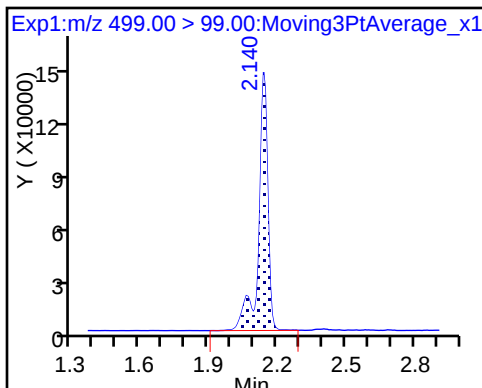
8 Perfluorooctane sulfonic acid



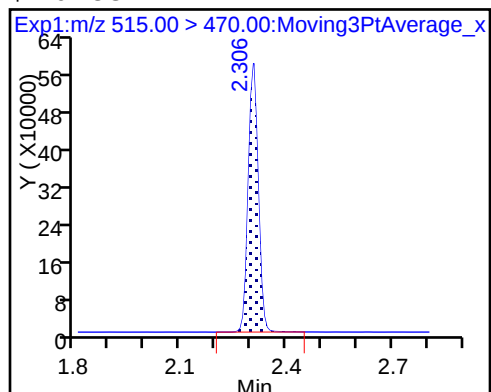
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Lab Sample ID: CCVL 320-192938/4 Calibration Date: 11/06/2017 07:01
 Instrument ID: A8_N Calib Start Date: 11/03/2017 13:37
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 11/03/2017 14:01
 Lab File ID: 2017.11.06_537A_004.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		1.052		19.3	20.0	-3.5	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.9369	0.8198		1.95	2.22	-12.5	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.674	1.594		6.35	6.67	-4.8	50.0
Perfluorooctanoic acid (PFOA)	Ave	0.9258	0.8734		4.20	4.45	-5.7	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9389	0.9137		8.65	8.89	-2.7	50.0
Perfluorononanoic acid (PFNA)	Ave	0.6642	0.6047		4.05	4.45	-8.9	50.0
13C2 PFHxA	Ave	1.100	0.9304		8.46	10.0	-15.4	30.0
13C2 PFDA	Ave	0.7652	0.7583		9.91	10.0	-0.9	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49991.b\2017.11.06_537A_004.d
 Lims ID: CCVL
 Client ID:
 Sample Type: CCVL
 Inject. Date: 06-Nov-2017 07:01:15 ALS Bottle#: 2 Worklist Smp#: 4
 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\20171106-49991.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 06-Nov-2017 12:33:13 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK016

First Level Reviewer: phomsophat

Date: 06-Nov-2017 08:00:22

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.464	1.464	0.0	1.000	2702173	19.3		1414	
298.90 > 99.00	1.464	1.464	0.0	1.000	1869282		1.45(0.00-0.00)	5130	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.601	1.601	0.0	1.000	1688105	8.46		13625	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.768	1.768	0.0	1.000	1365042	6.35		1769	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.768	1.768	0.0	1.000	330641	1.95		111	
* 6 13C2-PFOA									
415.00 > 370.00	1.973	1.973	0.0		1814410	10.0		8859	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.980	1.980	0.0	1.000	704877	4.20		132	
413.00 > 169.00	1.980	1.980	0.0	1.000	397700		1.77(0.00-0.00)	433	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.208	2.208	0.0	1.000	1043106	8.65		1115	
499.00 > 99.00	2.208	2.208	0.0	1.000	215129		4.85(0.00-0.00)	486	
* 7 13C4 PFOS									
503.00 > 80.00	2.208	2.208	0.0		3682390	28.7		6953	
9 Perfluorononanoic acid									
463.00 > 419.00	2.215	2.215	0.0	1.000	487754	4.05		180	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.352	2.352	0.0	1.000	1375856	9.91		8589	

Reagents:

LC537-L2_00020

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49991.b\2017.11.06_537A_004.d

Injection Date: 06-Nov-2017 07:01:15

Instrument ID: A8_N

Lims ID: CCVL

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 4

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

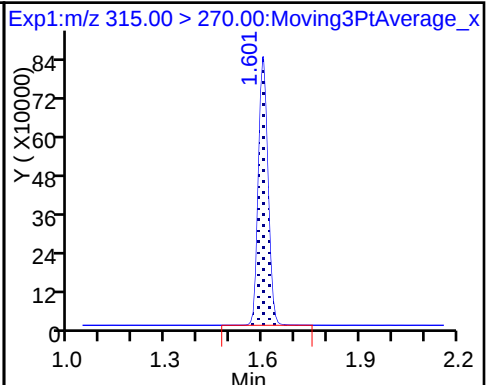
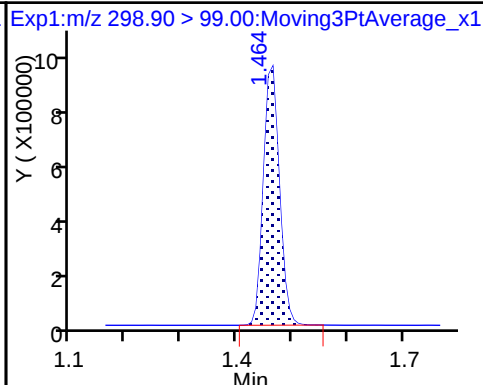
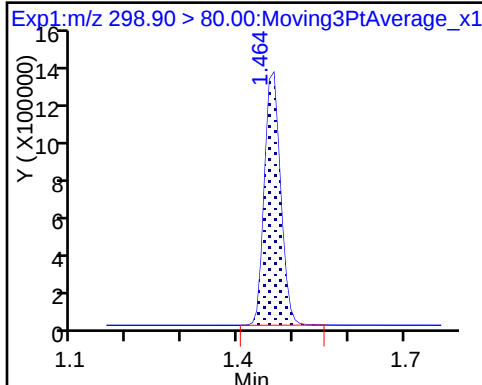
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

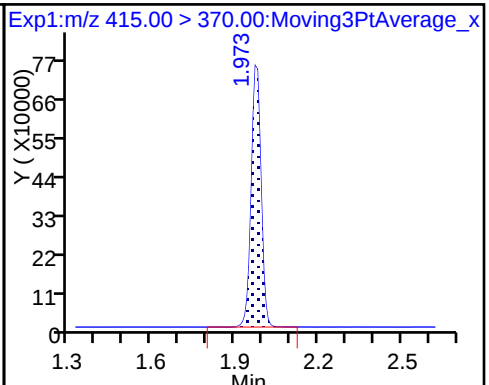
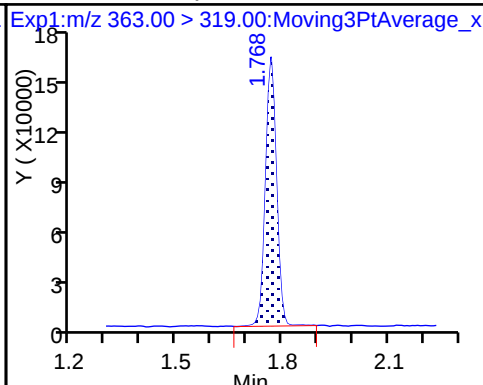
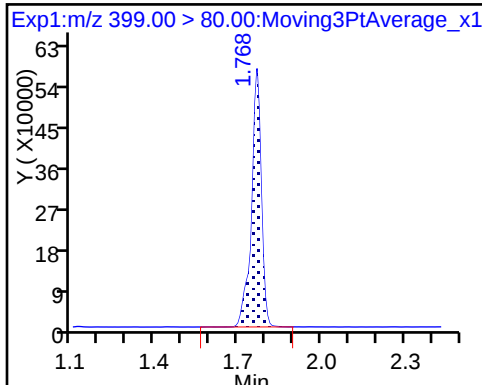
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

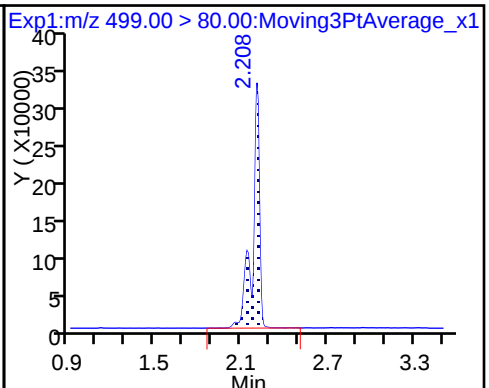
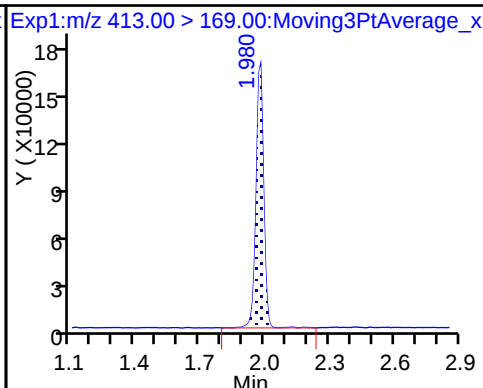
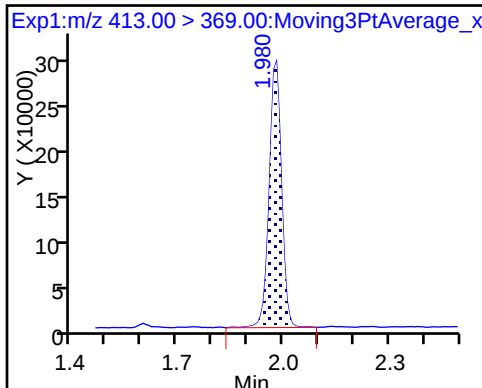
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

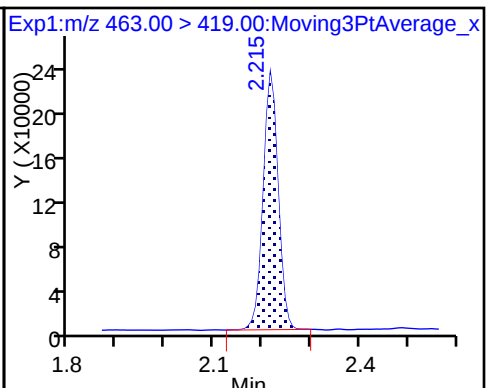
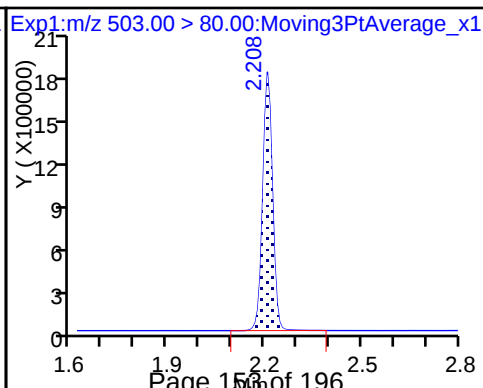
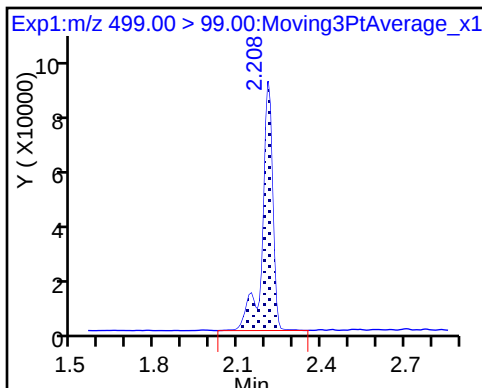
8 Perfluorooctane sulfonic acid



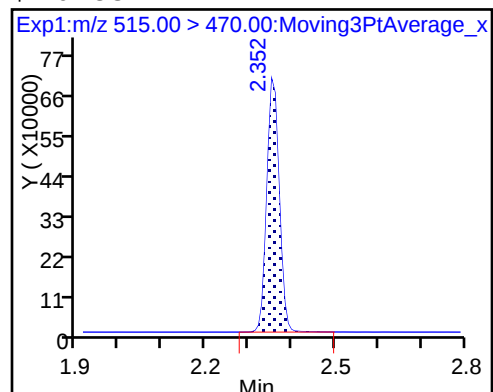
8 Perfluorooctane sulfonic acid

* 7 13C4 PFOS

9 Perfluorononanoic acid



\$ 10 13C2 PFDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Lab Sample ID: CCV 320-193089/1 Calibration Date: 11/06/2017 09:45
 Instrument ID: A8_N Calib Start Date: 11/03/2017 13:37
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 11/03/2017 14:01
 Lab File ID: 2017.11.06_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		1.053		45.1	45.0	0.1	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.9369	0.8908		4.75	5.00	-4.9	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.674	1.698		15.2	15.0	1.4	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9258	0.8532		9.22	10.0	-7.8	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9389	0.9207		19.6	20.0	-1.9	30.0
Perfluorononanoic acid (PFNA)	Ave	0.6642	0.6456		9.72	10.0	-2.8	30.0
13C2 PFHxA	Ave	1.100	1.044		9.49	10.0	-5.1	30.0
13C2 PFDA	Ave	0.7652	0.7648		9.99	10.0	-0.0	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_001.d
 Lims ID: CCV L3
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 06-Nov-2017 09:45:37 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\20171106-50019.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 07-Nov-2017 10:06:51 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK021

First Level Reviewer: barnettj

Date: 07-Nov-2017 10:03:54

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.442	1.444	-0.002	1.000	5715003	45.1		2729	
298.90 > 99.00	1.442	1.444	-0.002	1.000	4002468		1.43(0.00-0.00)	10005	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.573	0.005	1.000	1750440	9.49		11572	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.737	1.725	0.012	1.000	3071434	15.2		2779	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.737	1.725	0.012	1.000	747169	4.75		247	
* 6 13C2-PFOA									
415.00 > 370.00	1.927	1.913	0.014		1677167	10.0		7159	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.935	1.914	0.021	1.000	1432109	9.22		246	
413.00 > 169.00	1.935	1.914	0.021	1.000	783181		1.83(0.00-0.00)	605	
* 7 13C4 PFOS									
503.00 > 80.00	2.170	2.151	0.019		3457604	28.7		5485	
9 Perfluorononanoic acid									
463.00 > 419.00	2.177	2.158	0.019	1.000	1082974	9.72		381	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.170	2.162	0.008	1.000	2220460	19.6		2007	
499.00 > 99.00	2.170	2.162	0.008	1.000	460960		4.82(0.00-0.00)	1103	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.322	2.312	0.010	1.000	1282717	10.0		7806	

Reagents:

LC537-L3_00023

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_001.d

Injection Date: 06-Nov-2017 09:45:37

Instrument ID: A8_N

Lims ID: CCV L3

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 1

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

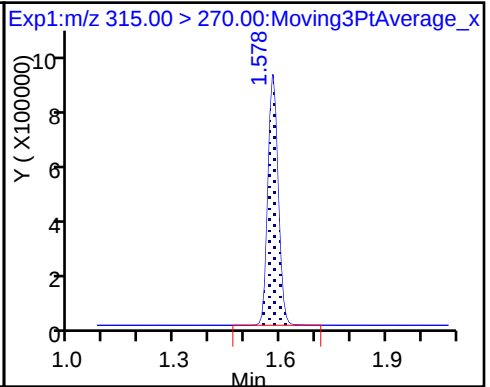
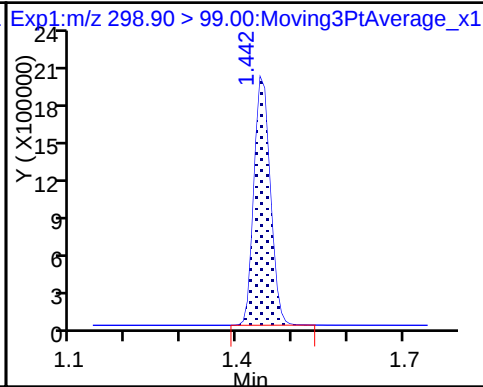
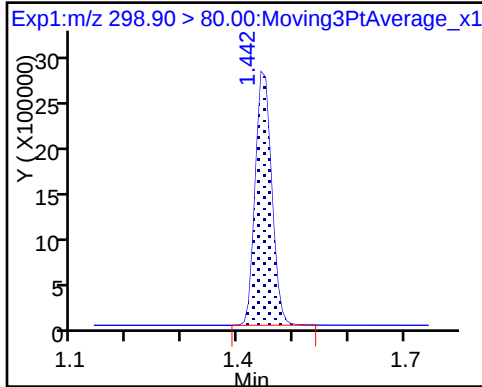
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

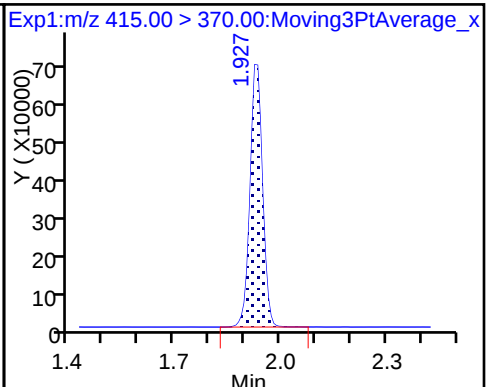
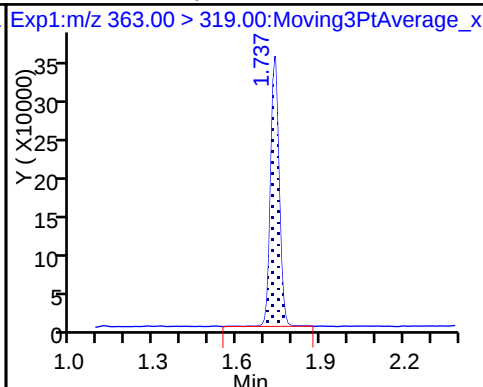
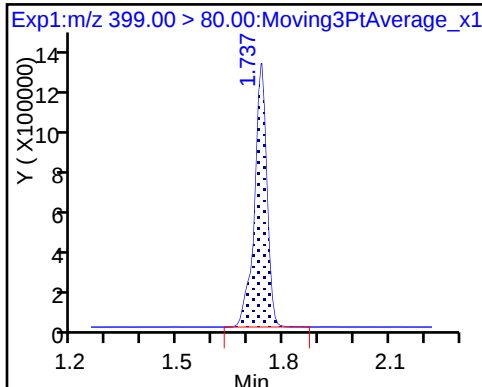
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

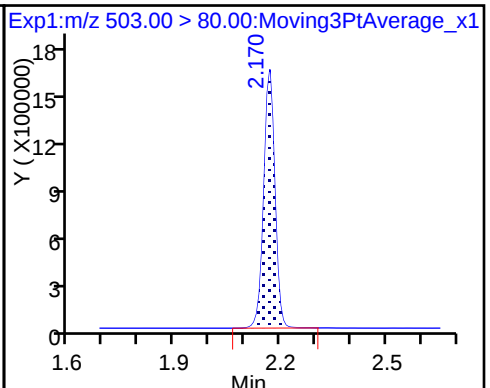
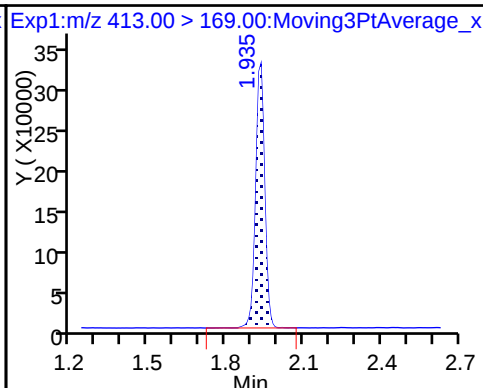
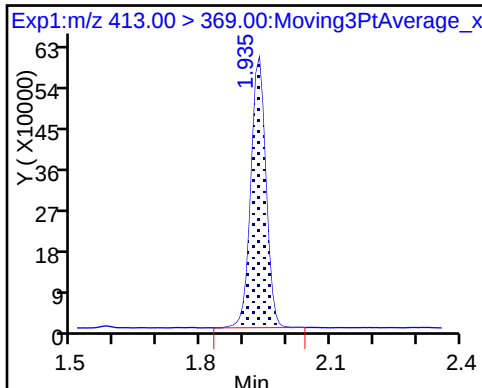
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

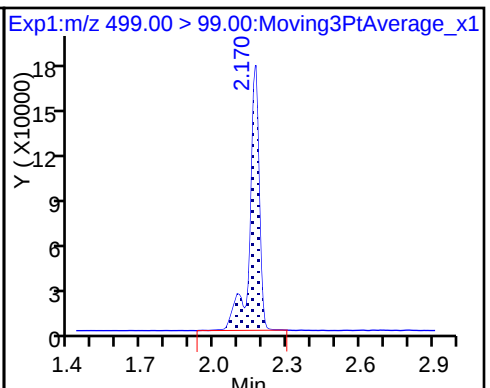
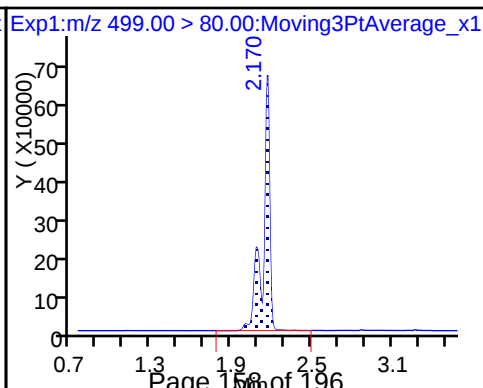
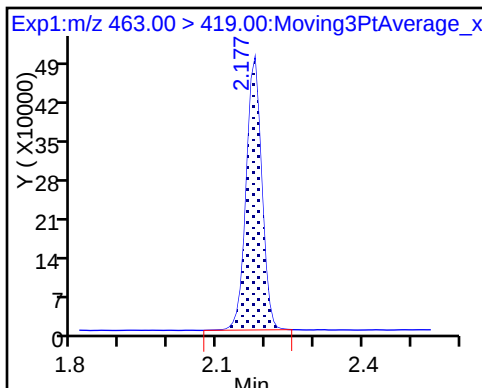
* 7 13C4 PFOS



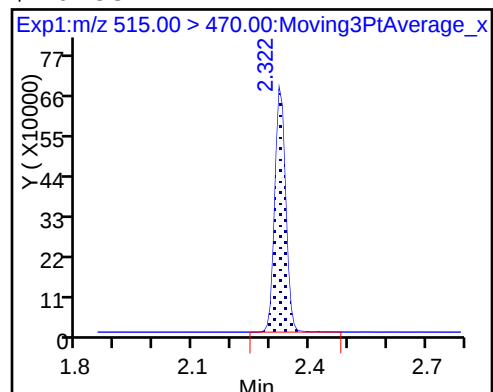
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Lab Sample ID: CCV 320-193089/8 Calibration Date: 11/06/2017 10:18
 Instrument ID: A8_N Calib Start Date: 11/03/2017 13:37
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 11/03/2017 14:01
 Lab File ID: 2017.11.06_537B_008.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		0.8784		128	135	-5.3	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.9369	0.9141		14.6	15.0	-2.4	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.674	1.628		43.8	45.0	-2.8	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9258	0.9160		29.7	30.0	-1.1	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9389	0.9362		59.8	60.0	-0.3	30.0
Perfluorononanoic acid (PFNA)	Ave	0.6642	0.6966		31.5	30.0	4.9	30.0
13C2 PFHxA	Ave	1.100	1.091		9.92	10.0	-0.8	30.0
13C2 PFDA	Ave	0.7652	0.7932		10.4	10.0	3.7	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_008.d
 Lims ID: CCV L5
 Client ID:
 Sample Type: CCVIS
 Inject. Date: 06-Nov-2017 10:18:24 ALS Bottle#: 5 Worklist Smp#: 8
 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\20171106-50019.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 07-Nov-2017 10:06:57 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK021

First Level Reviewer: barnettj

Date: 07-Nov-2017 10:04:09

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	1.444	-0.002	1.000	14332241	127.8		5863	
298.90 > 99.00	1.442	1.444	-0.002	1.000	10741026		1.33(0.00-0.00)	17012	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.573	0.005	1.000	1762171	9.92		11177	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.730	1.725	0.005	1.000	8853007	43.8		6531	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.730	1.725	0.005	1.000	2214864	14.6		669	
* 6 13C2-PFOA									
415.00 > 370.00	1.927	1.913	0.014		1614908	10.0		7285	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.927	1.914	0.013	1.000	4441384	29.7		739	
413.00 > 169.00	1.927	1.914	0.013	1.000	2402032		1.85(0.00-0.00)	1731	
* 7 13C4 PFOS									
503.00 > 80.00	2.162	2.151	0.011		3465963	28.7		5263	
9 Perfluorononanoic acid									
463.00 > 419.00	2.170	2.158	0.012	1.000	3375566	31.5		1029	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.162	2.162	0.0	1.000	6790009	59.8		4116	
499.00 > 99.00	2.162	2.162	0.0	1.000	1404389		4.83(0.00-0.00)	2207	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.322	2.312	0.010	1.000	1280900	10.4		7264	

Reagents:

LC537-L5_00024

Amount Added: 1.00

Units: mL

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_008.d

Injection Date: 06-Nov-2017 10:18:24

Instrument ID: A8_N

Lims ID: CCV L5

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 5

Worklist Smp#: 8

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

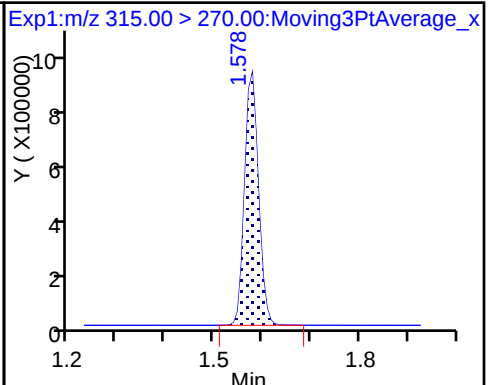
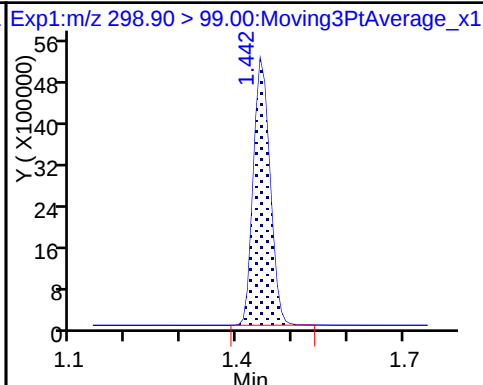
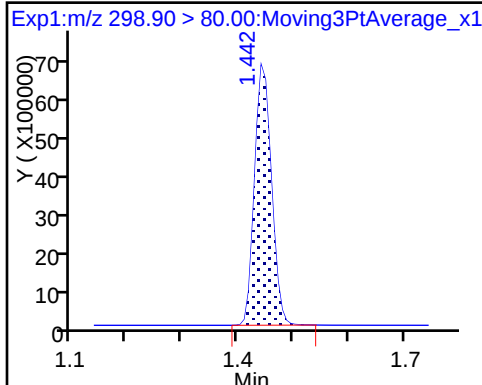
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

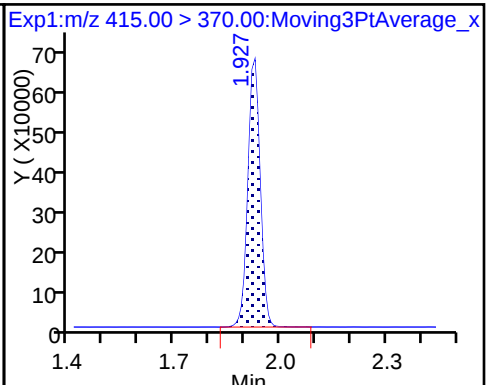
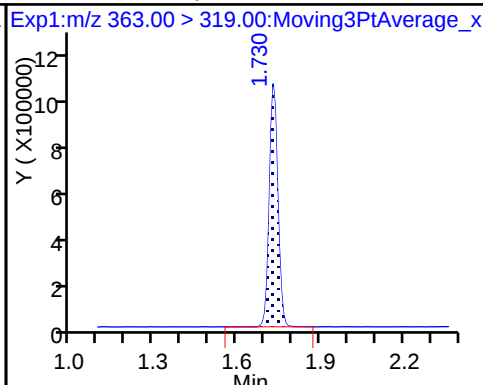
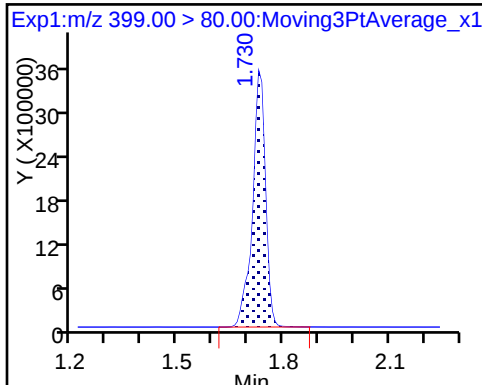
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

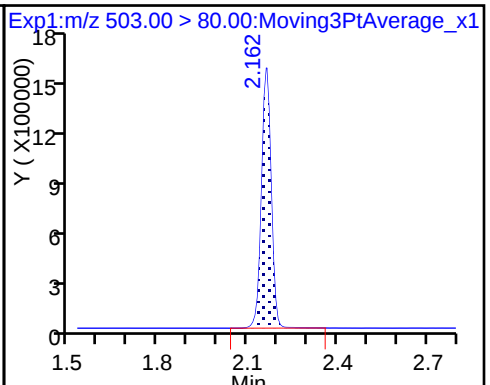
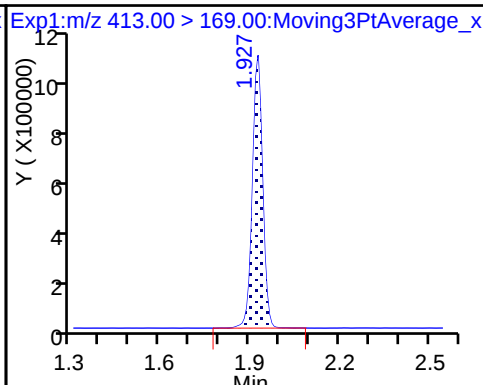
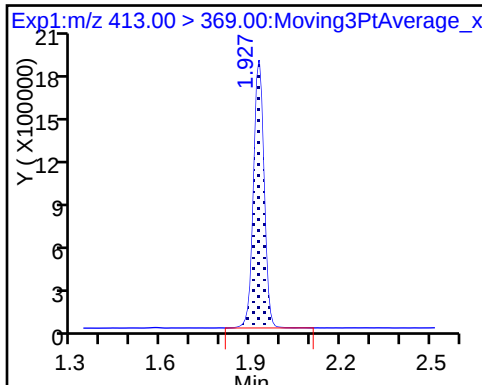
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

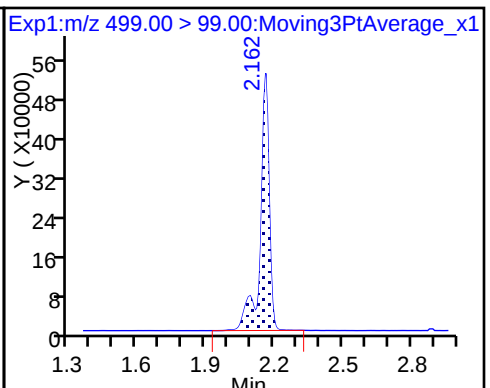
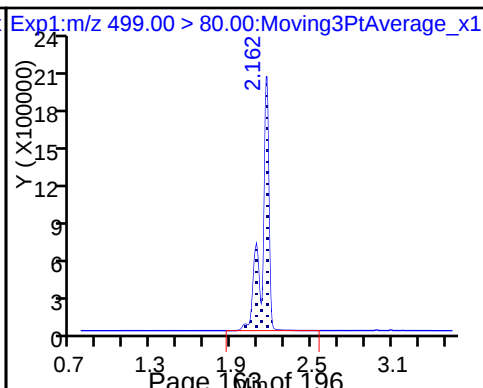
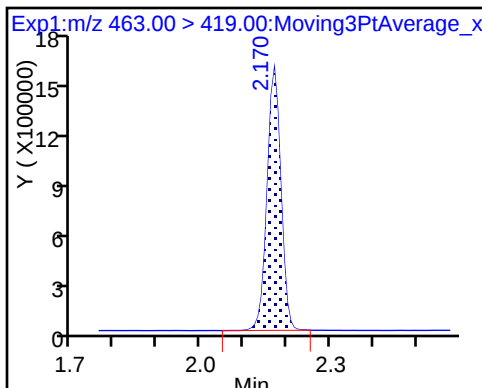
* 7 13C4 PFOS



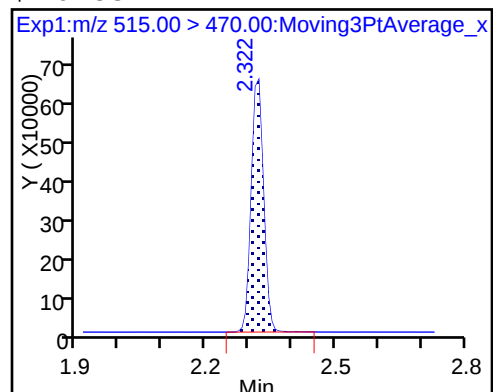
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: MB 320-191373/1-A
 Matrix: Water Lab File ID: 2017.11.06_537B_003.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 10/27/2017 08:32
 Sample wt/vol: 250.00 (mL) Date Analyzed: 11/06/2017 09:54
 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.: 193089 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	90		70-130
STL00996	13C2 PFDA	95		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_003.d
 Lims ID: MB 320-191373/1-A
 Client ID:
 Sample Type: MB
 Inject. Date: 06-Nov-2017 09:54:57 ALS Bottle#: 1 Worklist Smp#: 3
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: mb 320-191373/1-a
 Misc. Info.: Plate: 1 Rack: 3
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 07-Nov-2017 10:06:51 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK021

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.573	0.005	1.000	1591300	8.97		10863	
* 6 13C2-PFOA									
415.00 > 370.00	1.935	1.913	0.022		1611516	10.0		6501	
* 7 13C4 PFOS									
503.00 > 80.00	2.170	2.151	0.019		3678207	28.7		6181	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.322	2.312	0.010	1.000	1170470	9.49		8314	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_003.d

Injection Date: 06-Nov-2017 09:54:57

Instrument ID: A8_N

Lims ID: MB 320-191373/1-A

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 1

Worklist Smp#: 3

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

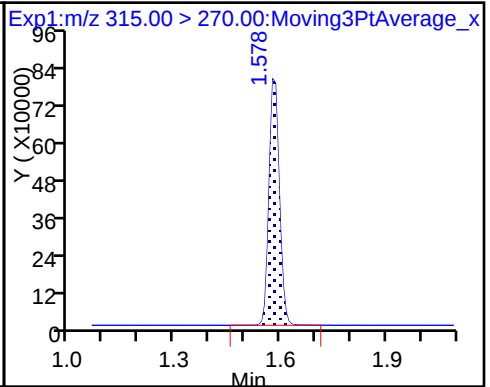
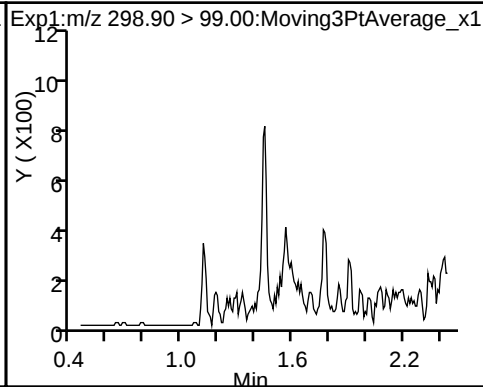
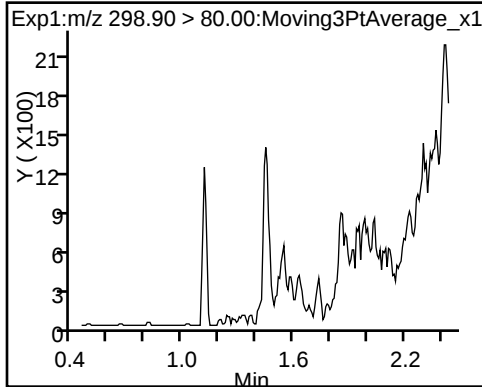
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid (ND)

1 Perfluorobutanesulfonic acid (ND)

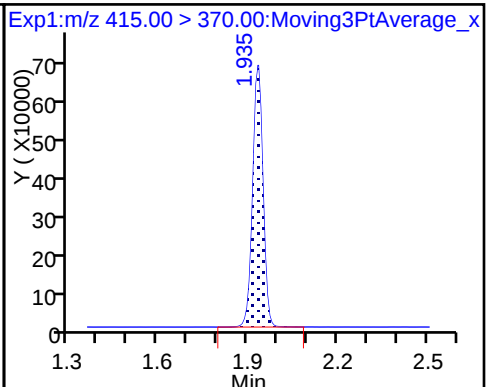
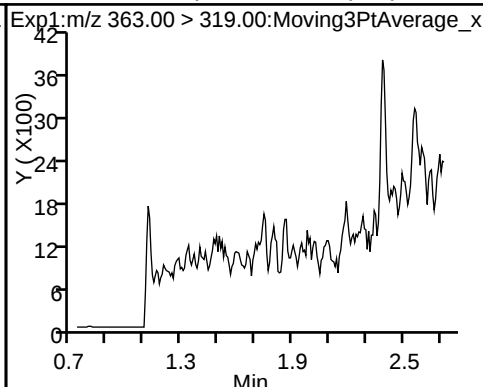
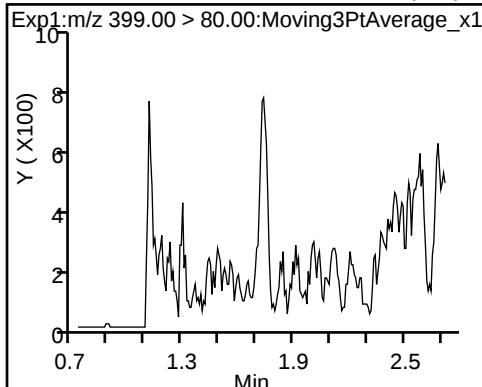
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid (ND)

4 Perfluoroheptanoic acid (ND)

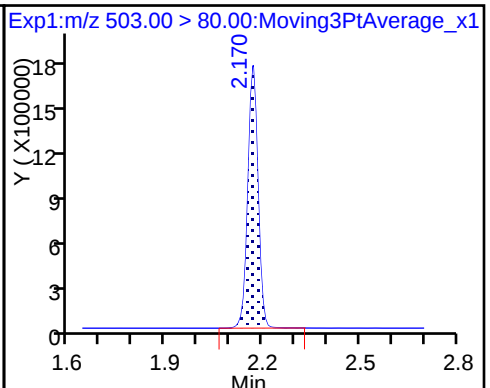
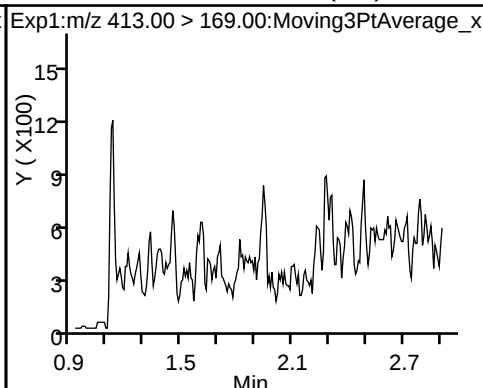
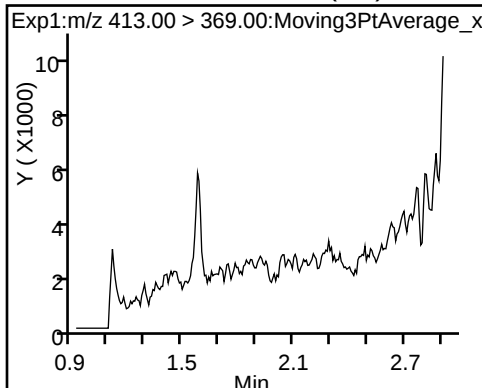
* 6 13C2-PFOA



5 Perfluorooctanoic acid (ND)

5 Perfluorooctanoic acid (ND)

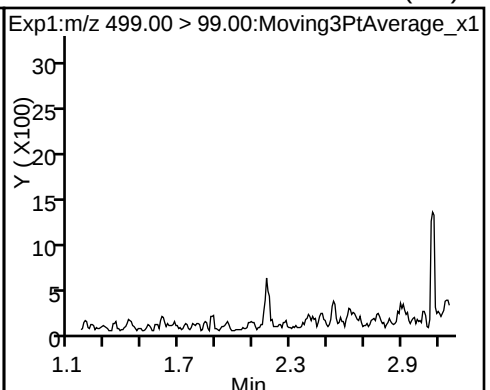
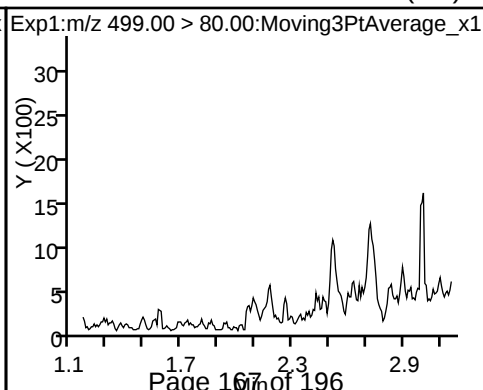
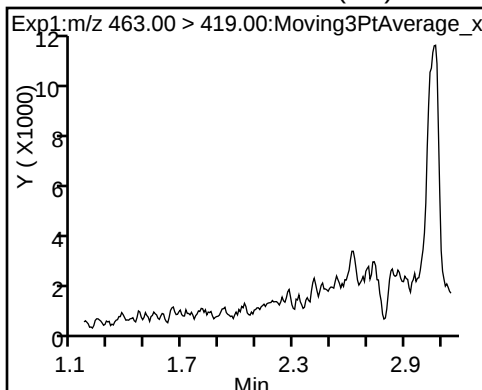
* 7 13C4 PFOS



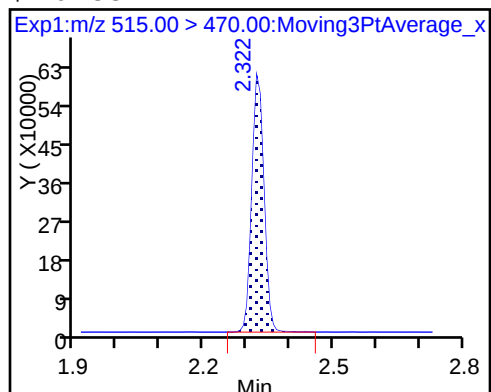
9 Perfluorononanoic acid (ND)

8 Perfluorooctane sulfonic acid (ND)

8 Perfluorooctane sulfonic acid (ND)



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_003.d
Lims ID: MB 320-191373/1-A
Client ID:
Sample Type: MB
Inject. Date: 06-Nov-2017 09:54:57 ALS Bottle#: 1 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-191373/1-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Method: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 07-Nov-2017 10:06:51 Calib Date: 03-Nov-2017 14:01:24
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d

Column 1 : Det: EXP1

Process Host: XAWRK021

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	8.97	89.75
\$ 10 13C2 PFDA	10.0	9.49	94.92

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: LLCS 320-191373/2-A
 Matrix: Water Lab File ID: 2017.11.06_537B_004.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 10/27/2017 08:32
 Sample wt/vol: 250.00 (mL) Date Analyzed: 11/06/2017 09:59
 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.: 193089 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	36.7	J	40	16	6.8
335-67-1	Perfluorooctanoic acid (PFOA)	20.2		20	8.0	2.8
375-95-1	Perfluorononanoic acid (PFNA)	20.9	J	24	20	8.0
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	29.5	J	30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	10.6		10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	86.4	J	90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	93		70-130
STL00996	13C2 PFDA	98		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_004.d
 Lims ID: LLCS 320-191373/2-A
 Client ID:
 Sample Type: LLCS
 Inject. Date: 06-Nov-2017 09:59:39 ALS Bottle#: 2 Worklist Smp#: 4
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: llcs 320-191373/2-a
 Misc. Info.: Plate: 1 Rack: 3
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 07-Nov-2017 10:06:51 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK021

First Level Reviewer: barnettj

Date: 07-Nov-2017 10:04:45

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.449	1.444	0.005	1.000	3040443	21.6		1602	
298.90 > 99.00	1.449	1.444	0.005	1.000	2206949		1.38(0.00-0.00)	4517	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.573	0.005	1.000	1654616	9.33		9683	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.737	1.725	0.012	1.000	1601049	7.39		1545	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.737	1.725	0.012	1.000	399131	2.64		133	
* 6 13C2-PFOA									
415.00 > 370.00	1.927	1.913	0.014		1611740	10.0		7321	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.935	1.914	0.021	1.000	754386	5.06		127	
413.00 > 169.00	1.935	1.914	0.021	1.000	404204		1.87(0.00-0.00)	365	
* 7 13C4 PFOS									
503.00 > 80.00	2.170	2.151	0.019		3712956	28.7		6273	
9 Perfluorononanoic acid									
463.00 > 419.00	2.177	2.158	0.019	1.000	559255	5.22		156	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.170	2.162	0.008	1.000	1114753	9.17		741	
499.00 > 99.00	2.170	2.162	0.008	1.000	233314		4.78(0.00-0.00)	384	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.322	2.312	0.010	1.000	1213932	9.84		8069	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_004.d

Injection Date: 06-Nov-2017 09:59:39

Instrument ID: A8_N

Lims ID: LLCS 320-191373/2-A

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 2

Worklist Smp#: 4

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

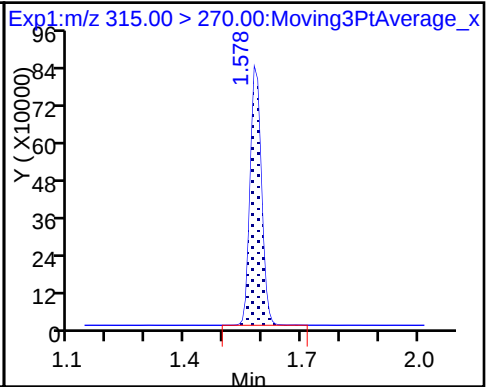
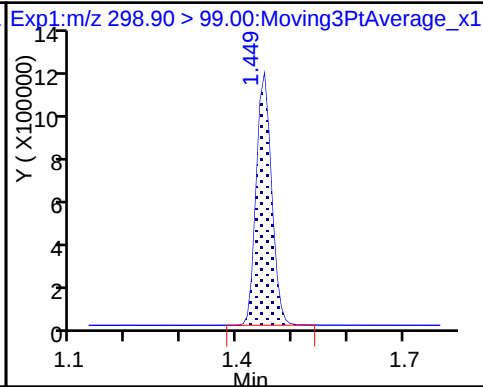
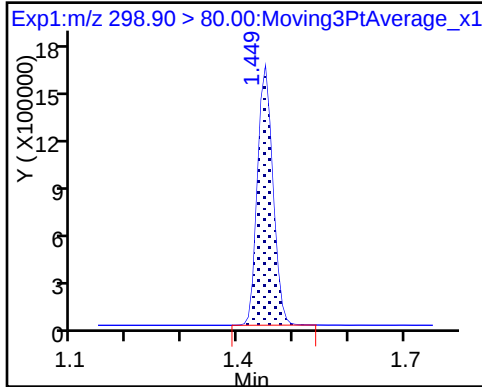
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

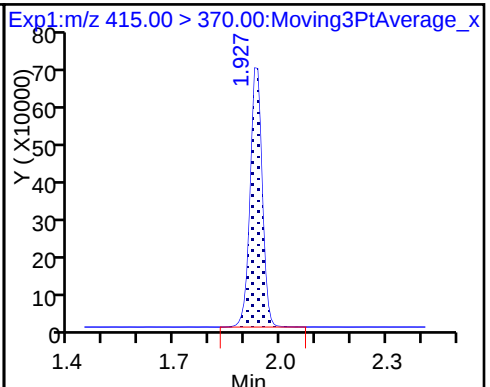
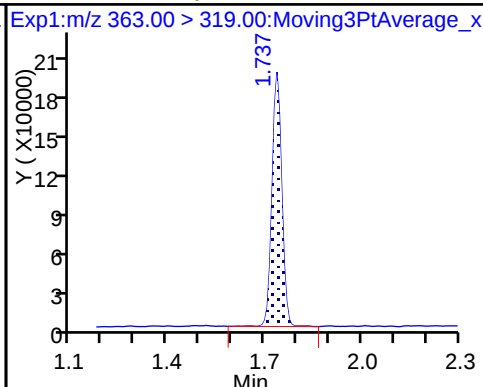
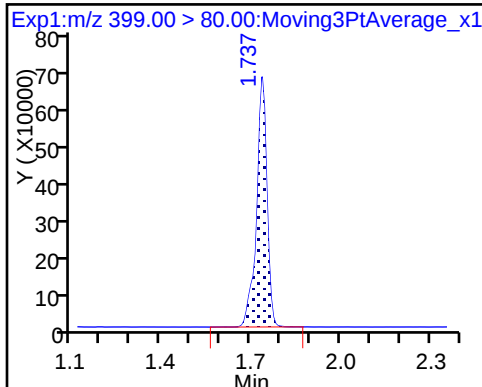
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

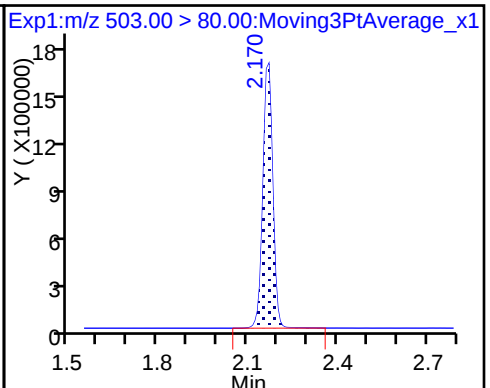
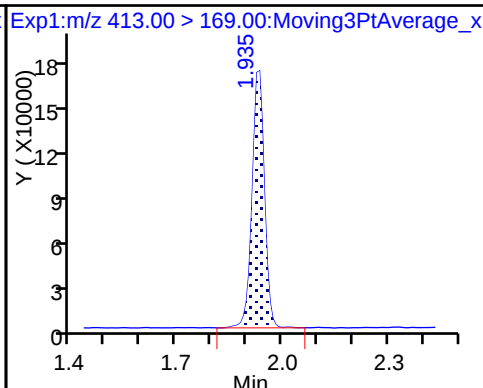
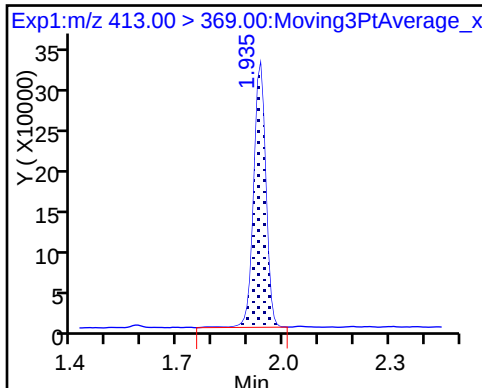
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

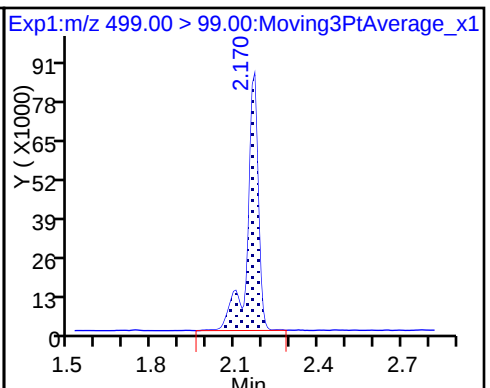
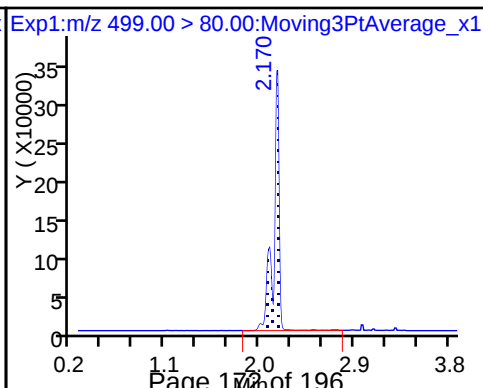
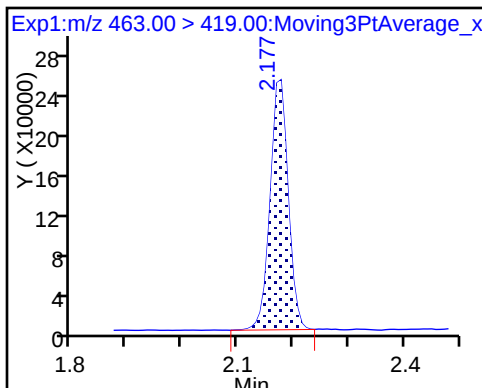
* 7 13C4 PFOS



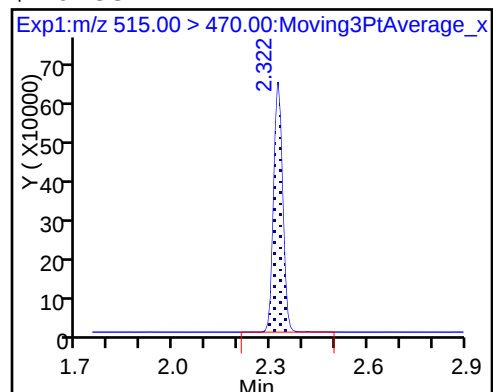
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_004.d
Lims ID: LLCs 320-191373/2-A
Client ID:
Sample Type: LLCs
Inject. Date: 06-Nov-2017 09:59:39 ALS Bottle#: 2 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: llcs 320-191373/2-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Method: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 07-Nov-2017 10:06:51 Calib Date: 03-Nov-2017 14:01:24
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d
Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj

Date: 07-Nov-2017 10:04:45

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	9.33	93.30
\$ 10 13C2 PFDA	10.0	9.84	98.43

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: LLCSD 320-191373/3-A
 Matrix: Water Lab File ID: 2017.11.06_537B_005.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 10/27/2017 08:32
 Sample wt/vol: 250.00 (mL) Date Analyzed: 11/06/2017 10:04
 Con. Extract Vol.: 1.00 (mL) Dilution Factor: 1
 Injection Volume: 2 (uL) GC Column: GeminiC18 3x100 ID: 3 (mm)
 % Moisture: _____ GPC Cleanup: (Y/N) N
 Analysis Batch No.: 193089 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	34.7	J	40	16	6.8
335-67-1	Perfluorooctanoic acid (PFOA)	18.7	J	20	8.0	2.8
375-95-1	Perfluorononanoic acid (PFNA)	19.5	J	24	20	8.0
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	26.8	J	30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	9.85	J	10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	81.0	J	90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	86		70-130
STL00996	13C2 PFDA	95		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_005.d
 Lims ID: LLCSD 320-191373/3-A
 Client ID:
 Sample Type: LLCSD
 Inject. Date: 06-Nov-2017 10:04:20 ALS Bottle#: 3 Worklist Smp#: 5
 Injection Vol: 2.0 ul Dil. Factor: 1.0000
 Sample Info: llcsd 320-191373/3-a
 Misc. Info.: Plate: 1 Rack: 3
 Operator ID: SACINSTLCMS01 Instrument ID: A8_N
 Method: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\537_A8_N.m
 Limit Group: LC 537 ICAL
 Last Update: 07-Nov-2017 10:06:51 Calib Date: 03-Nov-2017 14:01:24
 Integrator: Picker
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d
 Column 1 : Det: EXP1
 Process Host: XAWRK021

First Level Reviewer: barnettj

Date: 07-Nov-2017 10:05:12

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	1.444	0.005	1.000	2893829	20.2		1548	
298.90 > 99.00	1.449	1.444	0.005	1.000	1997161		1.45(0.00-0.00)	4355	
\$ 2 13C2 PFHxA									
315.00 > 270.00	1.578	1.573	0.005	1.000	1573061	8.62		11166	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.737	1.725	0.012	1.000	1474179	6.71		1131	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.737	1.725	0.012	1.000	382539	2.46		124	
* 6 13C2-PFOA									
415.00 > 370.00	1.927	1.913	0.014		1657607	10.0		8528	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.927	1.914	0.013	1.000	718747	4.68		124	
413.00 > 169.00	1.927	1.914	0.013	1.000	386871		1.86(0.00-0.00)	390	
* 7 13C4 PFOS									
503.00 > 80.00	2.162	2.151	0.011		3765246	28.7		5602	
9 Perfluorononanoic acid									
463.00 > 419.00	2.170	2.158	0.012	1.000	537644	4.88		155	
8 Perfluorooctane sulfonic acid									
499.00 > 80.00	2.170	2.162	0.008	1.000	1068390	8.67		972	
499.00 > 99.00	2.162	2.162	0.0	0.996	223908		4.77(0.00-0.00)	552	
\$ 10 13C2 PFDA									
515.00 > 470.00	2.322	2.312	0.010	1.000	1206025	9.51		8834	

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_005.d

Injection Date: 06-Nov-2017 10:04:20

Instrument ID: A8_N

Lims ID: LLCSD 320-191373/3-A

Client ID:

Operator ID: SACINSTLCMS01

ALS Bottle#: 3

Worklist Smp#: 5

Injection Vol: 2.0 ul

Dil. Factor: 1.0000

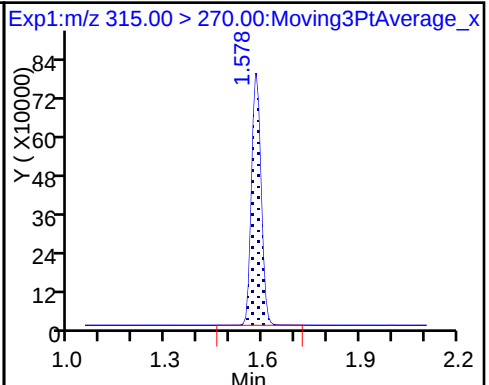
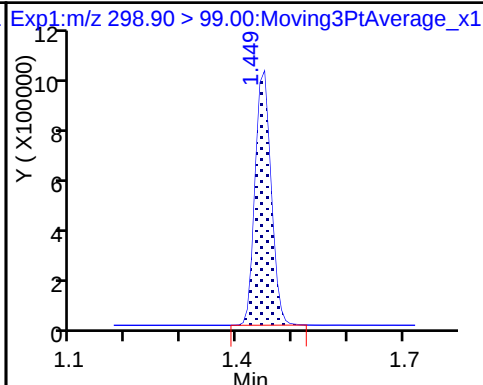
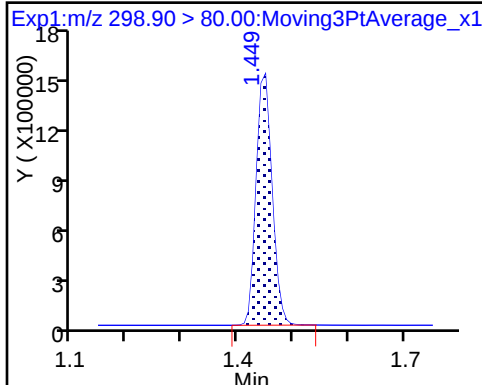
Method: 537_A8_N

Limit Group: LC 537 ICAL

1 Perfluorobutanesulfonic acid

1 Perfluorobutanesulfonic acid

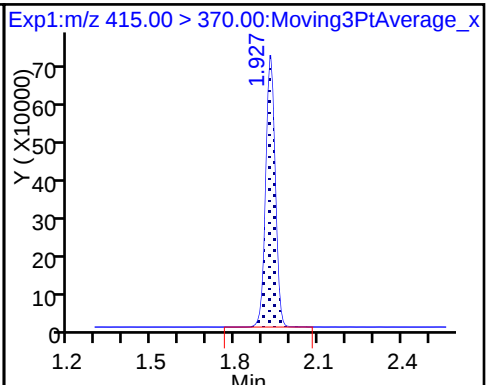
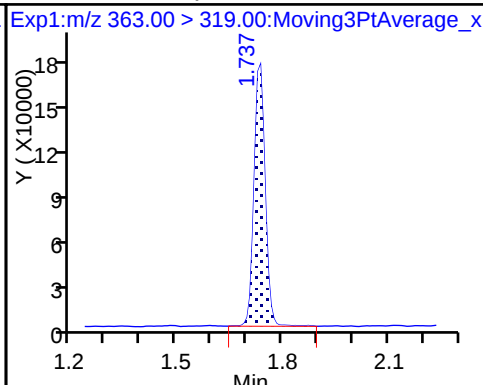
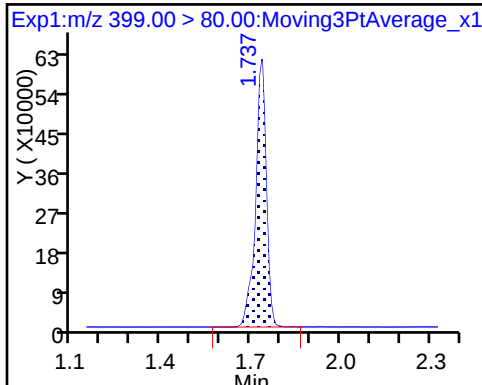
\$ 2 13C2 PFHxA



3 Perfluorohexanesulfonic acid

4 Perfluoroheptanoic acid

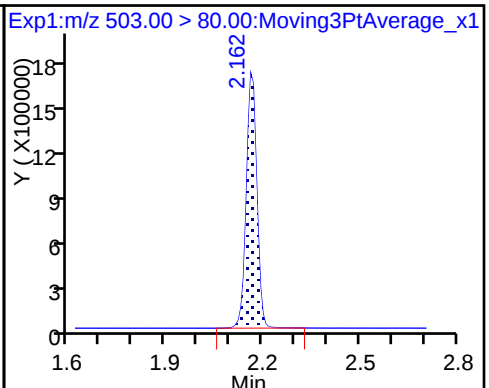
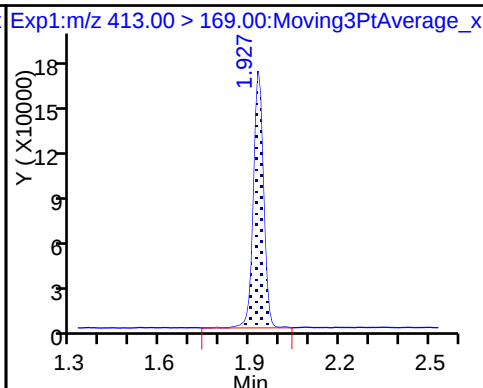
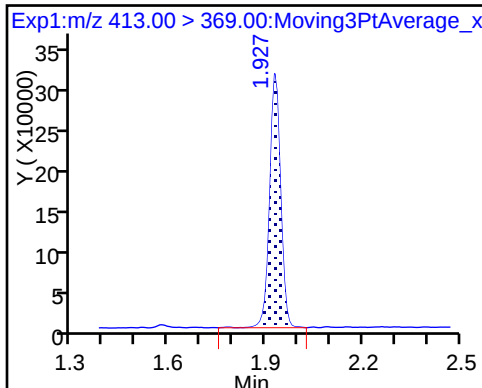
* 6 13C2-PFOA



5 Perfluorooctanoic acid

5 Perfluorooctanoic acid

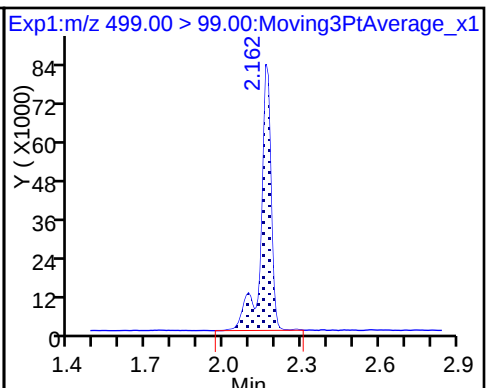
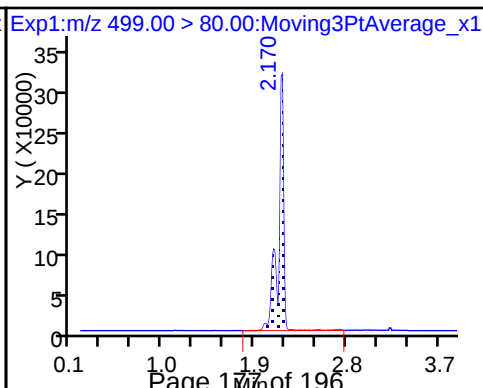
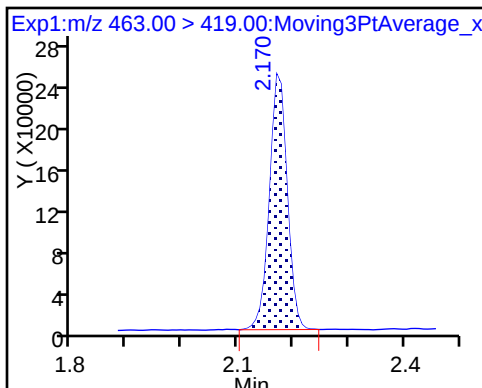
* 7 13C4 PFOS



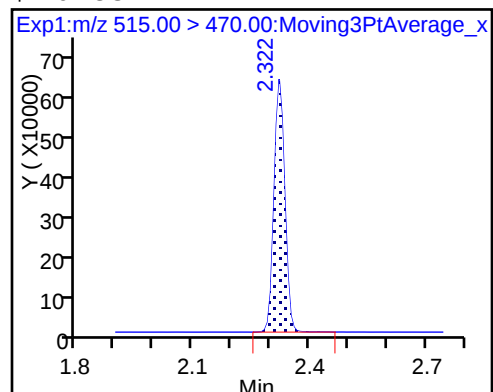
9 Perfluorononanoic acid

8 Perfluorooctane sulfonic acid

8 Perfluorooctane sulfonic acid



\$ 10 13C2 PFDA



TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\2017.11.06_537B_005.d
Lims ID: LLCSD 320-191373/3-A
Client ID:
Sample Type: LLCSD
Inject. Date: 06-Nov-2017 10:04:20 ALS Bottle#: 3 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: llcsd 320-191373/3-a
Misc. Info.: Plate: 1 Rack: 3
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Method: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 07-Nov-2017 10:06:51 Calib Date: 03-Nov-2017 14:01:24
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20171106-49975.b\2017.11.03_537XICAL_009.d
Column 1 : Det: EXP1
Process Host: XAWRK021

First Level Reviewer: barnettj

Date: 07-Nov-2017 10:05:12

Compound	Amount Added	Amount Recovered	% Rec.
\$ 2 13C2 PFHxA	10.0	8.62	86.25
\$ 10 13C2 PFDA	10.0	9.51	95.08

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-32676-1

SDG No.: _____

Instrument ID: A8_NStart Date: 11/03/2017 13:37Analysis Batch Number: 192908End Date: 11/03/2017 14:24

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-192908/4		11/03/2017 13:37	1	2017.11.03_537X ICAL 004.d	GeminiC18 3x100 3(mm)
IC 320-192908/5		11/03/2017 13:42	1	2017.11.03_537X ICAL 005.d	GeminiC18 3x100 3(mm)
IC 320-192908/6		11/03/2017 13:47	1	2017.11.03_537X ICAL 006.d	GeminiC18 3x100 3(mm)
IC 320-192908/7 ICISAV		11/03/2017 13:52	1	2017.11.03_537X ICAL 007.d	GeminiC18 3x100 3(mm)
IC 320-192908/8		11/03/2017 13:56	1	2017.11.03_537X ICAL 008.d	GeminiC18 3x100 3(mm)
IC 320-192908/9		11/03/2017 14:01	1	2017.11.03_537X ICAL 009.d	GeminiC18 3x100 3(mm)
ZZZZZ		11/03/2017 14:06	1		GeminiC18 3x100 3(mm)
CCVL 320-192908/11		11/03/2017 14:10	1		GeminiC18 3x100 3(mm)
ZZZZZ		11/03/2017 14:15	1		GeminiC18 3x100 3(mm)
ICV 320-192908/13		11/03/2017 14:20	1	2017.11.03_537X ICAL 013.d	GeminiC18 3x100 3(mm)
ZZZZZ		11/03/2017 14:24	1		GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1

SDG No.: _____

Instrument ID: A8_N Start Date: 11/06/2017 07:01Analysis Batch Number: 192938 End Date: 11/06/2017 07:01

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-192938/4		11/06/2017 07:01	1	2017.11.06_537A 004.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1

SDG No.: _____

Instrument ID: A8_N Start Date: 11/06/2017 09:45Analysis Batch Number: 193089 End Date: 11/06/2017 10:18

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-193089/1 CCVIS		11/06/2017 09:45	1	2017.11.06_537B 001.d	GeminiC18 3x100 3(mm)
ZZZZZ		11/06/2017 09:50	1		GeminiC18 3x100 3(mm)
MB 320-191373/1-A		11/06/2017 09:54	1	2017.11.06_537B 003.d	GeminiC18 3x100 3(mm)
LLCS 320-191373/2-A		11/06/2017 09:59	1	2017.11.06_537B 004.d	GeminiC18 3x100 3(mm)
LLCSD 320-191373/3-A		11/06/2017 10:04	1	2017.11.06_537B 005.d	GeminiC18 3x100 3(mm)
320-32676-1		11/06/2017 10:09	1	2017.11.06_537B 006.d	GeminiC18 3x100 3(mm)
320-32676-2		11/06/2017 10:13	1	2017.11.06_537B 007.d	GeminiC18 3x100 3(mm)
CCV 320-193089/8 CCVIS		11/06/2017 10:18	1	2017.11.06_537B 008.d	GeminiC18 3x100 3(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1

SDG No.: _____

Batch Number: 191373 Batch Start Date: 10/27/17 08:32 Batch Analyst: Santos, JonathanBatch Method: 537 Batch End Date: 10/27/17 16:53

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-IS 00051
MB 320-191373/1		537, 537				250.00 mL	1.00 mL	7 SU	100 uL
LLCS 320-191373/2		537, 537				250.00 mL	1.00 mL	7 SU	100 uL
LLCSD 320-191373/3		537, 537				250.00 mL	1.00 mL	7 SU	100 uL
320-32676-A-1	WGNA-102417-RW-4 829	537, 537	T	262.62 g	27.53 g	235.1 mL	1.00 mL	7 SU	100 uL
320-32676-A-2	WGNA-102417-FRB- 4829	537, 537	T	287.18 g	26.94 g	260.2 mL	1.00 mL	7 SU	100 uL

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-LSP 00025	LC537-SU 00050	AnalysisComment			
MB 320-191373/1		537, 537			100 uL	Ch ND			
LLCS 320-191373/2		537, 537		100 uL	100 uL	Ch ND			
LLCSD 320-191373/3		537, 537		100 uL	100 uL	Ch ND			
320-32676-A-1	WGNA-102417-RW-4 829	537, 537	T		100 uL	Ch ND			
320-32676-A-2	WGNA-102417-FRB- 4829	537, 537	T		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.: 320-32676-1

SDG No.: _____

Batch Number: 191373 Batch Start Date: 10/27/17 08:32 Batch Analyst: Santos, JonathanBatch Method: 537 Batch End Date: 10/27/17 16:53

Batch Notes	
Analyst ID - Aliquot Step	TQN
Analyst ID - Concentration	CCB
Analyst ID - Final Volume Step	TQN
Internal Standard ID#	1041860
Manifold ID	7
Methanol ID	1071552
Pipette ID	N32761F
Analyst ID - IS Reagent Drop	TQN
Analyst ID - IS Reagent Drop Witness	TWL
Analyst ID - SU Reagent Drop	JNS
Analyst ID - SU Reagent Drop Witness	CCB
Analyst ID - TA Reagent Drop	JNS
Analyst ID - TA Reagent Drop Witness	CCB
SPE Cartridge ID	6357081-09
Trizma ID	SLBR4303V
Reagent Water ID	10/25/17

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: 32676 Instrument ID & Date: 11-6-17 ICAL Batch: 192908

Extraction Batch: 191373 Worklist #: 50019 TALS Batch: 193089

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? <u>192938</u>	✓			✓
3. Native compounds and surrogates in control? Low-range within $\pm 50\%$ of true value Mid and High-range within $\pm 30\%$ of true value	✓			✓
4. Internal Standard areas in control? Areas $\geq 50\%$ 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? $\pm 50\%$ from the average area of the ICAL and 70-140% of the most recent CCV	✓			✓
8. Do results (e.g., dilutions/trip blanks) make sense?	✓			✓
9. Are MS/MSD recoveries and RPDs within method control limits?			✓	
10. Are all QC samples properly linked in TALS?	✓			✓
11. All manual integrations appropriate and completely documented?	✓			✓
12. Are nonconformances documented as NCMs?			✓	
13. Are all Chrom graphics uploaded?	✓			✓

1st Level Reviewer / Date: JRB 11-7-17

2nd Level Reviewer / Date: M. W. 11/7/2017

NCM # and Comments:

A8

Instrument ID & Date: 11-3-17 Worklist#: 49975

ICAL Batch: 192908, 192909 Calibration ID number: 36012, 36013

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 11-6-17

2nd Level Reviewer / Date: Mr. Wang 11/6/2017

NCM # and Comments: _____

TestAmerica Laboratories
Worklist QC Batch Report

Worklist Name: 06NOV2017_537B

Worklist Number: 50019

Instrument Name: A8_N

Chrom Method: 537_A8_N

Data Directory: \\ChromNa\Sacramento\ChromData\A8_N\20171106-50019.b

QC Batching: Enabled

Limit Group Batching: Enabled

QC Batch: 1	LC 537 ICAL Raw Batch: 193089	LC 537 CS ICAL Raw Batch: 193088
# 1 CCV L3	# 1 CCV L3	
# 2 RB	# 2 RB	
# 3 MB 320-191373/1-A	# 3 MB 320-191373/1-A	
# 4 LLCS 320-191373/2-A	# 4 LLCS 320-191373/2-A	
# 5 LLCSD 320-191373/3-A	# 5 LLCSD 320-191373/3-A	
# 6 320-32676-A-1-A	# 6 320-32676-A-1-A	
# 7 320-32676-A-2-A	# 7 320-32676-A-2-A	
# 8 CCV L5	# 8 CCV L5	# 8 CCV L5

QC Batch: 2	LC 537 CS ICAL Raw Batch: 193090	LC 537 ICAL Raw Batch: 193091
# 8 CCV L5	# 8 CCV L5	# 8 CCV L5
# 9 RB	# 9 RB	
#10 MB 320-191905/1-A	#10 MB 320-191905/1-A	
#11 LCS 320-191905/2-A	#11 LCS 320-191905/2-A	
#12 LCSD 320-191905/3-A	#12 LCSD 320-191905/3-A	
#13 320-32726-A-1-A	#13 320-32726-A-1-A	
#14 320-32726-A-2-A	#14 320-32726-A-2-A	
#15 320-32726-A-2-B MS	#15 320-32726-A-2-B MS	
#16 320-32726-A-2-C MSD	#16 320-32726-A-2-C MSD	
#17 320-32726-A-3-A	#17 320-32726-A-3-A	
#18 320-32726-A-4-A	#18 320-32726-A-4-A	
#19 320-32727-A-1-A	#19 320-32727-A-1-A	
#20 CCV L3	#20 CCV L3	

QC Batch: 3	LC 537 CS ICAL Raw Batch: 193202	LC 537 ICAL Raw Batch: 193203
#20 CCV L3	#20 CCV L3	
#21 RB	#21 RB	
#22 320-32727-A-1-B MS	#22 320-32727-A-1-B MS	
#23 320-32727-A-1-C MSD	#23 320-32727-A-1-C MSD	
#24 320-32727-A-2-A	#24 320-32727-A-2-A	
#25 320-32727-A-3-A	#25 320-32727-A-3-A	
#26 320-32727-A-4-A	#26 320-32727-A-4-A	
#27 320-32727-A-5-A	#27 320-32727-A-5-A	
#28 320-32727-A-6-A	#28 320-32727-A-6-A	
#29 CCV L5	#29 CCV L5	#29 CCV L5

QC Batch: 4	LC 537 CS ICAL Raw Batch: 193092	LC 537 ICAL Raw Batch: 193093
#29 CCV L5	#29 CCV L5	#29 CCV L5
#30 RB		#30 RB
#31 320-32258-A-1-A		#31 320-32258-A-1-A
#32 LCS 320-188750/2-A		#32 LCS 320-188750/2-A
#33 LCS 320-188750/3-A		#33 LCS 320-188750/3-A
#34 LCS 320-188750/4-A		#34 LCS 320-188750/4-A
#35 LCS 320-188750/5-A		#35 LCS 320-188750/5-A
#36 CCV L3	#36 CCV L3	#36 CCV L3

QC Batch: 5	LC 537 CS ICAL Raw Batch: 193113	LC 537 ICAL Raw Batch: 193114
#36 CCV L3 #37 RB #38 MB 320-192059/1-A #39 LLC S 320-192059/2-A #40 LLCSD 320-192059/3-A #41 320-32770-A-1-A #42 320-32770-A-1-B LMS #43 320-32770-A-1-C LMSD #44 320-32770-A-2-A #45 320-32770-A-3-A #46 320-32770-A-4-A #47 320-32772-A-1-A #48 CCV L5	#36 CCV L3 #37 RB #38 MB 320-192059/1-A #39 LLC S 320-192059/2-A #40 LLCSD 320-192059/3-A #41 320-32770-A-1-A #42 320-32770-A-1-B LMS #43 320-32770-A-1-C LMSD #44 320-32770-A-2-A #45 320-32770-A-3-A #46 320-32770-A-4-A #47 320-32772-A-1-A #48 CCV L5	#36 CCV L3

QC Batch: 6	LC 537 CS ICAL Raw Batch: 193204	LC 537 ICAL Raw Batch: 193205
#48 CCV L5 #49 RB #50 320-32772-A-1-B LMS #51 320-32772-A-1-C LMSD #52 320-32772-A-2-A #53 320-32772-A-3-A #54 320-32772-A-4-A #55 CCV L3	#48 CCV L5 #49 RB #50 320-32772-A-1-B LMS #51 320-32772-A-1-C LMSD #52 320-32772-A-2-A #53 320-32772-A-3-A #54 320-32772-A-4-A #55 CCV L3	#55 CCV L3

QC Batch: 7	LC 537 CS ICAL Raw Batch: 193115	LC 537 ICAL Raw Batch: 193116
#55 CCV L3 #56 RB #57 MB 320-192019/1-A #58 LCS 320-192019/2-A #59 LCSD 320-192019/3-A #60 680-144771-D-2-A #61 680-144771-D-3-A #62 RINSE #63 RINSE #64 RINSE #65 CCV L5 #66 RB	#55 CCV L3	#55 CCV L3 #56 RB #57 MB 320-192019/1-A #58 LCS 320-192019/2-A #59 LCSD 320-192019/3-A #60 680-144771-D-2-A #61 680-144771-D-3-A #62 RINSE #63 RINSE #64 RINSE #65 CCV L5 #66 RB

01

A8 11/06/17

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-191373

Analyst: Santos, Jonathan

Batch Open: 10/27/2017 8:32:00AM

Method Code: 320-537_Prep-320

Batch End: 10/27/2017 4:53:00PM

Extraction of Perfluorinated Alkyl Acids

	Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmnt FinAmnt	PHs		Rcvd	Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
					Adj1	Adj2						
1	MB-320-191373/1 N/A	N/A		250.00 mL	7			N/A	N/A	N/A	Ch ND	
				1.00 mL								
2	LLCS-320-191373/2 N/A	N/A		250.00 mL	7			N/A	N/A	N/A	Ch ND	
				1.00 mL								
3	LLCSD-320-191373/3 N/A	N/A		250.00 mL	7			N/A	N/A	N/A	Ch ND	
				1.00 mL								
	320-32676-A-1 (537_DOD5)	N/A (320-32676-1)	262.62 g	235.1 mL	7			10/29/17	16_Days	4	Ch ND	
			27.53 g	1.00 mL								
	320-32676-A-2 (537_DOD5)	N/A (320-32676-1)	287.18 g	260.2 mL	7			10/29/17	16_Days	4	Ch ND	
			26.94 g	1.00 mL								

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Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-191373

Analyst: Santos, Jonathan

Batch Open: 10/27/2017 8:32:00AM

Method Code: 320-537_Prep-320

Batch End: 10/27/2017 4:53:00PM

Batch Notes

Manifold ID 7

Trizma ID SLBR4303V

SPE Cartridge ID 6357081-09

Methanol ID 1071552

Reagent Water ID 10/25/17

Internal Standard ID# 1041860

Pipette ID N32761F

Analyst ID - TA Reagent Drop JNS

Analyst ID - TA Reagent Drop CCB
Witness

Analyst ID - SU Reagent Drop JNS

Analyst ID - SU Reagent Drop CCB
Witness

Analyst ID - IS Reagent Drop TQN

Analyst ID - IS Reagent Drop TWL
Witness

Analyst ID - Concentration CCB

Analyst ID - Aliquot Step TQN

Analyst ID - Final Volume Step TQN

Batch Comment N/A

Comments

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-191373

Analyst: Santos, Jonathan

Batch Open: 10/27/2017 8:32:00AM

Method Code: 320-537_Prep-320

Batch End:

Batch Notes

Manifold ID 7

Trizma ID SLBR4303V

SPE Cartridge ID 6357081-09

Methanol ID 1071552

Reagent Water ID 10/25/17

Internal Standard ID# 1041860

Pipette ID N32761F

Analyst ID - TA Reagent Drop JNS

Analyst ID - TA Reagent Drop CCB

Witness

Analyst ID - SU Reagent Drop JNS

Analyst ID - SU Reagent Drop CCB

Witness

Analyst ID - IS Reagent Drop TAN

Analyst ID - IS Reagent Drop TAN

Witness

Analyst ID - Concentration CCB

Analyst ID - Aliquot Step TAN

Analyst ID - Final Volume Step TAN

Batch Comment N/A

Comments

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-191373

Analyst: Santos, Jonathan

Batch Open: 10/27/2017 8:32:00AM

Method Code: 320-537_Prep-320

Batch End:

Reagent Additions Worksheet

Lab ID	Reagent Code	Amount Added	Final Amount	By	Witness
MB 320-191373/1	LC537-SU_00050	100 uL	1.00 mL	JNS 10/27/17	CES 10-27-17
LLCS 320-191373/2	LC537-LSP_00025	100 uL	1.00 mL		
LLCS 320-191373/2	LC537-SU_00050	100 uL	1.00 mL		
LLCSD 320-191373/3	LC537-LSP_00025	100 uL	1.00 mL		
LLCSD 320-191373/3	LC537-SU_00050	100 uL	1.00 mL		
320-32676-A-1	LC537-SU_00050	100 uL	1.00 mL		
320-32676-A-2	LC537-SU_00050	100 uL	1.00 mL		

Other Reagents:

Reagent	Amount/Units	Lot#:

Sacramento Preparation Data Review Checklist

Preparation Batch Number(s) 191373

Test 537-Prep

Earliest Holding Time 11/7/17

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

1st Level Reviewer: TAN

Date: 11/01/17

2nd Level Reviewer: VPM

Date: 11/1/17

Comments: _____

Shipping and Receiving Documents

TestAmerica Sacramento

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

Chain of Custody Record
TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
Regulatory Program: ☒ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact		Project Manager: Andy Frebowitz		Site Contact: Mary Kay Bond		Date: 10/24/2017		COC No:		
TetraTech		Tel/Fax: 610.382.1170		Lab Contact: Dave Alltucker		Carrier: FedEx		1 of 1 COCs		
234 Mall Boulevard Suite 260		Analysis Turnaround Time ☐ CALENDAR DAYS ☐ WORKING DAYS TAT if different from Below 21 ☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day		Filtered Sample (Y/N) Perform MS / MSD (Y/N) EPA 537 UCMR3		 320-32676 Chain of Custody		Sampler: Mary Kay Bond		
King of Prussia, PA 19406								For Lab Use Only:		
610-382-1174								Walk-in Client:		
610-491-9688								Lab Sampling:		
Project Name: WE04								Job / SDG No.:		
Site: WE04										
P O # 1132358 (through EarthToxics)										
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sample Specific Notes:			
WGNA-102417-RW-4829		10/24/2017	08:10	G	DW	2				
WGNA-102417-FRB-4829		10/24/2017	08:05	G	DW	2	Field Reagent Blank			
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other: Trizma										
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)				
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown						☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months				
Fed Ex Tracking: 770557761054										
Custody Seals Intact: ☐ Yes ☐ No		Custody Seal No.:		Cooler Temp. (°C): Obs'd: 1.4°C		Corr'd:		Therm ID No.: AK3		
Relinquished by: <i>Mary Kay Bond</i>		Company: Tetra Tech		Date/Time: 10/24/2017 16:00		Received by: <i>[Signature]</i>		Company: THWS		
Relinquished by:		Company:		Date/Time:		Received by:		Company:		
Relinquished by:		Company:		Date/Time:		Received in Laboratory by:		Company:		

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

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 320-32676-1

Login Number: 32676

List Source: TestAmerica Sacramento

List Number: 1

Creator: Aguayo, Alonso

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-102417-RW-4829","537","RES","320-32676-1","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","8.9","ng/L","J M","7.2","DL","","","TRG","","","43","LOQ","YES","-99","","","235.1","1.00","17","","
"WGNA-102417-RW-4829","537","RES","320-32676-1","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","12","ng/L","J","3.0","DL","","","TRG","","","21","LOQ","YES","-99","","","235.1","1.00","8.5","","
"WGNA-102417-RW-4829","537","RES","320-32676-1","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","13","ng/L","U","5.8","DL","","","TRG","","","32","LOQ","YES","-99","","","235.1","1.00","13","","
"WGNA-102417-RW-4829","537","RES","320-32676-1","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","38","ng/L","U","17","DL","","","TRG","","","96","LOQ","YES","-99","","","235.1","1.00","38","","
"WGNA-102417-RW-4829","537","RES","320-32676-1","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","8.0","ng/L","J","2.0","DL","","","TRG","","","11","LOQ","YES","-99","","","235.1","1.00","4.3","","
"WGNA-102417-RW-4829","537","RES","320-32676-1","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","21","ng/L","U M","8.5","DL","","","TRG","","","26","LOQ","YES","-99","","","235.1","1.00","21","","
"WGNA-102417-RW-4829","537","RES","320-32676-1","TALSAC","STL00993","13C2
PFHxA","35","ng/L","","","-99","DL","","","SURRE","83","","","-99","LOQ","YES","42.5","","","235.1","1.00","0","","
"WGNA-102417-RW-4829","537","RES","320-32676-1","TALSAC","STL00996","13C2
PFDA","41","ng/L","","","-99","DL","","","SURRE","96","","","-99","LOQ","YES","42.5","","","235.1","1.00","0","","
"WGNA-102417-FRB-4829","537","RES","320-32676-2","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","15","ng/L","U","6.5","DL","","","TRG","","","38","LOQ","YES","-99","","","260.2","1.00","15","","
"WGNA-102417-FRB-4829","537","RES","320-32676-2","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","7.7","ng/L","U","2.7","DL","","","TRG","","","19","LOQ","YES","-99","","","260.2","1.00","7.7","","
"WGNA-102417-FRB-4829","537","RES","320-32676-2","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","12","ng/L","U","5.3","DL","","","TRG","","","29","LOQ","YES","-99","","","260.2","1.00","12","","
"WGNA-102417-FRB-4829","537","RES","320-32676-2","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","35","ng/L","U","15","DL","","","TRG","","","86","LOQ","YES","-99","","","260.2","1.00","35","","
"WGNA-102417-FRB-4829","537","RES","320-32676-2","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","3.8","ng/L","U","1.8","DL","","","TRG","","","9.6","LOQ","YES","-99","","","260.2","1.00","3.8","","
"WGNA-102417-FRB-4829","537","RES","320-32676-2","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","19","ng/L","U","7.7","DL","","","TRG","","","23","LOQ","YES","-99","","","260.2","1.00","19","","
"WGNA-102417-FRB-4829","537","RES","320-32676-2","TALSAC","STL00993","13C2
PFHxA","35","ng/L","","","-99","DL","","","SURRE","90","","","-99","LOQ","YES","38.4","","","260.2","1.00","0","","
"WGNA-102417-FRB-4829","537","RES","320-32676-2","TALSAC","STL00996","13C2
PFDA","37","ng/L","","","-99","DL","","","SURRE","97","","","-99","LOQ","YES","38.4","","","260.2","1.00","0","","
"LLCS 320-191373/2-A","537","RES","LLCS 320-191373/2-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","36.7","ng/L","J","6.8","DL","","","SPK","92","","","40","LOQ","YES","40.0","","","250.00","1.00","16","","
"LLCS 320-191373/2-A","537","RES","LLCS 320-191373/2-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","20.2","ng/L","","","2.8","DL","","","SPK","101","","","20","LOQ","YES","20.0","","","250.00","1.00","8.0","","
"LLCS 320-191373/2-A","537","RES","LLCS 320-191373/2-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","29.5","ng/L","J","5.5","DL","","","SPK","98","","","30","LOQ","YES","30.0","","","250.00","1.00","12","","
"LLCS 320-191373/2-A","537","RES","LLCS 320-191373/2-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","86.4","ng/L","J","16","DL","","","SPK","96","","","90","LOQ","YES","90.0","","","250.00","1.00","36","","
"LLCS 320-191373/2-A","537","RES","LLCS 320-191373/2-A","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","10.6","ng/L","","","1.9","DL","","","SPK","106","","","10","LOQ","YES","10.0","","","250.00","1.00","4.0","","
"LLCS 320-191373/2-A","537","RES","LLCS 320-191373/2-A","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","20.9","ng/L","J","8.0","DL","","","SPK","104","","","24","LOQ","YES","20.0","","","250.00","1.00","20","","
"LLCS 320-191373/2-A","537","RES","LLCS 320-191373/2-A","TALSAC","STL00993","13C2
PFHxA","37.3","ng/L","","","-99","DL","","","SURRE","93","","","-99","LOQ","YES","40.0","","","250.00","1.00","0","","
"LLCS 320-191373/2-A","537","RES","LLCS 320-191373/2-A","TALSAC","STL00996","13C2
PFDA","39.4","ng/L","","","-99","DL","","","SURRE","98","","","-99","LOQ","YES","40.0","","","250.00","1.00","0","","
"LLCSD 320-191373/3-A","537","RES","LLCSD 320-191373/3-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","34.7","ng/L","J","6.8","DL","","","SPK","87","6","40","LOQ","YES","40.0","LLCS 320-191373/2-A","250.00","1.00","16","","
"LLCSD 320-191373/3-A","537","RES","LLCSD 320-191373/3-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","18.7","ng/L","J","2.8","DL","","","SPK","94","8","20","LOQ","YES","20.0","LLCS 320-191373/2-

A","250.00","1.00","8.0",""
"LLCSD 320-191373/3-A","537","RES","LLCSD 320-191373/3-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","26.8","ng/L","J","5.5","DL","","","SPK","89","10","30","LOQ","YES","30.0","LLCS 320-191373/2-A","250.00","1.00","12",""
"LLCSD 320-191373/3-A","537","RES","LLCSD 320-191373/3-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","81.0","ng/L","J","16","DL","","","SPK","90","7","90","LOQ","YES","90.0","LLCS 320-191373/2-A","250.00","1.00","36",""
"LLCSD 320-191373/3-A","537","RES","LLCSD 320-191373/3-A","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","9.85","ng/L","J","1.9","DL","","","SPK","99","7","10","LOQ","YES","10.0","LLCS 320-191373/2-A","250.00","1.00","4.0",""
"LLCSD 320-191373/3-A","537","RES","LLCSD 320-191373/3-A","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","19.5","ng/L","J","8.0","DL","","","SPK","98","7","24","LOQ","YES","20.0","LLCS 320-191373/2-A","250.00","1.00","20",""
"LLCSD 320-191373/3-A","537","RES","LLCSD 320-191373/3-A","TALSAC","STL00993","13C2 PFHxA","34.5","ng/L","","","-99","DL","","","SURR","86","8","-99","LOQ","YES","40.0","LLCS 320-191373/2-A","250.00","1.00","0",""
"LLCSD 320-191373/3-A","537","RES","LLCSD 320-191373/3-A","TALSAC","STL00996","13C2 PFDA","38.0","ng/L","","","-99","DL","","","SURR","95","3","-99","LOQ","YES","40.0","LLCS 320-191373/2-A","250.00","1.00","0",""
"MB 320-191373/1-A","537","RES","MB 320-191373/1-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","16","ng/L","U","6.8","DL","","","TRG","","","40","LOQ","YES","-99","","","250.00","1.00","16",""
"MB 320-191373/1-A","537","RES","MB 320-191373/1-A","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","8.0","ng/L","U","2.8","DL","","","TRG","","","20","LOQ","YES","-99","","","250.00","1.00","8.0",""
"MB 320-191373/1-A","537","RES","MB 320-191373/1-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","12","ng/L","U","5.5","DL","","","TRG","","","30","LOQ","YES","-99","","","250.00","1.00","12",""
"MB 320-191373/1-A","537","RES","MB 320-191373/1-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","36","ng/L","U","16","DL","","","TRG","","","90","LOQ","YES","-99","","","250.00","1.00","36",""
"MB 320-191373/1-A","537","RES","MB 320-191373/1-A","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","4.0","ng/L","U","1.9","DL","","","TRG","","","10","LOQ","YES","-99","","","250.00","1.00","4.0",""
"MB 320-191373/1-A","537","RES","MB 320-191373/1-A","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","20","ng/L","U","8.0","DL","","","TRG","","","24","LOQ","YES","-99","","","250.00","1.00","20",""
"MB 320-191373/1-A","537","RES","MB 320-191373/1-A","TALSAC","STL00993","13C2 PFHxA","35.9","ng/L","","","-99","DL","","","SURR","90","","","-99","LOQ","YES","40.0","","","250.00","1.00","0",""
"MB 320-191373/1-A","537","RES","MB 320-191373/1-A","TALSAC","STL00996","13C2 PFDA","38.0","ng/L","","","-99","DL","","","SURR","95","","","-99","LOQ","YES","40.0","","","250.00","1.00","0",""
"Unknown","Unknown","WGNA-102417-RW-4829","10/24/2017 08:10","AQ","320-32676-1","NM","","","1.40","537","METHOD","RES","10/27/2017 08:32","11/06/2017 10:09","TALSAC","COA","WET","NA","1","NA","NA","","","100","320-191373","320-191373","NA","320-193089","320-32676-1","10/25/2017 09:40","11/08/2017 15:20",""
"Unknown","Unknown","WGNA-102417-FRB-4829","10/24/2017 08:05","AQ","320-32676-2","FB","","","1.40","537","METHOD","RES","10/27/2017 08:32","11/06/2017 10:13","TALSAC","COA","WET","NA","1","NA","NA","","","100","320-191373","320-191373","NA","320-193089","320-32676-1","10/25/2017 09:40","11/08/2017 15:20",""
"Unknown","Unknown","LLCS 320-191373/2-A","","","AQ","LLCS 320-191373/2-A","LCS","","","-99","537","METHOD","RES","10/27/2017 08:32","11/06/2017 09:59","TALSAC","COA","WET","NA","1","NA","NA","","","100","320-191373","320-191373","NA","320-193089","320-32676-1","10/27/2017 08:32","11/08/2017 15:20",""
"Unknown","Unknown","LLCSD 320-191373/3-A","","","AQ","LLCSD 320-191373/3-A","LCSD","","","-99","537","METHOD","RES","10/27/2017 08:32","11/06/2017 10:04","TALSAC","COA","WET","NA","1","NA","NA","","","100","320-191373","320-191373","NA","320-193089","320-32676-1","10/27/2017 08:32","11/08/2017 15:20",""
"Unknown","Unknown","MB 320-191373/1-A","","","AQ","MB 320-191373/1-A","MB","","","-99","537","METHOD","RES","10/27/2017 08:32","11/06/2017 09:54","TALSAC","COA","WET","NA","1","NA","NA","","","100","320-191373","320-191373","NA","320-

193089","320-32676-1","10/27/2017 08:32","11/08/2017 15:20",""



INTERNAL CORRESPONDENCE

TO:	A. FREBOWITZ	DATE:	NOVEMBER 21, 2017
FROM:	TERRI L. SOLOMON	COPIES:	DV FILE
SUBJECT:	ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS) NAS JRB WILLOW GROVE SAMPLE DELIVERY GROUP (SDG) 320-32676-1		
SAMPLES:	1/Field Reagent Blank (FRB) WGNA-102417-FRB-4829 1/Drinking Water WGNA-102417-RW-4829		

Overview

The sample set for NAS JRB Willow Grove, SDG 320-32676-1, consisted of one (1) drinking water sample and one (1) FRB sample. All samples were analyzed for select polyfluorinated alkyl acids including pentadecafluorooctanoic acid (PFOA), perfluorobutane sulfonic acid (PFBS), perfluoroheptanoic acid (PFHpA), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA) and perfluorooctane sulfonic acid (PFOS). No field duplicate sample pairs were included in this SDG.

The samples were collected by Tetra Tech on October 24, 2017 and analyzed by Test America-Sacramento. All sample analyses were conducted in accordance with EPA Method 537 version 1.1 analytical and reporting protocols.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, initial/continuing calibrations, laboratory method/FRBs, surrogate spike recoveries, laboratory control sample / laboratory control sample duplicate results, internal standard areas and recoveries, chromatographic resolution, analyte identification, analyte quantitation, and detection limits. Areas of concern are listed below.

Major

None.

Minor

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

Notes

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

Sample
WGNA-102417-RW-4829

Associated FRB
WGNA-102417-FRB-4829

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

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

TO: A. FREBOWITZ
SDG: 320-32676-1

PAGE 2

Executive Summary

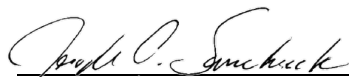
Laboratory Performance: None.

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

The data for these analyses were reviewed with reference to the Environmental Protection Agency document EPA/600/R-08/092, Method 537, "Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)", (September 2009) 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 ($< 2 \times \text{IDL}$ for inorganics and $< \text{CRQL}$ 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: 320-32676-1 FRACTION: PFAS MEDIA: WATER	NSAMPLE	WGNA-102417-FRB-4829			WGNA-102417-RW-4829		
	LAB_ID	320-32676-2			320-32676-1		
	SAMP_DATE	10/24/2017			10/24/2017		
	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	P
PERFLUOROBUTANESULFONIC ACID		35	U		38	U	
PERFLUOROHEPTANOIC ACID		3.8	U		8	J	P
PERFLUOROHXANESULFONIC ACID		12	U		13	U	
PERFLUORONONANOIC ACID		19	U		21	U	
PERFLUOROOCTANE SULFONIC ACID		15	U		8.9	J	P

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Client Sample ID: WGNA-102417-RW-4829 Lab Sample ID: 320-32676-1
 Matrix: Water Lab File ID: 2017.11.06_537B_006.d
 Analysis Method: 537 Date Collected: 10/24/2017 08:10
 Extraction Method: 537 Date Extracted: 10/27/2017 08:32
 Sample wt/vol: 235.1 (mL) Date Analyzed: 11/06/2017 10:09
 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.: 193089 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	8.9	J M	43	17	7.2
335-67-1	Perfluorooctanoic acid (PFOA)	12	J	21	8.5	3.0
375-95-1	Perfluorononanoic acid (PFNA)	21	U M	26	21	8.5
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	13	U	32	13	5.8
375-85-9	Perfluoroheptanoic acid (PFHpA)	8.0	J	11	4.3	2.0
375-73-5	Perfluorobutanesulfonic acid (PFBS)	38	U	96	38	17

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	83		70-130
STL00996	13C2 PFDA	96		70-130

Ali L. Salameh
11/15/2017

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Client Sample ID: WGNA-102417-FRB-4829 Lab Sample ID: 320-32676-2
 Matrix: Water Lab File ID: 2017.11.06_537B_007.d
 Analysis Method: 537 Date Collected: 10/24/2017 08:05
 Extraction Method: 537 Date Extracted: 10/27/2017 08:32
 Sample wt/vol: 260.2 (mL) Date Analyzed: 11/06/2017 10:13
 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.: 193089 Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	38	15	6.5
335-67-1	Perfluorooctanoic acid (PFOA)	7.7	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)	3.8	U	9.6	3.8	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	86	35	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	90		70-130
STL00996	13C2 PFDA	97		70-130

Amir L. Salameh
11/15/2017

Appendix B

Results as Reported by the Laboratory

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-32676-1</u>
SDG No.: _____	
Client Sample ID: <u>WGNA-102417-RW-4829</u>	Lab Sample ID: <u>320-32676-1</u>
Matrix: <u>Water</u>	Lab File ID: <u>2017.11.06_537B_006.d</u>
Analysis Method: <u>537</u>	Date Collected: <u>10/24/2017 08:10</u>
Extraction Method: <u>537</u>	Date Extracted: <u>10/27/2017 08:32</u>
Sample wt/vol: <u>235.1 (mL)</u>	Date Analyzed: <u>11/06/2017 10:09</u>
Con. Extract Vol.: <u>1.00 (mL)</u>	Dilution Factor: <u>1</u>
Injection Volume: <u>2 (uL)</u>	GC Column: <u>GeminiC18 3x100 ID: 3 (mm)</u>
% Moisture: _____	GPC Cleanup: (Y/N) <u>N</u>
Analysis Batch No.: <u>193089</u>	Units: <u>ng/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	8.9	J M	43	17	7.2
335-67-1	Perfluorooctanoic acid (PFOA)	12	J	21	8.5	3.0
375-95-1	Perfluorononanoic acid (PFNA)	21	U M	26	21	8.5
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	13	U	32	13	5.8
375-85-9	Perfluoroheptanoic acid (PFHpA)	8.0	J	11	4.3	2.0
375-73-5	Perfluorobutanesulfonic acid (PFBS)	38	U	96	38	17

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	83		70-130
STL00996	13C2 PFDA	96		70-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-32676-1</u>
SDG No.: _____	
Client Sample ID: <u>WGNA-102417-FRB-4829</u>	Lab Sample ID: <u>320-32676-2</u>
Matrix: <u>Water</u>	Lab File ID: <u>2017.11.06_537B_007.d</u>
Analysis Method: <u>537</u>	Date Collected: <u>10/24/2017 08:05</u>
Extraction Method: <u>537</u>	Date Extracted: <u>10/27/2017 08:32</u>
Sample wt/vol: <u>260.2 (mL)</u>	Date Analyzed: <u>11/06/2017 10:13</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>193089</u>	Units: <u>ng/L</u>

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	U	38	15	6.5
335-67-1	Perfluorooctanoic acid (PFOA)	7.7	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)	3.8	U	9.6	3.8	1.8
375-73-5	Perfluorobutanesulfonic acid (PFBS)	35	U	86	35	15

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	90		70-130
STL00996	13C2 PFDA	97		70-130

Appendix C

Support Documentation

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

Chain of Custody Record



TestAmerica Laboratories, Inc.

Client Contact						Project Manager: Andy Frebowitz						Site Contact: Mary Kay Bond						Date: 10/24/2017						COC No.:										
TetraTech						Tel/Fax: 610.382.1170						Lab Contact: Dave Alltucker						Carrier: FedEx						1 of 1 COCs										
234 Mall Boulevard Suite 260						Analysis Turnaround Time						 320-32676 Chain of Custody						Sampler: Mary Kay Bond For Lab Use Only: Walk-in Client: Lab Sampling:																
King of Prussia, PA 19406						☐ CALENDAR DAYS ☐ WORKING DAYS																												
610-382-1174						TAT if different from Below 21																												
610-491-9688						☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day																												
Project Name: WE04																																		
Site: WE04																		Job / SDG No.:																
P O # 1132358 (through EarthToxics)																																		
Sample Identification						Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y / N)	EPA 537 UCMR3																					
WGNA-102417-RW-4829						10/24/2017	08:10	G	DW	2	N	N	Y																					
WGNA-102417-FRB-4829						10/24/2017	08:05	G	DW	2	N	N	Y	Field Reagent Blank																				
Preservation Used: 1= Ice, 2= HCl; 3= H ₂ SO ₄ ; 4=HNO ₃ ; 5=NaOH; 6= Other: Trizma																																		
Possible Hazard Identification:																		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)																
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the																																		
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown																		☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months																
Fed Ex Tracking: 770557761054																																		
Custody Seals Intact: ☐ Yes ☐ No										Custody Seal No.:										Cooler Temp. (°C): Obs'd: 1.4°C Corr'd: Therm ID No.: AK3														
Relinquished by: Mary K Bond										Company: Tetra Tech					Date/Time: 10/24/2017 16:00					Received by: [Signature]					Company: TAWS					Date/Time: 10/25/17 940				
Relinquished by:										Company:					Date/Time:					Received by:					Company:					Date/Time:				
Relinquished by:										Company:					Date/Time:					Received in Laboratory by:					Company:					Date/Time:				

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

Job Narrative
320-32676-1

Receipt

The samples were received on 10/25/2017 9:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4° C.

LCMS

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

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

Organic Prep

Method(s) 537: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-191373.

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: 320-32676-1

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: 320-32676-1

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

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-32676-1	WGNA-102417-RW-4829	Water	10/24/17 08:10	10/25/17 09:40
320-32676-2	WGNA-102417-FRB-4829	Water	10/24/17 08:05	10/25/17 09:40

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1

SDG No.: _____

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
WGNA-102417-RW-482 9	320-32676-1	83	96
WGNA-102417-FRB-48 29	320-32676-2	90	97
	MB 320-191373/1-A	90	95
	LLCS 320-191373/2-A	93	98
	LLCSD 320-191373/3-A	86	95

PFHxA = 13C2 PFHxA
PFDA = 13C2 PFDA

QC LIMITS
70-130
70-130

Column to be used to flag recovery values

FORM II 537

FORM III
LCMS LOW LEVEL CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 2017.11.06_537B_004.d
 Lab ID: LLCS 320-191373/2-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LLCS CONCENTRATION (ng/L)	LLCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	40.0	36.7 J	92	50-150	
Perfluorooctanoic acid (PFOA)	20.0	20.2	101	50-150	
Perfluorononanoic acid (PFNA)	20.0	20.9 J	104	50-150	
Perfluorohexanesulfonic acid (PFHxS)	30.0	29.5 J	98	50-150	
Perfluoroheptanoic acid (PFHpA)	10.0	10.6	106	50-150	
Perfluorobutanesulfonic acid (PFBS)	90.0	86.4 J	96	50-150	

Column to be used to flag recovery and RPD values

FORM III
LCMS LOW LEVEL CONTROL STANDARD DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Matrix: Water Level: Low Lab File ID: 2017.11.06_537B_005.d
 Lab ID: LLCSD 320-191373/3-A Client ID: _____

COMPOUND	SPIKE ADDED (ng/L)	LLCSD CONCENTRATION (ng/L)	LLCSD % REC	% RPD	QC LIMITS		#
					RPD	REC	
Perfluorooctanesulfonic acid (PFOS)	40.0	34.7 J	87	6	50	50-150	
Perfluorooctanoic acid (PFOA)	20.0	18.7 J	94	8	50	50-150	
Perfluorononanoic acid (PFNA)	20.0	19.5 J	98	7	50	50-150	
Perfluorohexanesulfonic acid (PFHxS)	30.0	26.8 J	89	10	50	50-150	
Perfluoroheptanoic acid (PFHpA)	10.0	9.85 J	99	7	50	50-150	
Perfluorobutanesulfonic acid (PFBS)	90.0	81.0 J	90	7	50	50-150	

Column to be used to flag recovery and RPD values

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
SDG No.: _____
Lab File ID: 2017.11.06_537B_003.d Lab Sample ID: MB 320-191373/1-A
Matrix: Water Date Extracted: 10/27/2017 08:32
Instrument ID: A8_N Date Analyzed: 11/06/2017 09:54
Level: (Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LLCS 320-191373/2-A	2017.11.06_ 537B 004.d	11/06/2017 09:59
	LLCSD 320-191373/3-A	2017.11.06_ 537B 005.d	11/06/2017 10:04
WGNA-102417-RW-4829	320-32676-1	2017.11.06_ 537B 006.d	11/06/2017 10:09
WGNA-102417-FRB-4829	320-32676-2	2017.11.06_ 537B 007.d	11/06/2017 10:13

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Client Sample ID: _____ Lab Sample ID: MB 320-191373/1-A
 Matrix: Water Lab File ID: 2017.11.06_537B_003.d
 Analysis Method: 537 Date Collected: _____
 Extraction Method: 537 Date Extracted: 10/27/2017 08:32
 Sample wt/vol: 250.00 (mL) Date Analyzed: 11/06/2017 09:54
 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.: 193089 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	90		70-130
STL00996	13C2 PFDA	95		70-130

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Instrument ID: A8_N Calibration Start Date: 11/03/2017 13:37
 GC Column: GeminiC18 3x100 ID: 3 (mm) Calibration End Date: 11/03/2017 14:01
 Calibration ID: 36012

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		1535518	1.91	3276559	2.15		
UPPER LIMIT		2303277	2.41	4914839	2.65		
LOWER LIMIT		767759	1.41	1638280	1.65		
LAB SAMPLE ID	CLIENT SAMPLE ID						
ICV 320-192908/13		1512045	1.90	3433628	2.14		
CCV 320-193089/1 CCVIS		1677167	1.93	3457604	2.17		
MB 320-191373/1-A		1611516	1.94	3678207	2.17		
LLCS 320-191373/2-A		1611740	1.93	3712956	2.17		
LLCSD 320-191373/3-A		1657607	1.93	3765246	2.16		
320-32676-1	WGNA-102417-RW-4829	1656288	1.93	3563461	2.16		
320-32676-2	WGNA-102417-FRB-4829	1634672	1.93	3633409	2.16		
CCV 320-193089/8 CCVIS		1614908	1.93	3465963	2.16		

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.: 320-32676-1
 SDG No.: _____
 Sample No.: CCV 320-193089/1 Date Analyzed: 11/06/2017 09:45
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2017.11.06_537B_001 Heated Purge: (Y/N) N
 Calibration ID: 36012

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		1677167	1.93	3457604	2.17		
UPPER LIMIT		2348034	2.43	4840646	2.67		
LOWER LIMIT		1174017	1.43	2420323	1.67		
LAB SAMPLE ID	CLIENT SAMPLE ID						
MB 320-191373/1-A		1611516	1.94	3678207	2.17		
LLCS 320-191373/2-A		1611740	1.93	3712956	2.17		
LLCSD 320-191373/3-A		1657607	1.93	3765246	2.16		
320-32676-1	WGNA-102417-RW-4829	1656288	1.93	3563461	2.16		
320-32676-2	WGNA-102417-FRB-4829	1634672	1.93	3633409	2.16		

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.: 320-32676-1
 SDG No.: _____
 Sample No.: CCV 320-193089/8 Date Analyzed: 11/06/2017 10:18
 Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3 (mm)
 Lab File ID (Standard): 2017.11.06_537B_008 Heated Purge: (Y/N) N
 Calibration ID: 36012

	13PFOA		PFOS			
	AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD	1614908	1.93	3465963	2.16		
UPPER LIMIT	2260871	2.43	4852348	2.66		
LOWER LIMIT	1130436	1.43	2426174	1.66		
LAB SAMPLE ID	CLIENT SAMPLE ID					
MB 320-191373/1-A		1611516	1.94	3678207	2.17	
LLCS 320-191373/2-A		1611740	1.93	3712956	2.17	
LLCSD 320-191373/3-A		1657607	1.93	3765246	2.16	
320-32676-1	WGNA-102417-RW-4829	1656288	1.93	3563461	2.16	
320-32676-2	WGNA-102417-FRB-4829	1634672	1.93	3633409	2.16	

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.: 320-32676-1 Analy Batch No.: 192908

SDG No.: _____

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

Calibration Start Date: 11/03/2017 13:37 Calibration End Date: 11/03/2017 14:01 Calibration ID: 36012

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-192908/4	2017.11.03_537XICAL_004.d
Level 2	IC 320-192908/5	2017.11.03_537XICAL_005.d
Level 3	IC 320-192908/6	2017.11.03_537XICAL_006.d
Level 4	IC 320-192908/7	2017.11.03_537XICAL_007.d
Level 5	IC 320-192908/8	2017.11.03_537XICAL_008.d
Level 6	IC 320-192908/9	2017.11.03_537XICAL_009.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanesulfonic acid (PFBS)	1.0397 0.8468	1.0767	1.0898	0.9577	0.9303	QuaF		1.1193	-0.001498						0.9990		0.9600
Perfluoroheptanoic acid (PFHpA)	0.9433 0.9848	0.9187	0.9551	0.9185	0.9011	Ave		0.9369				3.2		30.0			
Perfluorohexanesulfonic acid (PFHxS)	1.6459 1.6841	1.6355	1.7405	1.6631	1.6755	Ave		1.6741				2.2		30.0			
Perfluorooctanoic acid (PFOA)	0.9757 0.9799	0.8919	0.9000	0.8953	0.9117	Ave		0.9258				4.4		30.0			
Perfluorooctanesulfonic acid (PFOS)	0.8958 0.9902	0.9213	0.9281	0.9268	0.9715	Ave		0.9389				3.7		30.0			
Perfluorononanoic acid (PFNA)	0.6610 0.7042	0.6285	0.6624	0.6810	0.6478	Ave		0.6642				3.9		30.0			
13C2 PFHxA	1.0891 1.1664	1.0526	1.1042	1.1123	1.0772	Ave		1.1003				3.5		30.0			
13C2 PFDA	0.7748 0.8159	0.7295	0.7569	0.7811	0.7330	Ave		0.7652				4.3		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.: 320-32676-1 Analy Batch No.: 192908

SDG No.: _____

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

Calibration Start Date: 11/03/2017 13:37 Calibration End Date: 11/03/2017 14:01 Calibration ID: 36012

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-192908/4	2017.11.03_537XICAL_004.d
Level 2	IC 320-192908/5	2017.11.03_537XICAL_005.d
Level 3	IC 320-192908/6	2017.11.03_537XICAL_006.d
Level 4	IC 320-192908/7	2017.11.03_537XICAL_007.d
Level 5	IC 320-192908/8	2017.11.03_537XICAL_008.d
Level 6	IC 320-192908/9	2017.11.03_537XICAL_009.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5
Perfluorobutanesulfonic acid (PFBS)	PFOS	QuaF	1076553 16699152	2591121	5461974	10142530	14011858	9.00 180	20.0	45.0	90.0	135
Perfluoroheptanoic acid (PFHpA)	13PF OA	Ave	143455 2810797	331548	736034	1420703	2102676	1.00 20.0	2.22	5.00	10.0	15.0
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	568156 11071993	1312135	2908204	5871843	8413133	3.00 60.0	6.67	15.0	30.0	45.0
Perfluorooctanoic acid (PFOA)	13PF OA	Ave	296934 5597122	644149	1388033	2771271	4257225	2.00 40.0	4.45	10.0	20.0	30.0
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	412315 8679676	985487	2067792	4363079	6504279	4.00 80.0	8.89	20.0	40.0	60.0
Perfluorononanoic acid (PFNA)	13PF OA	Ave	201053 4019666	453612	1020851	2106479	3023088	2.00 40.0	4.45	10.0	20.0	30.0
13C2 PFHxA	13PF OA	Ave	1655691 1664260	1708988	1701491	1719911	1675220	10.0 10.0	10.0	10.0	10.0	10.0
13C2 PFDA	13PF OA	Ave	1177922 1164156	1184358	1166275	1207887	1139992	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.: 320-32676-1 Analy Batch No.: 192908

SDG No.: _____

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

Calibration Start Date: 11/03/2017 13:37 Calibration End Date: 11/03/2017 14:01 Calibration ID: 36012

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-192908/4	2017.11.03_537XICAL_004.d
Level 2	IC 320-192908/5	2017.11.03_537XICAL_005.d
Level 3	IC 320-192908/6	2017.11.03_537XICAL_006.d
Level 4	IC 320-192908/7	2017.11.03_537XICAL_007.d
Level 5	IC 320-192908/8	2017.11.03_537XICAL_008.d
Level 6	IC 320-192908/9	2017.11.03_537XICAL_009.d

ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanesulfonic acid (PFBS)	-6.0	-1.2	3.9	-3.1	1.9	-0.5	50	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	0.7	-1.9	1.9	-2.0	-3.8	5.1	50	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	-1.7	-2.3	4.0	-0.7	0.1	0.6	50	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	5.4	-3.7	-2.8	-3.3	-1.5	5.8	50	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	-4.6	-1.9	-1.2	-1.3	3.5	5.5	50	30	30	30	30	30
Perfluorononanoic acid (PFNA)	-0.5	-5.4	-0.3	2.5	-2.5	6.0	50	30	30	30	30	30
13C2 PFHxA	-1.0	-4.3	0.4	1.1	-2.1	6.0	30	30	30	30	30	30
13C2 PFDA	1.3	-4.7	-1.1	2.1	-4.2	6.6	30	30	30	30	30	30

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Lab Sample ID: ICV 320-192908/13 Calibration Date: 11/03/2017 14:20
 Instrument ID: A8_N Calib Start Date: 11/03/2017 13:37
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 11/03/2017 14:01
 Lab File ID: 2017.11.03_537XICAL_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		0.8310		83.7	100	-16.4	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.9369	0.8136		8.68	10.0	-13.2	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.674	1.463		17.5	20.1	-12.6	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9258	0.7995		17.7	20.5	-13.6	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9389	0.8637		18.1	19.7	-8.0	30.0
Perfluorononanoic acid (PFNA)	Ave	0.6642	0.6428		19.5	20.1	-3.2	30.0
13C2 PFHxA	Ave	1.100	1.039		9.44	10.0	-5.6	30.0
13C2 PFDA	Ave	0.7652	0.7391		9.66	10.0	-3.4	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Lab Sample ID: CCVL 320-192938/4 Calibration Date: 11/06/2017 07:01
 Instrument ID: A8_N Calib Start Date: 11/03/2017 13:37
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 11/03/2017 14:01
 Lab File ID: 2017.11.06_537A_004.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		1.052		19.3	20.0	-3.5	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.9369	0.8198		1.95	2.22	-12.5	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.674	1.594		6.35	6.67	-4.8	50.0
Perfluorooctanoic acid (PFOA)	Ave	0.9258	0.8734		4.20	4.45	-5.7	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9389	0.9137		8.65	8.89	-2.7	50.0
Perfluorononanoic acid (PFNA)	Ave	0.6642	0.6047		4.05	4.45	-8.9	50.0
13C2 PFHxA	Ave	1.100	0.9304		8.46	10.0	-15.4	30.0
13C2 PFDA	Ave	0.7652	0.7583		9.91	10.0	-0.9	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Lab Sample ID: CCV 320-193089/1 Calibration Date: 11/06/2017 09:45
 Instrument ID: A8_N Calib Start Date: 11/03/2017 13:37
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 11/03/2017 14:01
 Lab File ID: 2017.11.06_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		1.053		45.1	45.0	0.1	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.9369	0.8908		4.75	5.00	-4.9	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.674	1.698		15.2	15.0	1.4	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9258	0.8532		9.22	10.0	-7.8	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9389	0.9207		19.6	20.0	-1.9	30.0
Perfluorononanoic acid (PFNA)	Ave	0.6642	0.6456		9.72	10.0	-2.8	30.0
13C2 PFHxA	Ave	1.100	1.044		9.49	10.0	-5.1	30.0
13C2 PFDA	Ave	0.7652	0.7648		9.99	10.0	-0.0	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Lab Sample ID: CCV 320-193089/8 Calibration Date: 11/06/2017 10:18
 Instrument ID: A8_N Calib Start Date: 11/03/2017 13:37
 GC Column: GeminiC18 3x100 ID: 3.00 (mm) Calib End Date: 11/03/2017 14:01
 Lab File ID: 2017.11.06_537B_008.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	QuaF		0.8784		128	135	-5.3	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	0.9369	0.9141		14.6	15.0	-2.4	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.674	1.628		43.8	45.0	-2.8	30.0
Perfluorooctanoic acid (PFOA)	Ave	0.9258	0.9160		29.7	30.0	-1.1	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	0.9389	0.9362		59.8	60.0	-0.3	30.0
Perfluorononanoic acid (PFNA)	Ave	0.6642	0.6966		31.5	30.0	4.9	30.0
13C2 PFHxA	Ave	1.100	1.091		9.92	10.0	-0.8	30.0
13C2 PFDA	Ave	0.7652	0.7932		10.4	10.0	3.7	30.0

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica SacramentoJob No.: 320-32676-1

SDG No.: _____

Instrument ID: A8_NStart Date: 11/03/2017 13:37Analysis Batch Number: 192908End Date: 11/03/2017 14:24

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
IC 320-192908/4		11/03/2017 13:37	1	2017.11.03_537X ICAL 004.d	GeminiC18 3x100 3(mm)
IC 320-192908/5		11/03/2017 13:42	1	2017.11.03_537X ICAL 005.d	GeminiC18 3x100 3(mm)
IC 320-192908/6		11/03/2017 13:47	1	2017.11.03_537X ICAL 006.d	GeminiC18 3x100 3(mm)
IC 320-192908/7 ICISAV		11/03/2017 13:52	1	2017.11.03_537X ICAL 007.d	GeminiC18 3x100 3(mm)
IC 320-192908/8		11/03/2017 13:56	1	2017.11.03_537X ICAL 008.d	GeminiC18 3x100 3(mm)
IC 320-192908/9		11/03/2017 14:01	1	2017.11.03_537X ICAL 009.d	GeminiC18 3x100 3(mm)
ZZZZZ		11/03/2017 14:06	1		GeminiC18 3x100 3(mm)
CCVL 320-192908/11		11/03/2017 14:10	1		GeminiC18 3x100 3(mm)
ZZZZZ		11/03/2017 14:15	1		GeminiC18 3x100 3(mm)
ICV 320-192908/13		11/03/2017 14:20	1	2017.11.03_537X ICAL 013.d	GeminiC18 3x100 3(mm)
ZZZZZ		11/03/2017 14:24	1		GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1

SDG No.: _____

Instrument ID: A8_N Start Date: 11/06/2017 07:01Analysis Batch Number: 192938 End Date: 11/06/2017 07:01

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-192938/4		11/06/2017 07:01	1	2017.11.06_537A 004.d	GeminiC18 3x100 3(mm)

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1
 SDG No.: _____
 Instrument ID: A8_N Start Date: 11/06/2017 09:45
 Analysis Batch Number: 193089 End Date: 11/06/2017 10:18

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-193089/1 CCVIS		11/06/2017 09:45	1	2017.11.06_537B 001.d	GeminiC18 3x100 3(mm)
ZZZZZ		11/06/2017 09:50	1		GeminiC18 3x100 3(mm)
MB 320-191373/1-A		11/06/2017 09:54	1	2017.11.06_537B 003.d	GeminiC18 3x100 3(mm)
LLCS 320-191373/2-A		11/06/2017 09:59	1	2017.11.06_537B 004.d	GeminiC18 3x100 3(mm)
LLCSD 320-191373/3-A		11/06/2017 10:04	1	2017.11.06_537B 005.d	GeminiC18 3x100 3(mm)
320-32676-1		11/06/2017 10:09	1	2017.11.06_537B 006.d	GeminiC18 3x100 3(mm)
320-32676-2		11/06/2017 10:13	1	2017.11.06_537B 007.d	GeminiC18 3x100 3(mm)
CCV 320-193089/8 CCVIS		11/06/2017 10:18	1	2017.11.06_537B 008.d	GeminiC18 3x100 3(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-32676-1

SDG No.: _____

Batch Number: 191373 Batch Start Date: 10/27/17 08:32 Batch Analyst: Santos, JonathanBatch Method: 537 Batch End Date: 10/27/17 16:53

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-IS 00051
MB 320-191373/1		537, 537				250.00 mL	1.00 mL	7 SU	100 uL
LLCS 320-191373/2		537, 537				250.00 mL	1.00 mL	7 SU	100 uL
LLCSD 320-191373/3		537, 537				250.00 mL	1.00 mL	7 SU	100 uL
320-32676-A-1	WGNA-102417-RW-4 829	537, 537	T	262.62 g	27.53 g	235.1 mL	1.00 mL	7 SU	100 uL
320-32676-A-2	WGNA-102417-FRB- 4829	537, 537	T	287.18 g	26.94 g	260.2 mL	1.00 mL	7 SU	100 uL

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-LSP 00025	LC537-SU 00050	AnalysisComment			
MB 320-191373/1		537, 537			100 uL	Ch ND			
LLCS 320-191373/2		537, 537		100 uL	100 uL	Ch ND			
LLCSD 320-191373/3		537, 537		100 uL	100 uL	Ch ND			
320-32676-A-1	WGNA-102417-RW-4 829	537, 537	T		100 uL	Ch ND			
320-32676-A-2	WGNA-102417-FRB- 4829	537, 537	T		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.: 320-32676-1

SDG No.: _____

Batch Number: 191373 Batch Start Date: 10/27/17 08:32 Batch Analyst: Santos, JonathanBatch Method: 537 Batch End Date: 10/27/17 16:53

Batch Notes	
Analyst ID - Aliquot Step	TQN
Analyst ID - Concentration	CCB
Analyst ID - Final Volume Step	TQN
Internal Standard ID#	1041860
Manifold ID	7
Methanol ID	1071552
Pipette ID	N32761F
Analyst ID - IS Reagent Drop	TQN
Analyst ID - IS Reagent Drop Witness	TWL
Analyst ID - SU Reagent Drop	JNS
Analyst ID - SU Reagent Drop Witness	CCB
Analyst ID - TA Reagent Drop	JNS
Analyst ID - TA Reagent Drop Witness	CCB
SPE Cartridge ID	6357081-09
Trizma ID	SLBR4303V
Reagent Water ID	10/25/17

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.

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-191373

Analyst: Santos, Jonathan

Batch Open: 10/27/2017 8:32:00AM

Method Code: 320-537_Prep-320

Batch End: 10/27/2017 4:53:00PM

Extraction of Perfluorinated Alkyl Acids

Input Sample Lab ID (Analytical Method)	SDG (Job #)	GrossWt TareWt	InitAmnt FinAmnt	PHs			Due Date	Analytical TAT	Div Rank	Comments	Output Sample Lab ID
				Revd	Adj1	Adj2					
1 MB~320-191373/1 N/A	N/A		250.00 mL	7			N/A	N/A	N/A	Ch ND	
			1.00 mL								
2 LLCS~320-191373/2 N/A	N/A		250.00 mL	7			N/A	N/A	N/A	Ch ND	
			1.00 mL								
3 LLCSD~320-191373/3 N/A	N/A		250.00 mL	7			N/A	N/A	N/A	Ch ND	
			1.00 mL								
320-32676-A-1 (537_DOD5)	N/A (320-32676-1)	262.62 g	235.1 mL	7			10/29/17	16_Days	4	Ch ND	
		27.53 g	1.00 mL								
320-32676-A-2 (537_DOD5)	N/A (320-32676-1)	287.18 g	260.2 mL	7			10/29/17	16_Days	4	Ch ND	
		26.94 g	1.00 mL								

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-191373

Analyst: Santos, Jonathan

Batch Open: 10/27/2017 8:32:00AM

Method Code: 320-537_Prep-320

Batch End: 10/27/2017 4:53:00PM

Batch Notes

Manifold ID 7

Trizma ID SLBR4303V

SPE Cartridge ID 6357081-09

Methanol ID 1071552

Reagent Water ID 10/25/17

Internal Standard ID# 1041860

Pipette ID N32761F

Analyst ID - TA Reagent Drop JNS

Analyst ID - TA Reagent Drop CCB

Witness

Analyst ID - SU Reagent Drop JNS

Analyst ID - SU Reagent Drop CCB

Witness

Analyst ID - IS Reagent Drop TQN

Analyst ID - IS Reagent Drop TWL

Witness

Analyst ID - Concentration CCB

Analyst ID - Aliquot Step TQN

Analyst ID - Final Volume Step TQN

Batch Comment N/A

Comments

Aqueous Extraction Analysis Sheet

(To Accompany Samples to Instruments)

Batch Number: 320-191373

Analyst: Santos, Jonathan

Batch Open: 10/27/2017 8:32:00AM

Method Code: 320-537_Prep-320

Batch End:

Batch Notes

Manifold ID 7

Trizma ID SLBR4303V

SPE Cartridge ID 6357081-09

Methanol ID 1071552

Reagent Water ID 10/25/17

Internal Standard ID# 1041860

Pipette ID N32761F

Analyst ID - TA Reagent Drop JNS

Analyst ID - TA Reagent Drop CCB
Witness

Analyst ID - SU Reagent Drop JNS

Analyst ID - SU Reagent Drop CCB
Witness

Analyst ID - IS Reagent Drop TAN

Analyst ID - IS Reagent Drop TWZ
Witness

Analyst ID - Concentration CCB

Analyst ID - Aliquot Step TAN

Analyst ID - Final Volume Step TAN

Batch Comment N/A

Comments

PFAS Calibration Calculations:

Initial Calibration 11/3/2017
Instrument A8_N

Perfluorohexanesulfonic acid

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	Reported RRF
3	568156	3298877	28.7	1.64764	1.6459
6.67	1312135	3450592	28.7	1.63622	1.6355
15	2908204	3194016	28.7	1.74212	1.7405
30	5871843	3374600	28.7	1.66461	1.6631
45	8413133	3199479	28.7	1.67706	1.6755
60	11071993	3141787	28.7	1.68570	1.6841
Average				1.67556	1.6741
Standard Deviation				0.0374	
RSD				0.0223	
%RSD				2.23033	2.2

Continuing Calibration 11/06/2017 @ 09:45
A8_N

Perfluorohexanesulfonic acid

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	%D	Reported RRF	Reported %D
15	3071434	3457604	28.7	1.6996	1.4276328	1.698	1.4

Willow Grove
SDG 320-32676-1

Sample Identification

WGNA-102417-RW-4829

Compound

Perfluoroheptanoic acid

Compound Area 291255

Internal Standard Amount (ng) 10

Dilution Factor 1

Internal Standard Area 1656288

Average RRF 0.9369

Sample Volume(ml) 235.1

Volume Extract (ml) 1

Injection Volume (μl) 1

Concentration 7.9835 ug/L

ng/L

JAS 11/21/17

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