NAVFAC
Naval Facilities Engineering Command

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 320-38340-1

Naval Air Warfare Center Warminster
Warminster, Pennsylvania

August 2019

N62269_001171
WARMINSTER_NAWC
SSIC 5000-33c

LABORATORY DATA PACKAGE, 320-38340-1, NAS WILLOW GROVE NAWC WARMINSTER PA

04/30/2018

TESTAMERICA LABORATORIES INC

Approved for public release: distribution unlimited.

ANALYTICAL REPORT

Job Number: 320-38340-1

Job Description: Warminster: PFAS, NAS JRB Willow Grove

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

Attention: Andy Frebowitz

Approved for release.
David R Alltucker
Project Manager I
4/30/2018 1:50 PM

David R Alltucker, Project Manager I
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david.alltucker@testamericainc.com
04/30/2018

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Qualifiers

LCMS

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

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	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
320-38340-1

Receipt
The samples were received on 4/19/2018 8:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice at 5.9 degrees 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 320-219207.

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: 320-38340-1

Client Sample ID: NAWC-041818-RW-260 — Lab Sample ID: 320-38340-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	19	J M	39	6.6	ng/L	1		537	Total/NA
Perfluorooctanoic acid (PFOA)	18	J	20	2.7	ng/L	1		537	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	8.8	J	29	5.4	ng/L	1		537	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.5	J	9.8	1.9	ng/L	1		537	Total/NA
Perfluorobutanesulfonic acid (PFBS)	16	J	88	16	ng/L	1		537	Total/NA

Client Sample ID: NAWC-041818-FRB-260 — Lab Sample ID: 320-38340-2

No Detections.

Client Sample ID: NAWC-041818-RW-228 — Lab Sample ID: 320-38340-3

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	15	J M	41	7.0	ng/L	1		537	Total/NA
Perfluorooctanoic acid (PFOA)	21		21	2.9	ng/L	1		537	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.9	J	10	2.0	ng/L	1		537	Total/NA
Perfluorobutanesulfonic acid (PFBS)	38	J	92	17	ng/L	1		537	Total/NA

Client Sample ID: NAWC-041818-FRB-228 — Lab Sample ID: 320-38340-4

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: NAWC-041818-RW-260 — Lab Sample ID: 320-38340-1

Date Collected: 04/18/18 12:10 — **Matrix: Water**
Date Received: 04/19/18 08:40

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	**19**	**J M**	39	6.6	ng/L		04/23/18 07:33	04/30/18 01:27	1
Perfluorooctanoic acid (PFOA)	**18**	**J**	20	2.7	ng/L		04/23/18 07:33	04/30/18 01:27	1
Perfluorononanoic acid (PFNA)	20	U M	23	7.8	ng/L		04/23/18 07:33	04/30/18 01:27	1
Perfluorohexanesulfonic acid (PFHxS)	**8.8**	**J**	29	5.4	ng/L		04/23/18 07:33	04/30/18 01:27	1
Perfluoroheptanoic acid (PFHpA)	**5.5**	**J**	9.8	1.9	ng/L		04/23/18 07:33	04/30/18 01:27	1
Perfluorobutanesulfonic acid (PFBS)	**16**	**J**	88	16	ng/L		04/23/18 07:33	04/30/18 01:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*97*		*70 - 130*	*04/23/18 07:33*	*04/30/18 01:27*	*1*
13C2 PFDA	*85*		*70 - 130*	*04/23/18 07:33*	*04/30/18 01:27*	*1*

Client Sample ID: NAWC-041818-FRB-260 — Lab Sample ID: 320-38340-2

Date Collected: 04/18/18 12:05 — **Matrix: Water**
Date Received: 04/19/18 08:40

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	16	U	40	6.7	ng/L		04/23/18 07:33	04/30/18 01:32	1
Perfluorooctanoic acid (PFOA)	7.9	U	20	2.8	ng/L		04/23/18 07:33	04/30/18 01:32	1
Perfluorononanoic acid (PFNA)	20	U	24	7.9	ng/L		04/23/18 07:33	04/30/18 01:32	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	30	5.4	ng/L		04/23/18 07:33	04/30/18 01:32	1
Perfluoroheptanoic acid (PFHpA)	4.0	U	9.9	1.9	ng/L		04/23/18 07:33	04/30/18 01:32	1
Perfluorobutanesulfonic acid (PFBS)	36	U	89	16	ng/L		04/23/18 07:33	04/30/18 01:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*98*		*70 - 130*	*04/23/18 07:33*	*04/30/18 01:32*	*1*
13C2 PFDA	*85*		*70 - 130*	*04/23/18 07:33*	*04/30/18 01:32*	*1*

Client Sample ID: NAWC-041818-RW-228 — Lab Sample ID: 320-38340-3

Date Collected: 04/18/18 13:10 — **Matrix: Water**
Date Received: 04/19/18 08:40

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	**15**	**J M**	41	7.0	ng/L		04/23/18 07:33	04/30/18 01:37	1
Perfluorooctanoic acid (PFOA)	**21**		21	2.9	ng/L		04/23/18 07:33	04/30/18 01:37	1
Perfluorononanoic acid (PFNA)	21	U M	25	8.2	ng/L		04/23/18 07:33	04/30/18 01:37	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	31	5.6	ng/L		04/23/18 07:33	04/30/18 01:37	1
Perfluoroheptanoic acid (PFHpA)	**7.9**	**J**	10	2.0	ng/L		04/23/18 07:33	04/30/18 01:37	1
Perfluorobutanesulfonic acid (PFBS)	**38**	**J**	92	17	ng/L		04/23/18 07:33	04/30/18 01:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*96*		*70 - 130*	*04/23/18 07:33*	*04/30/18 01:37*	*1*
13C2 PFDA	*84*		*70 - 130*	*04/23/18 07:33*	*04/30/18 01:37*	*1*

Client Sample ID: NAWC-041818-FRB-228 **Lab Sample ID: 320-38340-4**
Date Collected: 04/18/18 13:05 **Matrix: Water**
Date Received: 04/19/18 08:40

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

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	16	U	40	6.9	ng/L		04/23/18 07:33	04/30/18 01:41	1
Perfluorooctanoic acid (PFOA)	8.1	U	20	2.8	ng/L		04/23/18 07:33	04/30/18 01:41	1
Perfluorononanoic acid (PFNA)	20	U	24	8.1	ng/L		04/23/18 07:33	04/30/18 01:41	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	30	5.6	ng/L		04/23/18 07:33	04/30/18 01:41	1
Perfluoroheptanoic acid (PFHpA)	4.0	U	10	1.9	ng/L		04/23/18 07:33	04/30/18 01:41	1
Perfluorobutanesulfonic acid (PFBS)	36	U	91	16	ng/L		04/23/18 07:33	04/30/18 01:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*95*		*70 - 130*	*04/23/18 07:33*	*04/30/18 01:41*	*1*
13C2 PFDA	*91*		*70 - 130*	*04/23/18 07:33*	*04/30/18 01:41*	*1*

Default Detection Limits

Client: Tetra Tech, Inc. TestAmerica Job ID: 320-38340-1
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: 320-38340-1

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

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
		PFHxA	PFDA
Lab Sample ID	Client Sample ID	(70-130)	(70-130)
320-38340-1	NAWC-041818-RW-260	97	85
320-38340-2	NAWC-041818-FRB-260	98	85
320-38340-3	NAWC-041818-RW-228	96	84
320-38340-4	NAWC-041818-FRB-228	95	91
LCS 320-219207/2-A	Lab Control Sample	91	85
LCSD 320-219207/3-A	Lab Control Sample Dup	94	88
MB 320-219207/1-A	Method Blank	96	88

Surrogate Legend

PFHxA = 13C2 PFHxA

PFDA = 13C2 PFDA

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

Lab Sample ID: MB 320-219207/1-A **Client Sample ID: Method Blank**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 220561 **Prep Batch: 219207**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	16	U	40	6.8	ng/L		04/23/18 07:33	04/30/18 01:13	1
Perfluorooctanoic acid (PFOA)	8.0	U	20	2.8	ng/L		04/23/18 07:33	04/30/18 01:13	1
Perfluorononanoic acid (PFNA)	20	U	24	8.0	ng/L		04/23/18 07:33	04/30/18 01:13	1
Perfluorohexanesulfonic acid (PFHxS)	12	U	30	5.5	ng/L		04/23/18 07:33	04/30/18 01:13	1
Perfluoroheptanoic acid (PFHpA)	4.0	U	10	1.9	ng/L		04/23/18 07:33	04/30/18 01:13	1
Perfluorobutanesulfonic acid (PFBS)	36	U	90	16	ng/L		04/23/18 07:33	04/30/18 01:13	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*96*		*70 - 130*	*04/23/18 07:33*	*04/30/18 01:13*	*1*
13C2 PFDA	*88*		*70 - 130*	*04/23/18 07:33*	*04/30/18 01:13*	*1*

Lab Sample ID: LCS 320-219207/2-A **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 220561 **Prep Batch: 219207**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorooctanesulfonic acid (PFOS)	132	121	M	ng/L		92	70 - 130
Perfluorooctanoic acid (PFOA)	66.0	61.9		ng/L		94	70 - 130
Perfluorononanoic acid (PFNA)	66.0	57.7		ng/L		87	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	100	98.6		ng/L		99	70 - 130
Perfluoroheptanoic acid (PFHpA)	32.0	29.6		ng/L		93	70 - 130
Perfluorobutanesulfonic acid (PFBS)	300	280		ng/L		93	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C2 PFHxA	*91*		*70 - 130*
13C2 PFDA	*85*		*70 - 130*

Lab Sample ID: LCSD 320-219207/3-A **Client Sample ID: Lab Control Sample Dup**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 220561 **Prep Batch: 219207**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)	132	121	M	ng/L		92	70 - 130	0	30
Perfluorooctanoic acid (PFOA)	66.0	61.7		ng/L		93	70 - 130	0	30
Perfluorononanoic acid (PFNA)	66.0	57.7		ng/L		87	70 - 130	0	30
Perfluorohexanesulfonic acid (PFHxS)	100	101		ng/L		101	70 - 130	2	30
Perfluoroheptanoic acid (PFHpA)	32.0	29.9		ng/L		93	70 - 130	1	30
Perfluorobutanesulfonic acid (PFBS)	300	286		ng/L		95	70 - 130	2	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C2 PFHxA	*94*		*70 - 130*
13C2 PFDA	*88*		*70 - 130*

QC Association Summary

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

TestAmerica Job ID: 320-38340-1

LCMS

Prep Batch: 219207

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-38340-1	NAWC-041818-RW-260	Total/NA	Water	537	
320-38340-2	NAWC-041818-FRB-260	Total/NA	Water	537	
320-38340-3	NAWC-041818-RW-228	Total/NA	Water	537	
320-38340-4	NAWC-041818-FRB-228	Total/NA	Water	537	
MB 320-219207/1-A	Method Blank	Total/NA	Water	537	
LCS 320-219207/2-A	Lab Control Sample	Total/NA	Water	537	
LCSD 320-219207/3-A	Lab Control Sample Dup	Total/NA	Water	537	

Analysis Batch: 220561

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-38340-1	NAWC-041818-RW-260	Total/NA	Water	537	219207
320-38340-2	NAWC-041818-FRB-260	Total/NA	Water	537	219207
320-38340-3	NAWC-041818-RW-228	Total/NA	Water	537	219207
320-38340-4	NAWC-041818-FRB-228	Total/NA	Water	537	219207
MB 320-219207/1-A	Method Blank	Total/NA	Water	537	219207
LCS 320-219207/2-A	Lab Control Sample	Total/NA	Water	537	219207
LCSD 320-219207/3-A	Lab Control Sample Dup	Total/NA	Water	537	219207

Lab Chronicle

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

TestAmerica Job ID: 320-38340-1

Client Sample ID: NAWC-041818-RW-260
Lab Sample ID: 320-38340-1
Date Collected: 04/18/18 12:10
Matrix: Water
Date Received: 04/19/18 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			219207	04/23/18 07:33	SK	TAL SAC
Total/NA	Analysis	537		1	220561	04/30/18 01:27	JRB	TAL SAC

Client Sample ID: NAWC-041818-FRB-260
Lab Sample ID: 320-38340-2
Date Collected: 04/18/18 12:05
Matrix: Water
Date Received: 04/19/18 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			219207	04/23/18 07:33	SK	TAL SAC
Total/NA	Analysis	537		1	220561	04/30/18 01:32	JRB	TAL SAC

Client Sample ID: NAWC-041818-RW-228
Lab Sample ID: 320-38340-3
Date Collected: 04/18/18 13:10
Matrix: Water
Date Received: 04/19/18 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			219207	04/23/18 07:33	SK	TAL SAC
Total/NA	Analysis	537		1	220561	04/30/18 01:37	JRB	TAL SAC

Client Sample ID: NAWC-041818-FRB-228
Lab Sample ID: 320-38340-4
Date Collected: 04/18/18 13:05
Matrix: Water
Date Received: 04/19/18 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	537			219207	04/23/18 07:33	SK	TAL SAC
Total/NA	Analysis	537		1	220561	04/30/18 01:41	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: 320-38340-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

Laboratory: TestAmerica Sacramento

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

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

Method Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 320-38340-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

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

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

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

Sample Summary

Client: Tetra Tech, Inc.
TestAmerica Job ID: 320-38340-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-38340-1	NAWC-041818-RW-260	Water	04/18/18 12:10	04/19/18 08:40
320-38340-2	NAWC-041818-FRB-260	Water	04/18/18 12:05	04/19/18 08:40
320-38340-3	NAWC-041818-RW-228	Water	04/18/18 13:10	04/19/18 08:40
320-38340-4	NAWC-041818-FRB-228	Water	04/18/18 13:05	04/19/18 08:40

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Instrument ID: A8_N Analysis Batch Number: 217453

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

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

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

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

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

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

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

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

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

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

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

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

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Instrument ID: A8_N Analysis Batch Number: 217453

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

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

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

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

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

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

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

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

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

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

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

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

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Instrument ID: A8_N Analysis Batch Number: 220554

Lab Sample ID: CCVL 320-220554/1 Client Sample ID:

Date Analyzed: 04/29/18 22:39 Lab File ID: 2018.04.29_537A_004.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.12	Peak assignment corrected	barnettj	04/30/18 10:13

537

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Instrument ID: A8_N Analysis Batch Number: 220561

Lab Sample ID: CCV 320-220561/1 CCVIS Client Sample ID:

Date Analyzed: 04/30/18 01:04 Lab File ID: 2018.04.29_537B_001.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.10	Peak assignment corrected	barnettj	04/30/18 10:50

Lab Sample ID: LCS 320-219207/2-A Client Sample ID:

Date Analyzed: 04/30/18 01:18 Lab File ID: 2018.04.29_537B_004.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.11	Peak assignment corrected	roycea	04/30/18 09:01

Lab Sample ID: LCSD 320-219207/3-A Client Sample ID:

Date Analyzed: 04/30/18 01:23 Lab File ID: 2018.04.29_537B_005.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.11	Peak assignment corrected	roycea	04/30/18 09:02

Lab Sample ID: 320-38340-1 Client Sample ID: NAWC-041818-RW-260

Date Analyzed: 04/30/18 01:27 Lab File ID: 2018.04.29_537B_006.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.10	Peak assignment corrected	barnettj	04/30/18 10:51
Perfluorononanoic acid (PFNA)	2.11	Missed Peak	barnettj	04/30/18 10:51

537

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Instrument ID: A8_N Analysis Batch Number: 220561

Lab Sample ID: 320-38340-3 Client Sample ID: NAWC-041818-RW-228

Date Analyzed: 04/30/18 01:37 Lab File ID: 2018.04.29_537B_008.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.09	Peak assignment corrected	barnettj	04/30/18 10:52
Perfluorononanoic acid (PFNA)	2.11	Incomplete Integration	barnettj	04/30/18 10:52

Lab Sample ID: CCV 320-220561/10 CCVIS Client Sample ID:

Date Analyzed: 04/30/18 01:46 Lab File ID: 2018.04.29_537B_010.d GC Column: GeminiC18 3x1 ID: 3(mm)

COMPOUND NAME	RETENTION TIME	MANUAL INTEGRATION		
		REASON	ANALYST	DATE
Perfluorooctanesulfonic acid (PFOS)	2.10	Peak assignment corrected	roycea	04/30/18 09:03

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LC537-ICV_00030	07/30/18	02/15/18	MeOH/H2O, Lot 067374	10 mL	LC537-IS_00059	1000 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
.LC537-IS_00059	07/30/18	01/30/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00007	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00021	180 uL	13C4 PFOS	0.2868 ug/mL
..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-ICV_00030	07/30/18	02/15/18	MeOH/H2O, Lot 067374	10 mL	LC537-SU_00059	1000 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
					LC537ICIM2_00001	400 uL	Perfluorobutanesulfonic acid (PFBS)	100.092 ng/mL
							Perfluoroheptanoic acid (PFHpA)	10 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	20.1619 ng/mL
							Perfluorononanoic acid (PFNA)	20.1641 ng/mL
							Perfluorooctanoic acid (PFOA)	20.167 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	20.1702 ng/mL
.LC537-SU_00059	07/30/18	01/30/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
.LC537ICIM2_00001	08/15/18	02/15/18	Methanol, Lot 090285	10 mL	LC537ICIM_00020	0.5 mL	Perfluorobutanesulfonic acid (PFBS)	2.5023 ug/mL
							Perfluoroheptanoic acid (PFHpA)	0.25 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	0.504047 ug/mL
							Perfluorononanoic acid (PFNA)	0.504103 ug/mL
							Perfluorooctanoic acid (PFOA)	0.504176 ug/mL
							Perfluorooctanesulfonic acid (PFOS)	0.504255 ug/mL
..LC537ICIM_00020	08/15/18	02/15/18	Methanol, Lot 090285	25 mL	LC537-PFBS2_00009	0.625 mL	Perfluorobutanesulfonic acid (PFBS)	50.0459 ug/mL
					LC537-PFHpA2_00012	0.0625 mL	Perfluoroheptanoic acid (PFHpA)	5 ug/mL
					LC537-PFHxS2_00009	0.126 mL	Perfluorohexanesulfonic acid (PFHxS)	10.0809 ug/mL
					LC537-PFNA2_00010	0.126 mL	Perfluorononanoic acid (PFNA)	10.0821 ug/mL
					LC537-PFOA2_00011	0.126 mL	Perfluorooctanoic acid (PFOA)	10.0835 ug/mL
					LC537-PFOS2_00011	0.126 mL	Perfluorooctanesulfonic acid (PFOS)	10.0851 ug/mL
...LC537-PFBS2_00009	08/15/18	02/15/18	Methanol, Lot 090285	17.1 mL	LC537_PFBS2_00002	0.0343 g	Perfluorobutanesulfonic acid (PFBS)	2001.84 ug/mL
....LC537_PFBS2_00002	09/08/22	Santa Cruz Biotechnology, Lot F0917			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	0.998 g/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...LC537-PFHpA2_00012	08/15/18	02/15/18	Methanol, Lot 09092	23.95 mL	LC537_PFHpA2_00002	0.0479 g	Perfluoroheptanoic acid (PFHpA)	2000 ug/mL
....LC537_PFHpA2_00002	06/13/22		Afla Aesar, Lot 10200390		(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	1 g/g
...LC537-PFHxS2_00009	08/15/18	02/15/18	Methanol, Lot 090285	25.87 mL	LC537_PFHxS2_00002	0.0569 g	Perfluorohexanesulfonic acid (PFHxS)	2000.19 ug/mL
....LC537_PFHxS2_00002	06/08/22		Santa Cruz Biotechnology, Lot G2516		(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	0.9094 g/g
...LC537-PFNA2_00010	08/15/18	02/15/18	Methanol, Lot 090285	16.58 mL	LC537_PFNA2_00002	0.0333 g	Perfluorononanoic acid (PFNA)	2000.41 ug/mL
....LC537_PFNA2_00002	06/14/22		Aldrich, Lot MKCC0699		(Purchased Reagent)		Perfluorononanoic acid (PFNA)	0.996 g/g
...LC537-PFOA2_00011	08/15/18	02/15/18	Methanol, Lot 090285	22.96 mL	LC537_PFOA2_00002	0.0464 g	Perfluorooctanoic acid (PFOA)	2000.7 ug/mL
....LC537_PFOA2_00002	06/09/22		Afla Aesar, Lot 10199078		(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	0.99 g/g
...LC537-PFOS2_00011	08/15/18	02/15/18	Methanol, Lot 090285	14.71 mL	LC537_PFOS2_00002	0.0378 g	Perfluorooctanesulfonic acid (PFOS)	2001.01 ug/mL
....LC537_PFOS2_00002	06/14/22		Sigma, Lot BCBQ0108V		(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	0.7787 g/g
LC537-IS_00067	10/10/18	04/10/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL
.LCM2PFOA_00010	02/12/21		Wellington Laboratories, Lot M2PFOA0216		(Purchased Reagent)		13C2-PFOA	50 ug/mL
.LCMPFOS_00024	05/19/22		Wellington Laboratories, Lot MPFOS517		(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
LC537-L1_00022	09/30/18	04/02/18	MeOH/H2O, Lot 090285	5 mL	LC537-IS_00065	500 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
					LC537-MSP_00033	60 uL	Perfluorobutanesulfonic acid (PFBS)	8.99912 ng/mL
							Perfluoroheptanoic acid (PFHpA)	0.96 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	3.003 ng/mL
							Perfluorononanoic acid (PFNA)	1.98 ng/mL
							Perfluorooctanoic acid (PFOA)	1.98 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	3.95328 ng/mL
					LC537-SU_00064	500 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
.LC537-IS_00065	10/02/18	04/02/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL
..LCM2PFOA_00010	02/12/21		Wellington Laboratories, Lot M2PFOA0216		(Purchased Reagent)		13C2-PFOA	50 ug/mL
..LCMPFOS_00024	05/19/22		Wellington Laboratories, Lot MPFOS517		(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LC537-MSP_00033	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	509 uL	Perfluorobutanesulfonic acid (PFBS)	749.927 ng/mL
					LCPFHpA_00009	48 uL	Perfluoroheptanoic acid (PFHpA)	80 ng/mL
					LCPFHxS-br_00005	165 uL	Perfluorohexanesulfonic acid (PFHxS)	250.25 ng/mL
					LCPFNA_00009	99 uL	Perfluorononanoic acid (PFNA)	165 ng/mL
					LCPFOA_00010	99 uL	Perfluorooctanoic acid (PFOA)	165 ng/mL
					LCPFOS-br_00005	213 uL	Perfluorooctanesulfonic acid (PFOS)	329.44 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFHpA_00009	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHxS-br_00005	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00009	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00010	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFOS-br_00005	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LC537-SU_00064	10/02/18	04/02/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
LC537-L2_00022	09/30/18	04/02/18	MeOH/H2O, Lot 090285	20 mL	LC537-HSP_00028	320 uL	Perfluorobutanesulfonic acid (PFBS)	20.0138 ng/mL
							Perfluoroheptanoic acid (PFHpA)	2.16 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	6.72187 ng/mL
							Perfluorononanoic acid (PFNA)	4.4 ng/mL
							Perfluorooctanoic acid (PFOA)	4.4 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	8.78507 ng/mL
					LC537-IS_00065	2 mL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
					LC537-SU_00064	2 mL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
.LC537-HSP_00028	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	849 uL	Perfluorobutanesulfonic acid (PFBS)	1250.86 ng/mL
					LCPFHpA_00009	81 uL	Perfluoroheptanoic acid (PFHpA)	135 ng/mL
					LCPFHxS-br_00005	277 uL	Perfluorohexanesulfonic acid (PFHxS)	420.117 ng/mL
					LCPFNA_00009	165 uL	Perfluorononanoic acid (PFNA)	275 ng/mL
					LCPFOA_00010	165 uL	Perfluorooctanoic acid (PFOA)	275 ng/mL
					LCPFOS-br_00005	355 uL	Perfluorooctanesulfonic acid (PFOS)	549.067 ng/mL
..LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFHpA_00009	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHxS-br_00005	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00009	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00010	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFOS-br_00005	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LC537-IS_00065	10/02/18	04/02/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL
..LCM2PFOA_00010	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
..LCMPFOS_00024	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LC537-SU_00064	10/02/18	04/02/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
LC537-L3_00025	09/30/18	04/02/18	MeOH/H2O, Lot 090285	20 mL	LC537-HSP_00028	720 uL	Perfluorobutanesulfonic acid (PFBS)	45.031 ng/mL
							Perfluoroheptanoic acid (PFHpA)	4.86 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	15.1242 ng/mL
							Perfluorononanoic acid (PFNA)	9.9 ng/mL
							Perfluorooctanoic acid (PFOA)	9.9 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	19.7664 ng/mL
					LC537-IS_00065	2 mL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
					LC537-SU_00064	2 mL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
.LC537-HSP_00028	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	849 uL	Perfluorobutanesulfonic acid (PFBS)	1250.86 ng/mL
					LCPFHpA_00009	81 uL	Perfluoroheptanoic acid (PFHpA)	135 ng/mL
					LCPFHxS-br_00005	277 uL	Perfluorohexanesulfonic acid (PFHxS)	420.117 ng/mL
					LCPFNA_00009	165 uL	Perfluorononanoic acid (PFNA)	275 ng/mL
					LCPFOA_00010	165 uL	Perfluorooctanoic acid (PFOA)	275 ng/mL
					LCPFOS-br_00005	355 uL	Perfluorooctanesulfonic acid (PFOS)	549.067 ng/mL
..LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFHpA_00009	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHxS-br_00005	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00009	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00010	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFOS-br_00005	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LC537-IS_00065	10/02/18	04/02/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL
..LCM2PFOA_00010	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
..LCMPFOS_00024	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LC537-SU_00064	10/02/18	04/02/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
LC537-L4_00022	09/30/18	04/02/18	MeOH/H2O, Lot 090285	5 mL	LC537-HSP_00028	360 uL	Perfluorobutanesulfonic acid (PFBS)	90.0619 ng/mL
							Perfluoroheptanoic acid (PFHpA)	9.72 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	30.2484 ng/mL
							Perfluorononanoic acid (PFNA)	19.8 ng/mL
							Perfluorooctanoic acid (PFOA)	19.8 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	39.5328 ng/mL
					LC537-IS_00065	500 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
					LC537-SU_00064	500 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
.LC537-HSP_00028	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	849 uL	Perfluorobutanesulfonic acid (PFBS)	1250.86 ng/mL
					LCPFHpA_00009	81 uL	Perfluoroheptanoic acid (PFHpA)	135 ng/mL
					LCPFHxS-br_00005	277 uL	Perfluorohexanesulfonic acid (PFHxS)	420.117 ng/mL
					LCPFNA_00009	165 uL	Perfluorononanoic acid (PFNA)	275 ng/mL
					LCPFOA_00010	165 uL	Perfluorooctanoic acid (PFOA)	275 ng/mL
					LCPFOS-br_00005	355 uL	Perfluorooctanesulfonic acid (PFOS)	549.067 ng/mL
..LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFHpA_00009	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHxS-br_00005	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00009	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00010	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFOS-br_00005	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LC537-IS_00065	10/02/18	04/02/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL
..LCM2PFOA_00010	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
..LCMPFOS_00024	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LC537-SU_00064	10/02/18	04/02/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
LC537-L5_00026	09/30/18	04/02/18	MeOH/H2O, Lot 090285	20 mL	LC537-HSP_00028	2160 uL	Perfluorobutanesulfonic acid (PFBS)	135.093 ng/mL
							Perfluoroheptanoic acid (PFHpA)	14.58 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	45.3726 ng/mL
							Perfluorononanoic acid (PFNA)	29.7 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Perfluorooctanoic acid (PFOA)	29.7 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	59.2992 ng/mL
					LC537-IS_00065	2 mL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
					LC537-SU_00064	2 mL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL
.LC537-HSP_00028	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	849 uL	Perfluorobutanesulfonic acid (PFBS)	1250.86 ng/mL
					LCPFHpA_00009	81 uL	Perfluoroheptanoic acid (PFHpA)	135 ng/mL
					LCPFHxS-br_00005	277 uL	Perfluorohexanesulfonic acid (PFHxS)	420.117 ng/mL
					LCPFNA_00009	165 uL	Perfluorononanoic acid (PFNA)	275 ng/mL
					LCPFOA_00010	165 uL	Perfluorooctanoic acid (PFOA)	275 ng/mL
					LCPFOS-br_00005	355 uL	Perfluorooctanesulfonic acid (PFOS)	549.067 ng/mL
..LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFHpA_00009	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHxS-br_00005	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00009	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00010	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFOS-br_00005	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LC537-IS_00065	10/02/18	04/02/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL
..LCM2PFOA_00010	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
..LCMPFOS_00024	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LC537-SU_00064	10/02/18	04/02/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
LC537-L6_00022	09/30/18	04/02/18	MeOH/H2O, Lot 090285	5 mL	LC537-HSP_00028	720 uL	Perfluorobutanesulfonic acid (PFBS)	180.124 ng/mL
							Perfluoroheptanoic acid (PFHpA)	19.44 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	60.4968 ng/mL
							Perfluorononanoic acid (PFNA)	39.6 ng/mL
							Perfluorooctanoic acid (PFOA)	39.6 ng/mL
							Perfluorooctanesulfonic acid (PFOS)	79.0656 ng/mL
					LC537-IS_00065	500 uL	13C2-PFOA	10 ng/mL
							13C4 PFOS	28.68 ng/mL
					LC537-SU_00064	500 uL	13C2 PFDA	10 ng/mL
							13C2 PFHxA	10 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LC537-HSP_00028	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	849 uL	Perfluorobutanesulfonic acid (PFBS)	1250.86 ng/mL
					LCPFHpA_00009	81 uL	Perfluoroheptanoic acid (PFHpA)	135 ng/mL
					LCPFHxS-br_00005	277 uL	Perfluorohexanesulfonic acid (PFHxS)	420.117 ng/mL
					LCPFNA_00009	165 uL	Perfluorononanoic acid (PFNA)	275 ng/mL
					LCPFOA_00010	165 uL	Perfluorooctanoic acid (PFOA)	275 ng/mL
					LCPFOS-br_00005	355 uL	Perfluorooctanesulfonic acid (PFOS)	549.067 ng/mL
..LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
..LCPFHpA_00009	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
..LCPFHxS-br_00005	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
..LCPFNA_00009	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
..LCPFOA_00010	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL
..LCPFOS-br_00005	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
.LC537-IS_00065	10/02/18	04/02/18	Methanol, Lot 090285	30000 uL	LCM2PFOA_00010	60 uL	13C2-PFOA	0.1 ug/mL
					LCMPFOS_00024	180 uL	13C4 PFOS	0.2868 ug/mL
..LCM2PFOA_00010	02/12/21	Wellington Laboratories, Lot M2PFOA0216			(Purchased Reagent)		13C2-PFOA	50 ug/mL
..LCMPFOS_00024	05/19/22	Wellington Laboratories, Lot MPFOS517			(Purchased Reagent)		13C4 PFOS	47.8 ug/mL
.LC537-SU_00064	10/02/18	04/02/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL
..LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
..LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL
LC537-MSP_00033	09/30/18	03/30/18	Methanol, Lot 104453	30 mL	LCPFBSA_00002	509 uL	Perfluorobutanesulfonic acid (PFBS)	749.927 ng/mL
					LCPFHpA_00009	48 uL	Perfluoroheptanoic acid (PFHpA)	80 ng/mL
					LCPFHxS-br_00005	165 uL	Perfluorohexane Sulfonate	250.25 ng/mL
							Perfluorohexanesulfonic acid (PFHxS)	250.25 ng/mL
					LCPFNA_00009	99 uL	Perfluorononanoic acid (PFNA)	165 ng/mL
					LCPFOA_00010	99 uL	Perfluorooctanoic acid (PFOA)	165 ng/mL
					LCPFOS-br_00005	213 uL	Perfluorooctanesulfonic acid (PFOS)	329.44 ng/mL
.LCPFBSA_00002	12/02/21	Wellington Laboratories, Lot LPFBS1116			(Purchased Reagent)		Perfluorobutanesulfonic acid (PFBS)	44.2 ug/mL
.LCPFHpA_00009	12/02/21	Wellington Laboratories, Lot PFHpA1216			(Purchased Reagent)		Perfluoroheptanoic acid (PFHpA)	50 ug/mL
.LCPFHxS-br_00005	01/04/22	Wellington Laboratories, Lot brPFHxSK0117			(Purchased Reagent)		Perfluorohexane Sulfonate	45.5 ug/mL
							Perfluorohexanesulfonic acid (PFHxS)	45.5 ug/mL
.LCPFNA_00009	07/20/22	Wellington Laboratories, Lot PFNA0717			(Purchased Reagent)		Perfluorononanoic acid (PFNA)	50 ug/mL
.LCPFOA_00010	09/27/22	Wellington Laboratories, Lot PFOA0917			(Purchased Reagent)		Perfluorooctanoic acid (PFOA)	50 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.LCPFOS-br_00005	01/12/22	Wellington Laboratories, Lot brPFOSK0117			(Purchased Reagent)		Perfluorooctanesulfonic acid (PFOS)	46.4 ug/mL
LC537-SU_00066	10/10/18	04/10/18	Methanol, Lot 104453	30000 uL	LCMPFDA_00012	60 uL	13C2 PFDA	0.1 ug/mL
					LCMPFHxA_00015	60 uL	13C2 PFHxA	0.1 ug/mL
.LCMPFDA_00012	09/30/21	Wellington Laboratories, Lot MPFDA0916			(Purchased Reagent)		13C2 PFDA	50 ug/mL
.LCMPFHxA_00015	11/22/21	Wellington Laboratories, Lot MPFHxA1116			(Purchased Reagent)		13C2 PFHxA	50 ug/mL

Reagent

LC537_PFBS2_00002

T:6817 SKV

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)	≥ 97%	101.3%
Infrared Spectrum	Conforms to structure	Complies

Reagent

LC537_PFHpA2_00002

Alfa Aesar

Certificate of analysis

r:6.13.17 SW

PFHp A

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

Appearance: White fused solid

Water Content (Karl-Fischer): 0.30%

Melting Point: 32.0-34.3°C

Assay (Aqueous acid-base titration): 99.7%

Identification (FTIR): Conforms

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ThermoFisher SCIENTIFIC

Reagent

LC537_PFHxS2_00002

n: 6.8.17 SKU

CERTIFICATE OF ANALYSIS

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

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

$PFH_xS\text{-}K$

$C_6F_{13}SO_3K$ 438.201

$C_6F_{13}SO_3H$ 400.111

MW correction = $\frac{400.11}{438.201}$ = 0.91307 PFH_xS CasH 355-46-4

Purity & MW correction = 90.9%

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Reagent

LC537_PFNA2_00002

P: 6.14.17 SKV

SIGMA-ALDRICH®

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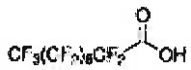
3050 Spruce Street, Saint Louis, MO 63103, USA
Website: www.sigmaaldrich.com
Email USA: techserv@sial.com
Outside USA: eurtechserv@sial.com

Certificate of Analysis

Product Name:
Perfluorononanoic acid – 97%

Product Number:	**394459**
Batch Number:	**MKCC0699**
Brand:	ALDRICH
CAS Number:	375-95-1
MDL Number:	MFCD00039605
Formula:	C9HF17O2
Formula Weight:	464.08 g/mol
Quality Release Date:	07 DEC 2016



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

Michael Grady, Manager
Quality Control
Milwaukee, WI US

PFNA

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

Version Number: 1

Reagent

LC537_PFOA2_00002

Alfa Aesar

Certificate of analysis

P: 6/9/17 SK✓

PFOA

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

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

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ThermoFisher SCIENTIFIC

Reagent

LC537_PFOS2_00002

R: 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:	$CF_3(CF_2)_6CF_2SO_3N(C_2H_5)_4$
Formula Weight:	629.37
Quality Release Date:	11 JUN 2015

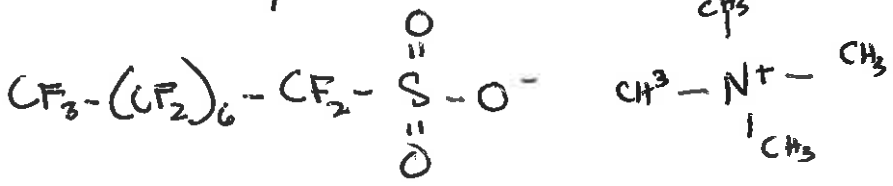
TEST	SPECIFICATION	RESULT
APPEARANCE (COLOR)	WHITE TO OFF WHITE	OFF-WHITE
APPEARANCE (FORM)	POWDER OR POWDER WITH CHUNK(S)	POWDER
CARBON CONTENT	29.77 % - 31.29 %	29.97 %
INFRARED SPECTRUM	CONFORMS TO STRUCTURE	CONFORMS

Claudia Geitner

Dr. Claudia Geitner
Manager Quality Control
Buchs, Switzerland

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

Purity & MW correction = 77.87%



	$C_8F_{17}SO_3^-H$	$C_8H_{20}N$
C = 12.011	96.088	96.088
F = 18.998	322.966	—
S = 32.066	32.066	—
O = 15.999	47.997	—
H = 1.008	1.008	20.160
N = 14.007	—	14.007
	500.125	130.255

Reagent

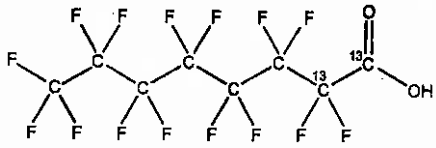
LCM2PFOA_00007

P: 5 of 7 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M2PFOA	**LOT NUMBER:**	M2PFOA0216
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]octanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_6HF_{15}O_2$	**MOLECULAR WEIGHT:**	416.05
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	02/12/2016		
EXPIRY DATE: (mm/dd/yyyy)	02/12/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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 ±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:

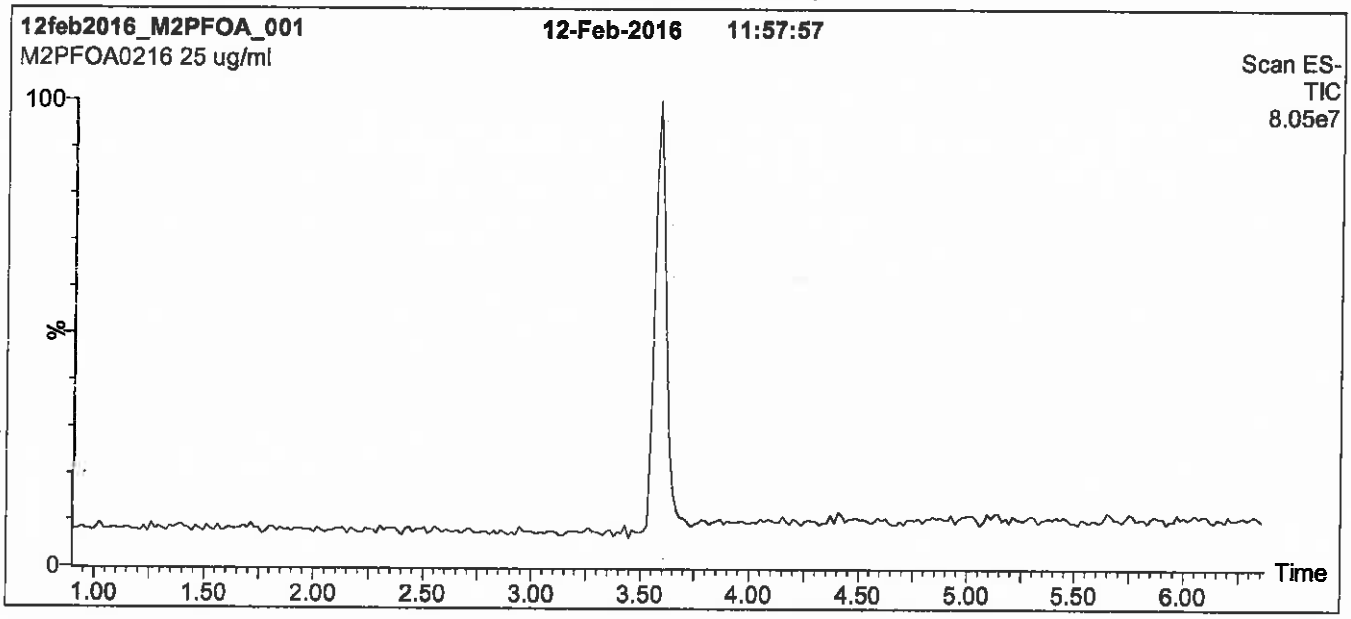
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

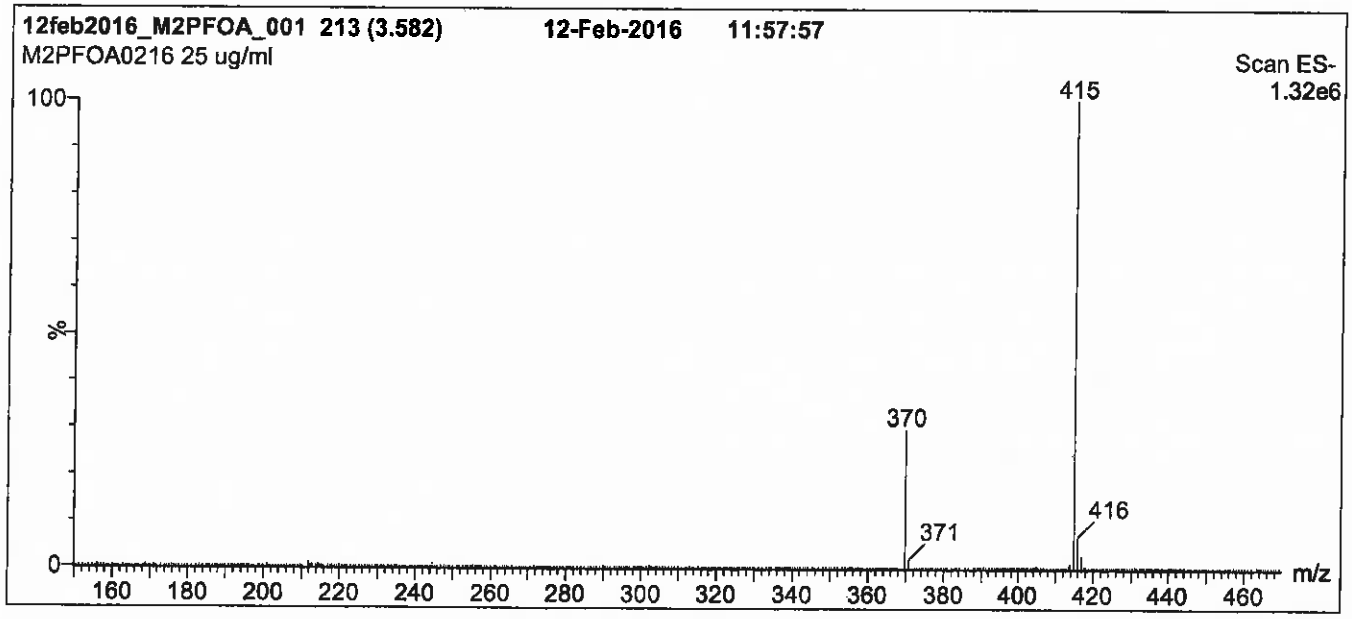
CALA

ANAB ACCREDITED

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc 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

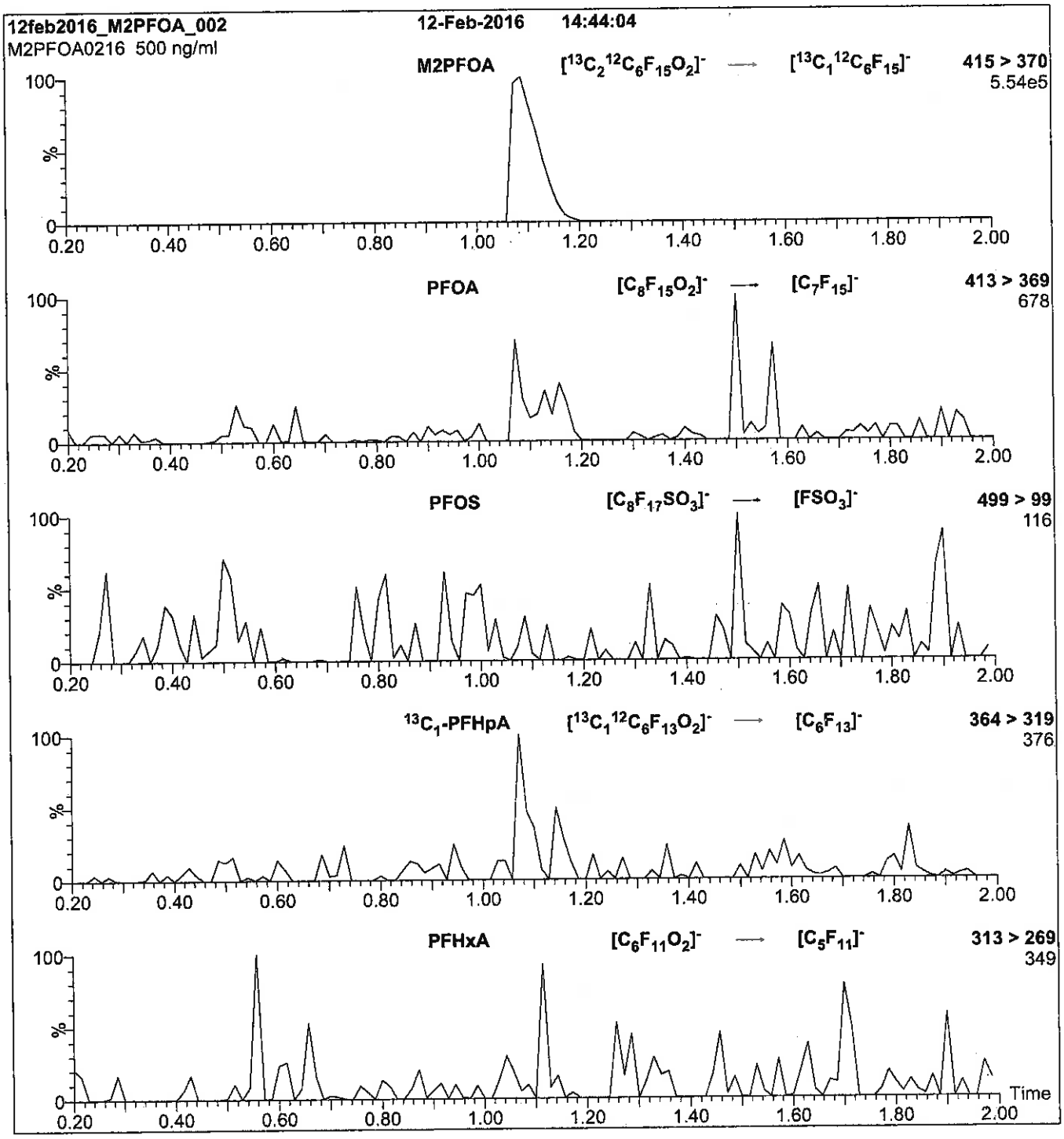
Flow: 300 µl/min

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 µl/min

MS Parameters

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

Reagent

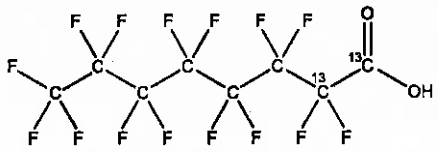
LCM2PFOA_00010

√ 8/30/14 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M2PFOA	**LOT NUMBER:**	M2PFOA0216
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]octanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_8HF_{15}O_2$	**MOLECULAR WEIGHT:**	416.05
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	02/12/2016		
EXPIRY DATE: (mm/dd/yyyy)	02/12/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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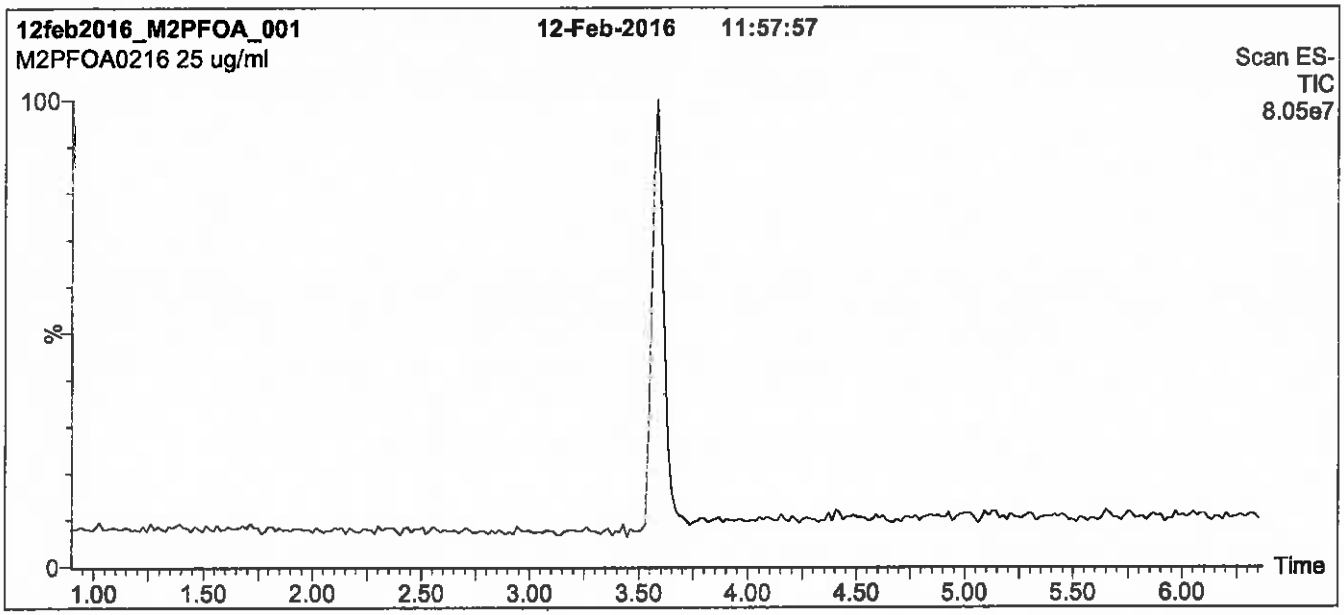
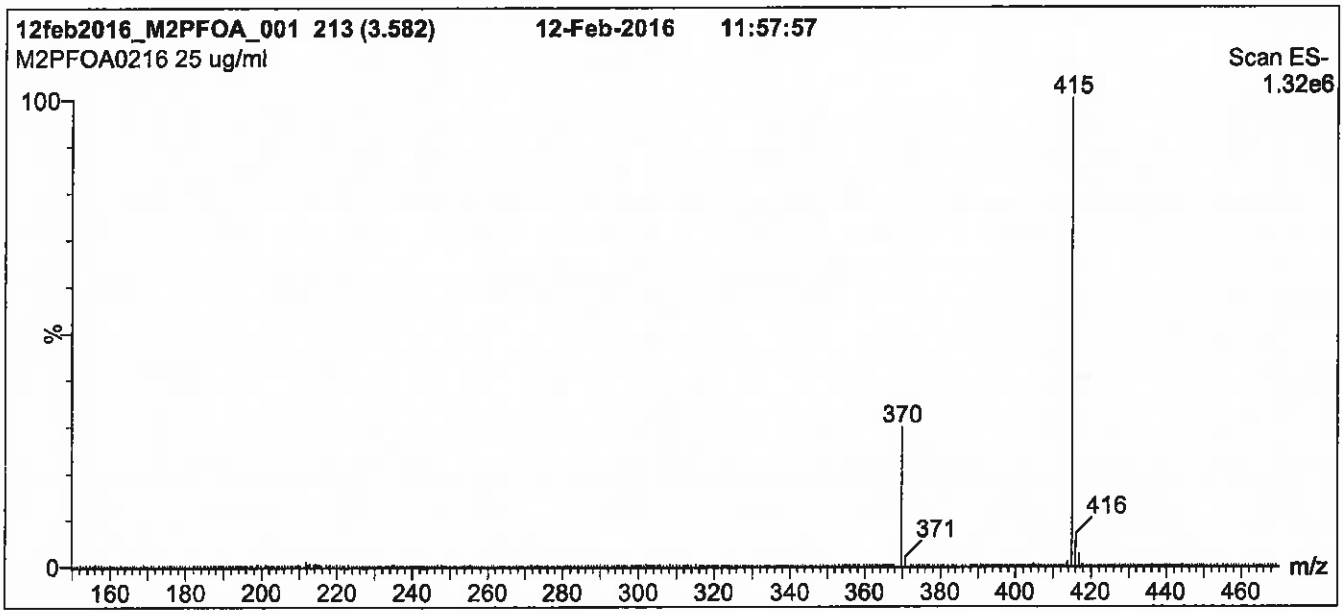
CALA

ANAB ACCREDITED

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc 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

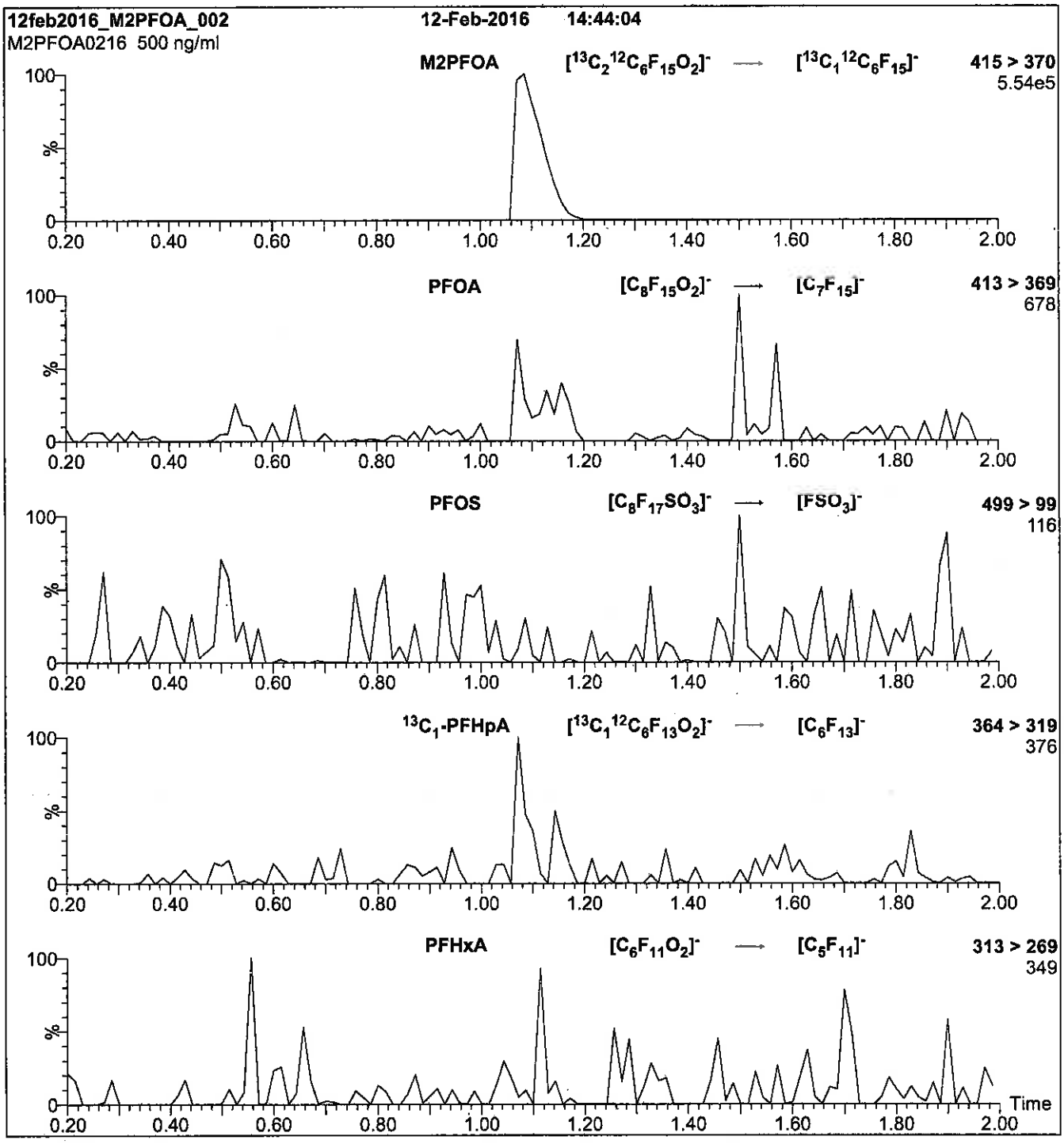
Flow: 300 µl/min

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 µl/min

MS Parameters

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

Reagent

LCMPFDA_00012

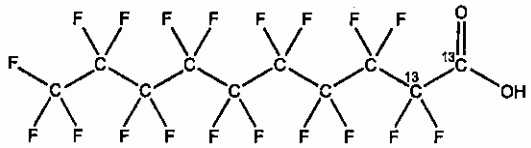
R: SBC 12/21/16

814255
ID: LCMPFDA_00012
Exp: 09/30/21 Prpd: SBC
13C2-Perfluorodecanoic a

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFDA	**LOT NUMBER:**	MPFDA0916
COMPOUND:	Perfluoro-*n*-[1,2-$^{13}C_2$]decanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_8HF_{19}O_2$	**MOLECULAR WEIGHT:**	516.07
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	09/30/2016		
EXPIRY DATE: (mm/dd/yyyy)	09/30/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains < 0.1% of $^{13}C_1$-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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

UNCERTAINTY:

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

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

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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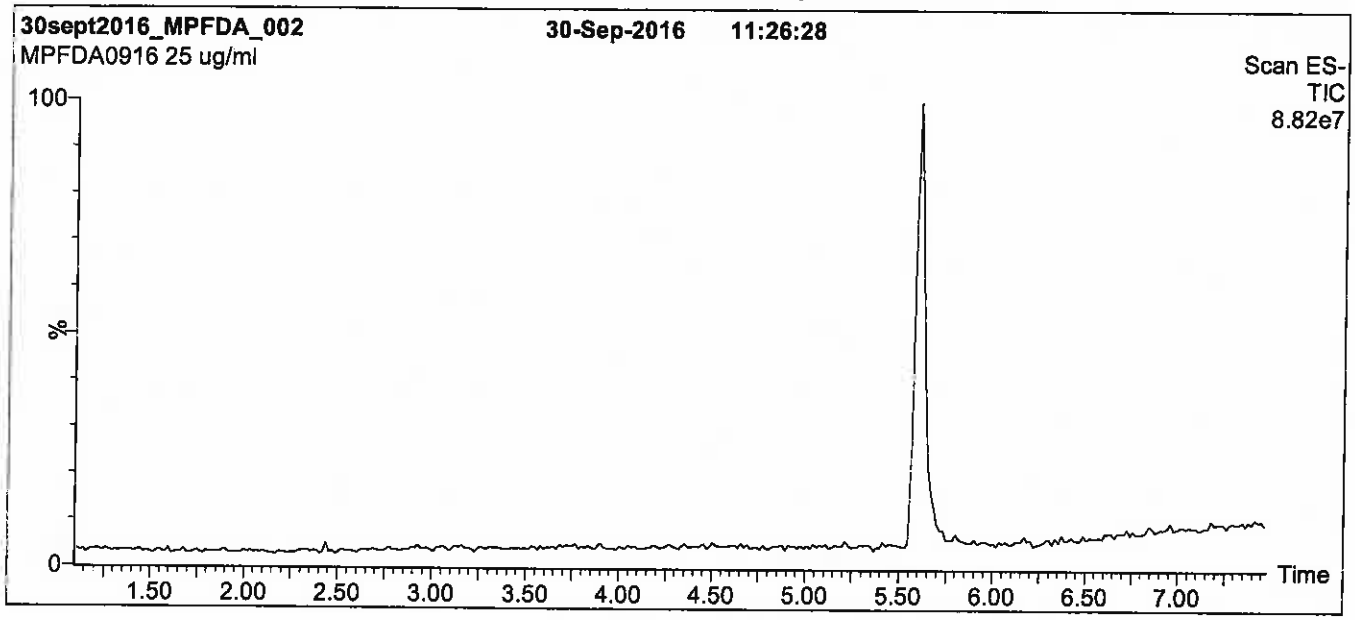
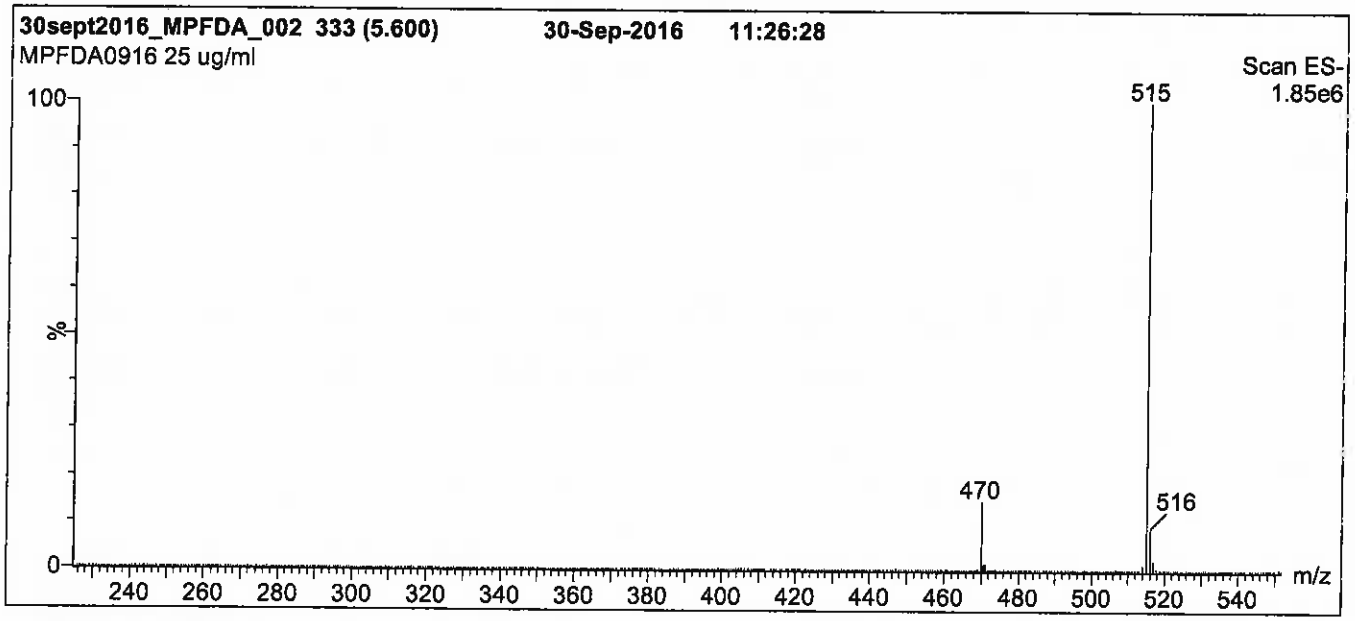
CALA Testing Accredited A 1226

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc 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

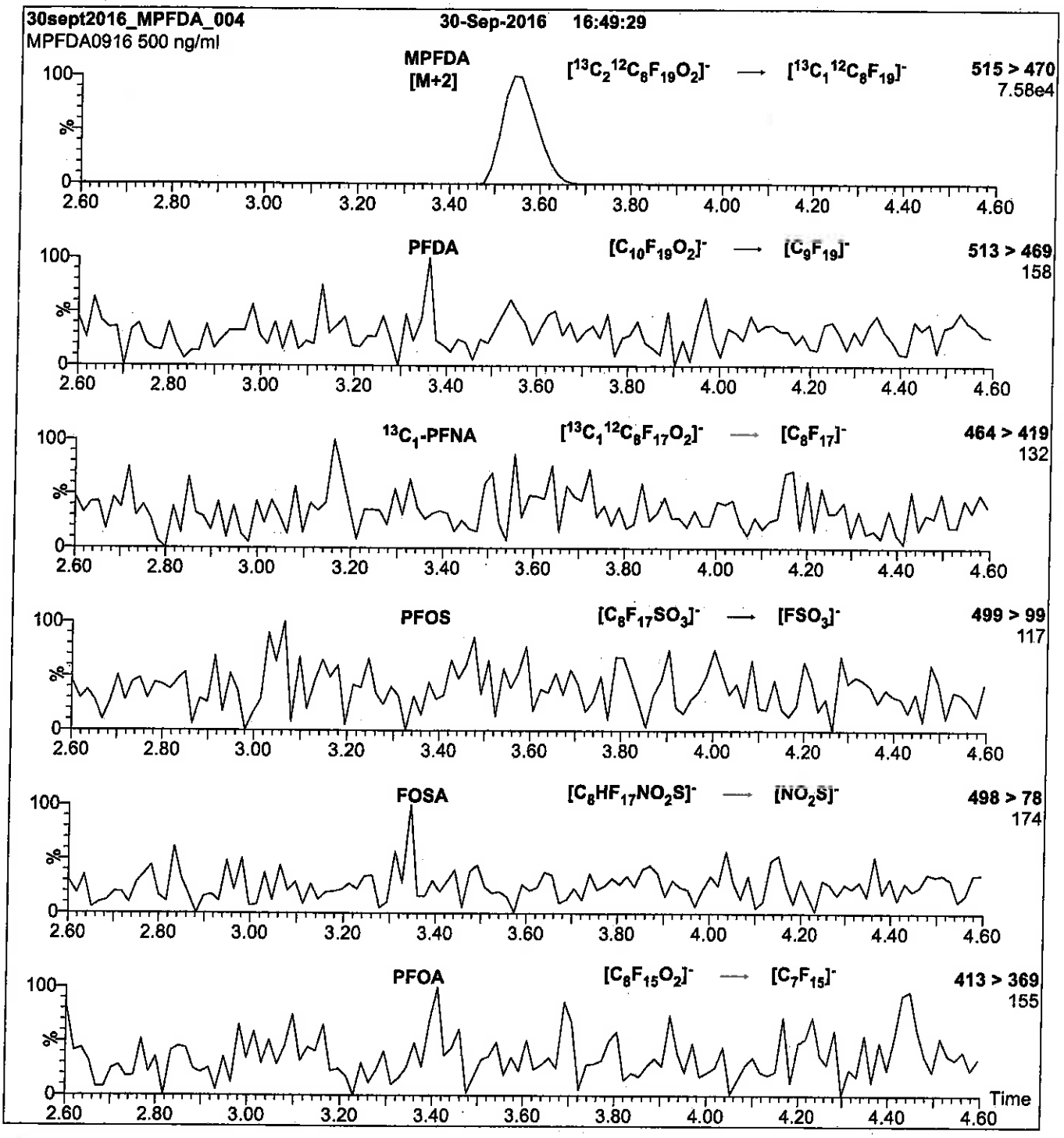
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml MPFDA)
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)
Flow:	300 µl/min

MS Parameters

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

Reagent

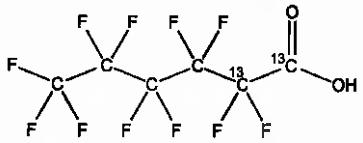
LCMPFHxA_00015

R: 5/8/17 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFHxA	**LOT NUMBER:**	MPFHxA1116
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]hexanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_4HF_{11}O_2$	**MOLECULAR WEIGHT:**	316.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	11/22/2016		
EXPIRY DATE: (mm/dd/yyyy)	11/22/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/13/2016 (mm/dd/yyyy)

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

INTENDED USE:

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CALA

ANAB ACCREDITED

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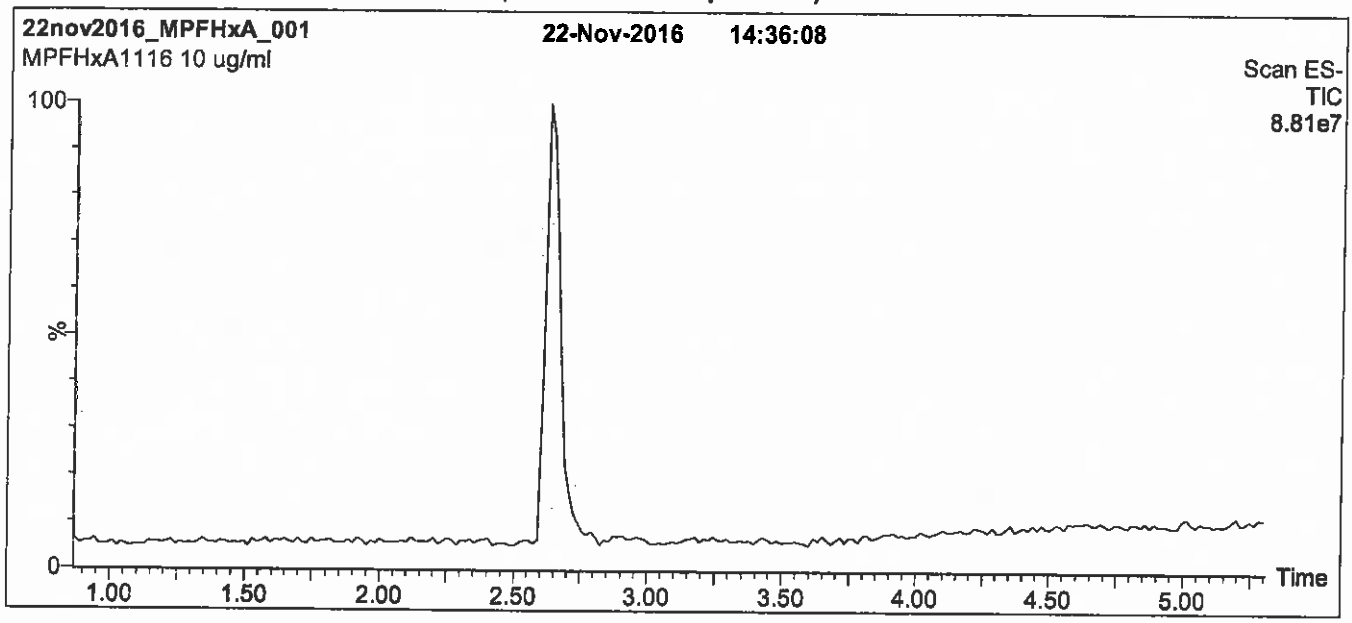
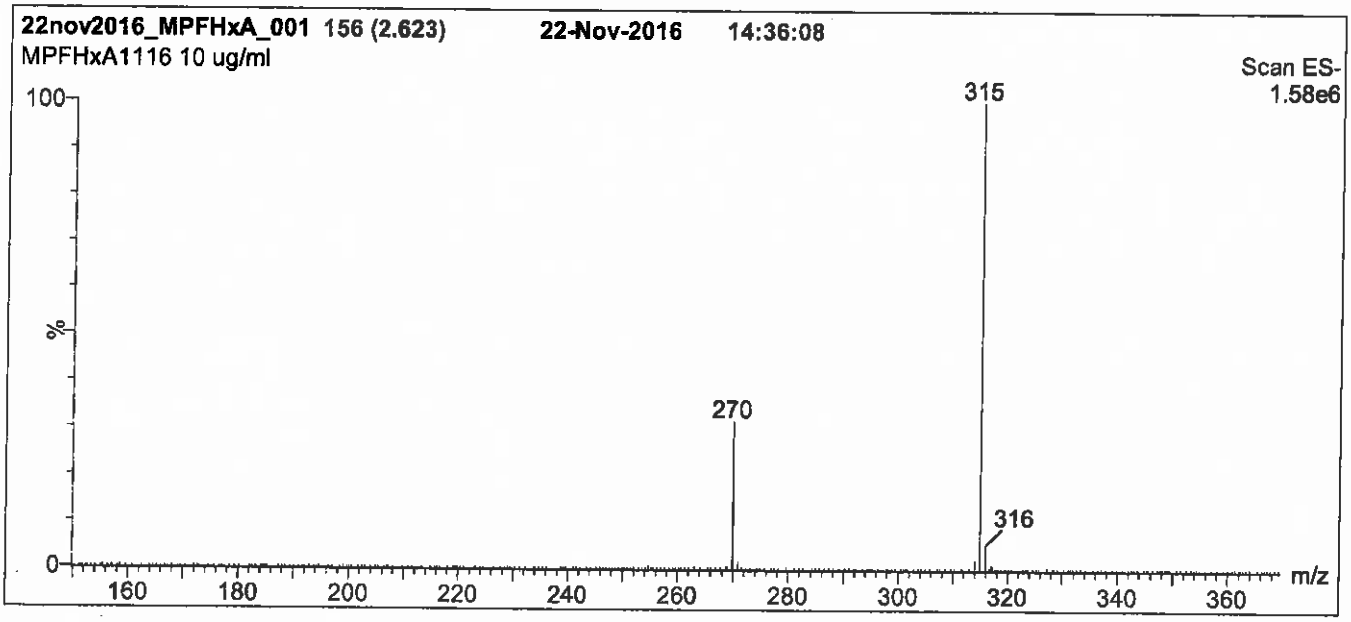
Figure 1: **MPFHxA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc 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

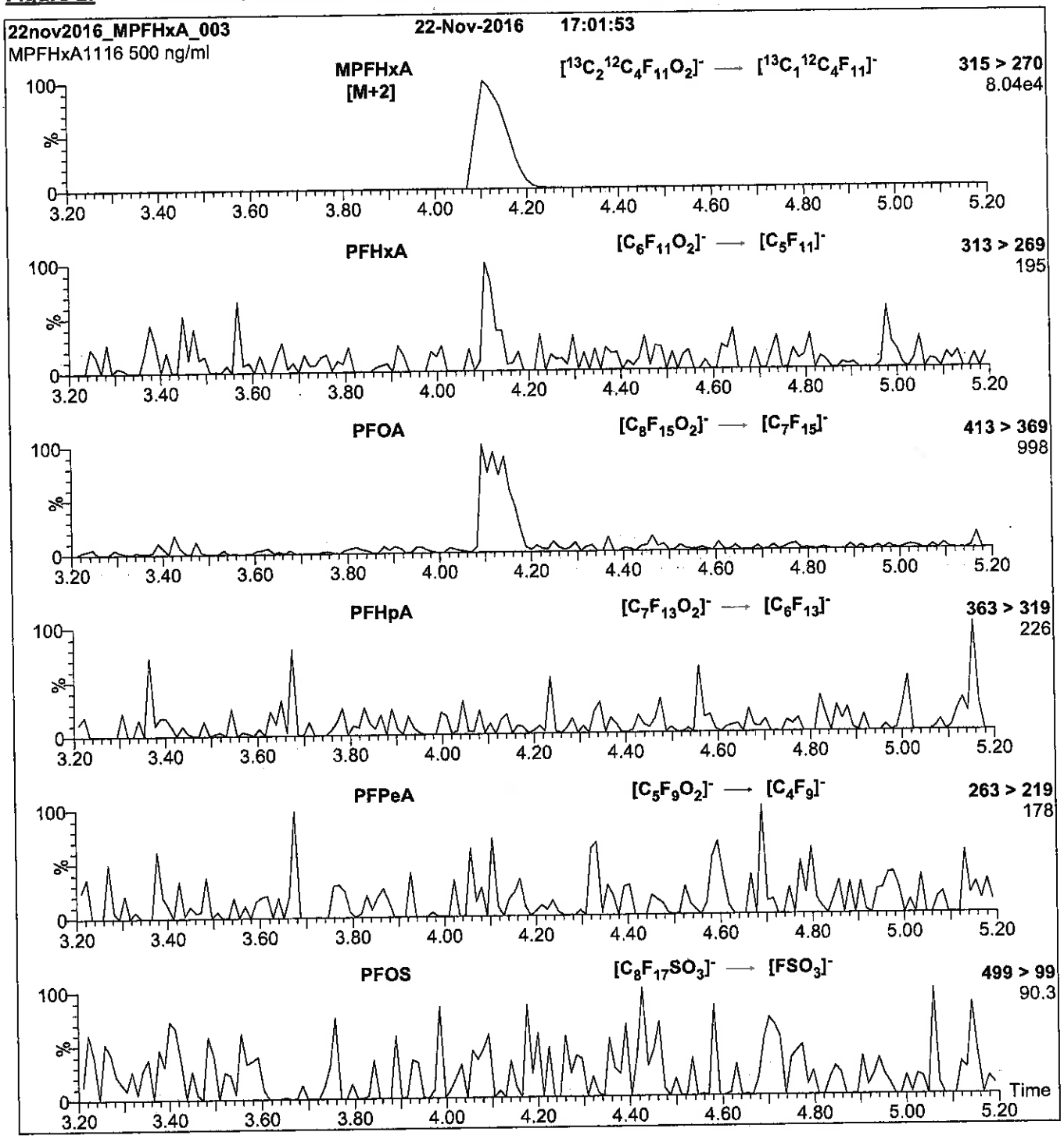
Flow: 300 µl/min

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 µl/min

MS Parameters

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

Reagent

LCMPFOS_00021

r: 5/8/17 SKV

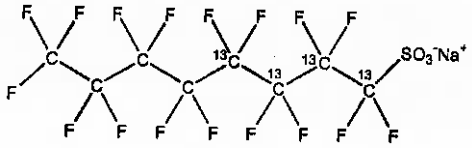
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFOS
LOT NUMBER: MPFOS1216
COMPOUND: Sodium perfluoro-1-[1,2,3,4-$^{13}C_4$]octanesulfonate

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4F_{17}SO_3Na$
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.8 ± 2.4 µg/ml (MPFOS anion)
CHEMICAL PURITY:	>98%
LAST TESTED: (mm/dd/yyyy)	12/12/2016
EXPIRY DATE: (mm/dd/yyyy)	12/12/2021
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place
MOLECULAR WEIGHT:	526.08
SOLVENT(S):	Methanol
ISOTOPIC PURITY:	≥99% ^{13}C ($1,2,3,4\text{-}^{13}C_4$)

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-$^{13}C_3$]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 $x_1, x_2, \ldots x_n$ on which it depends is:

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

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 ±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:

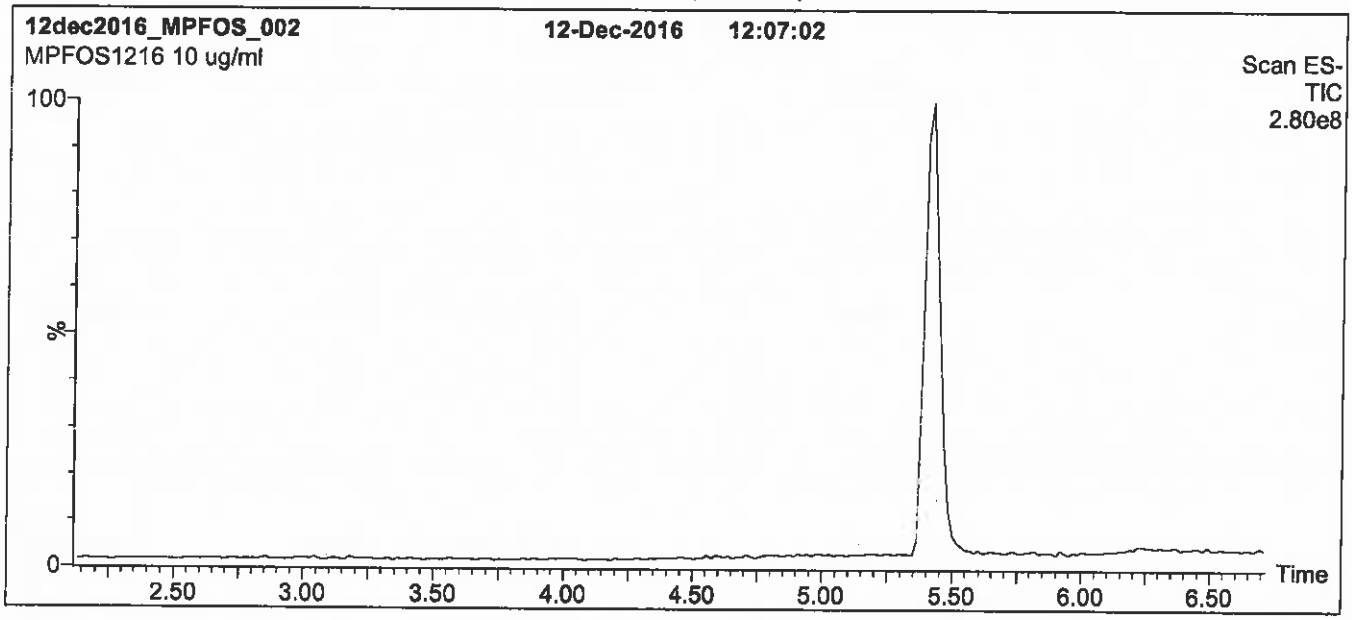
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

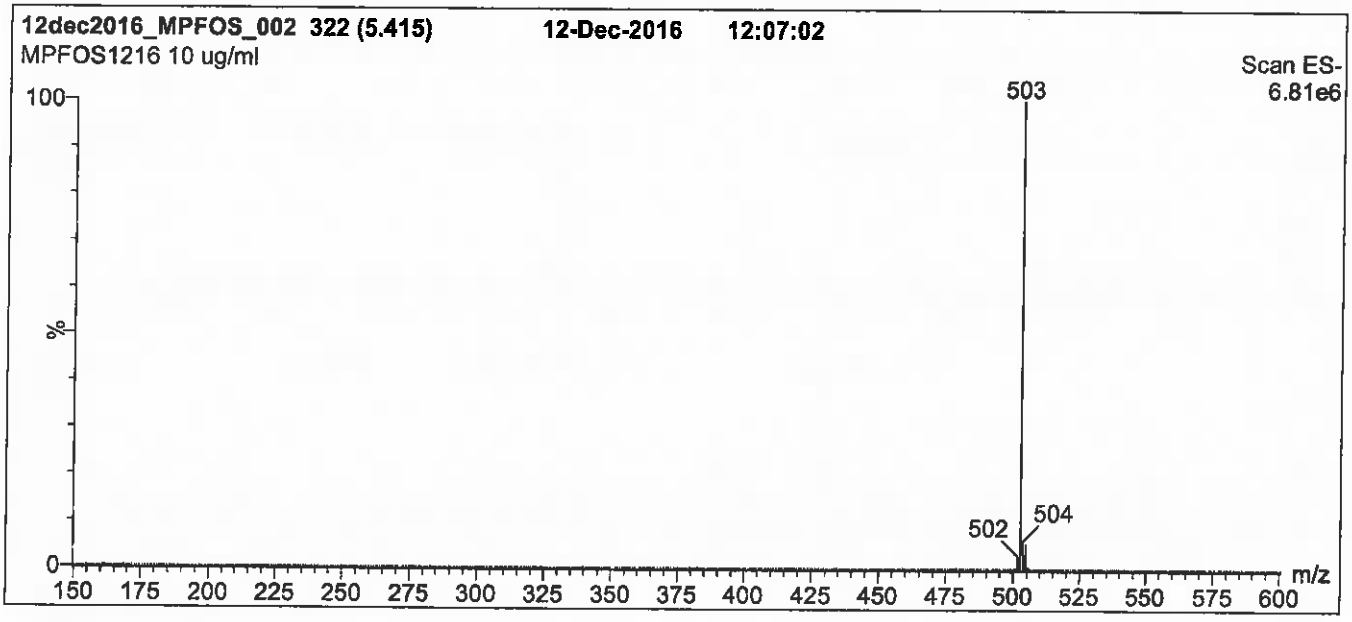
CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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 RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc 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

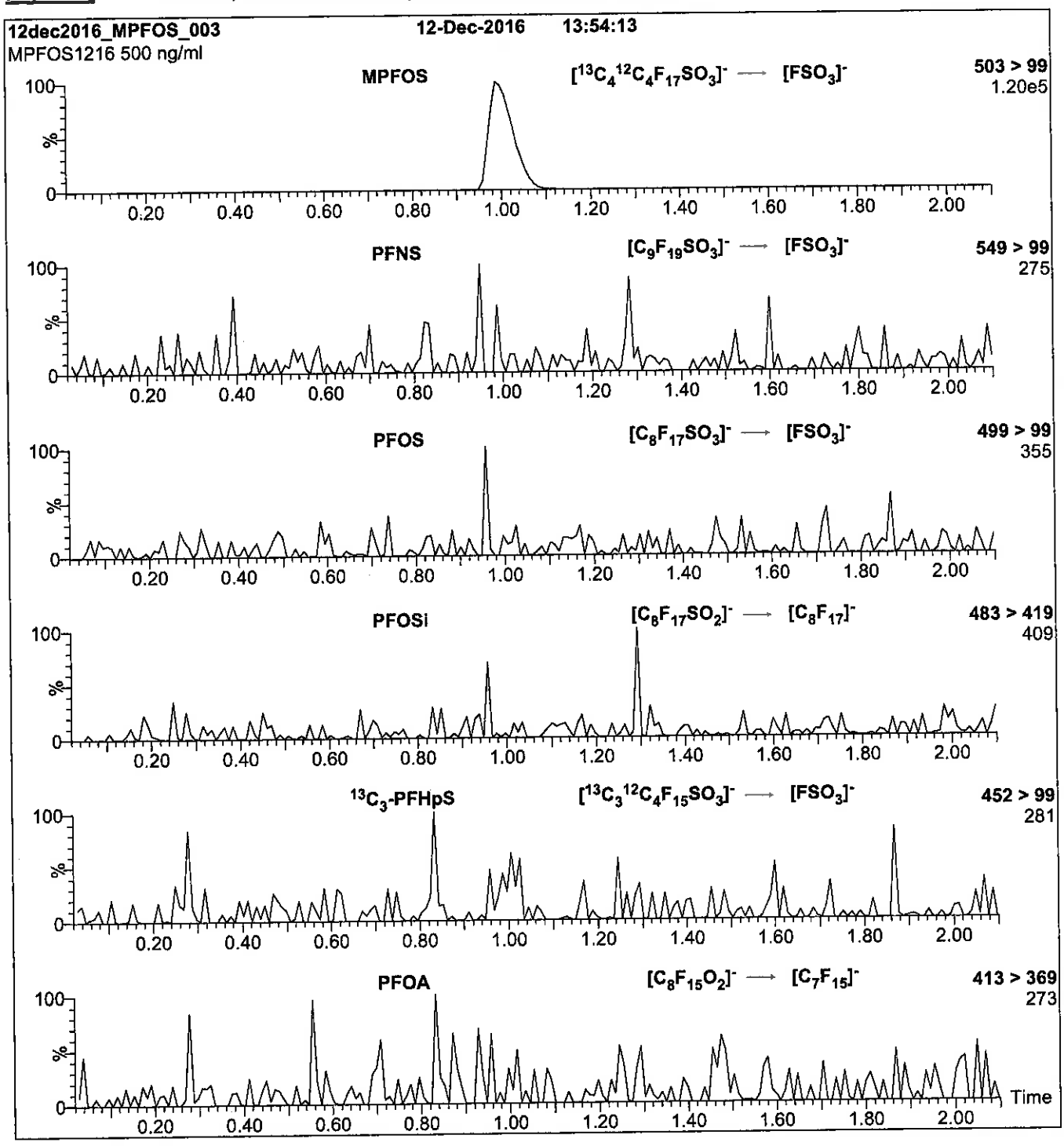
Flow: 300 µl/min

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 µl/min

MS Parameters

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

Reagent

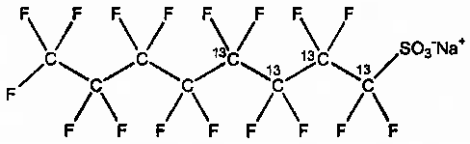
LCMPFOS_00024

r: 8/2/17 SKJ

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFOS	**LOT NUMBER:**	MPFOS0517
COMPOUND:	Sodium perfluoro-1-[1,2,3,4-$^{13}C_4$]octanesulfonate		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	526.08
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.8 ± 2.4 µg/ml (MPFOS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2,3,4\text{-}^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	05/19/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/19/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.8% Sodium perfluoro-1-[1,2,3-$^{13}C_3$]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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UNCERTAINTY:

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

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

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

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 ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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CALA

ANAB ACCREDITED

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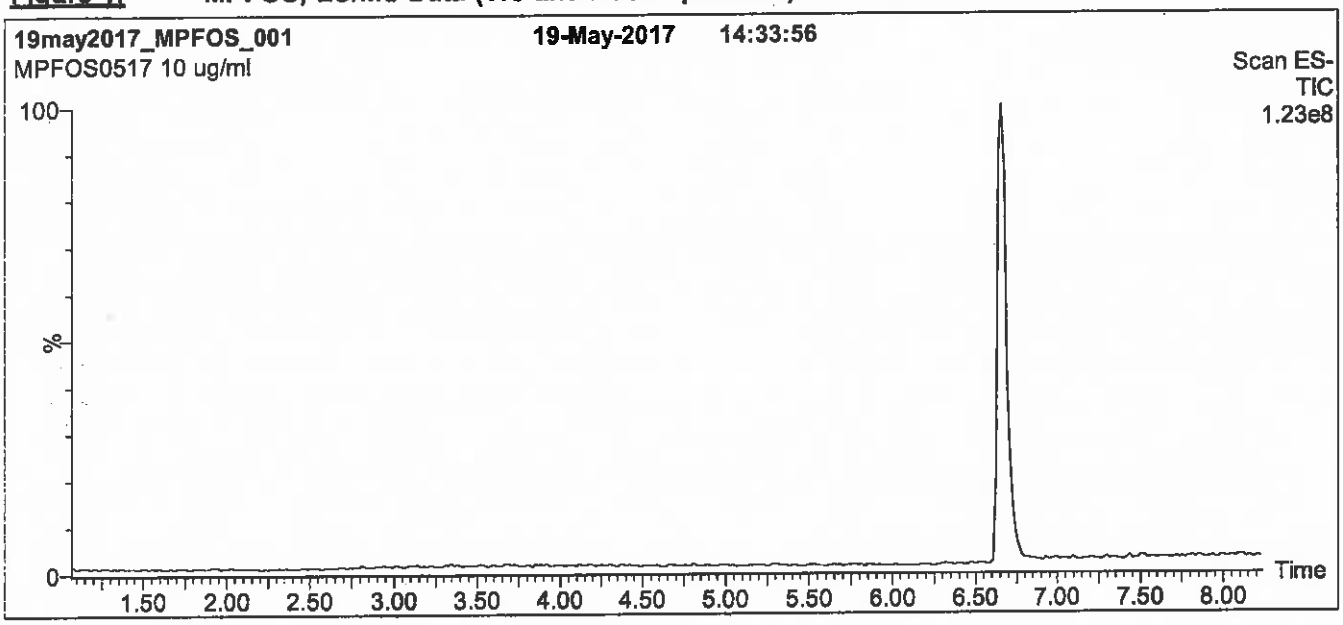
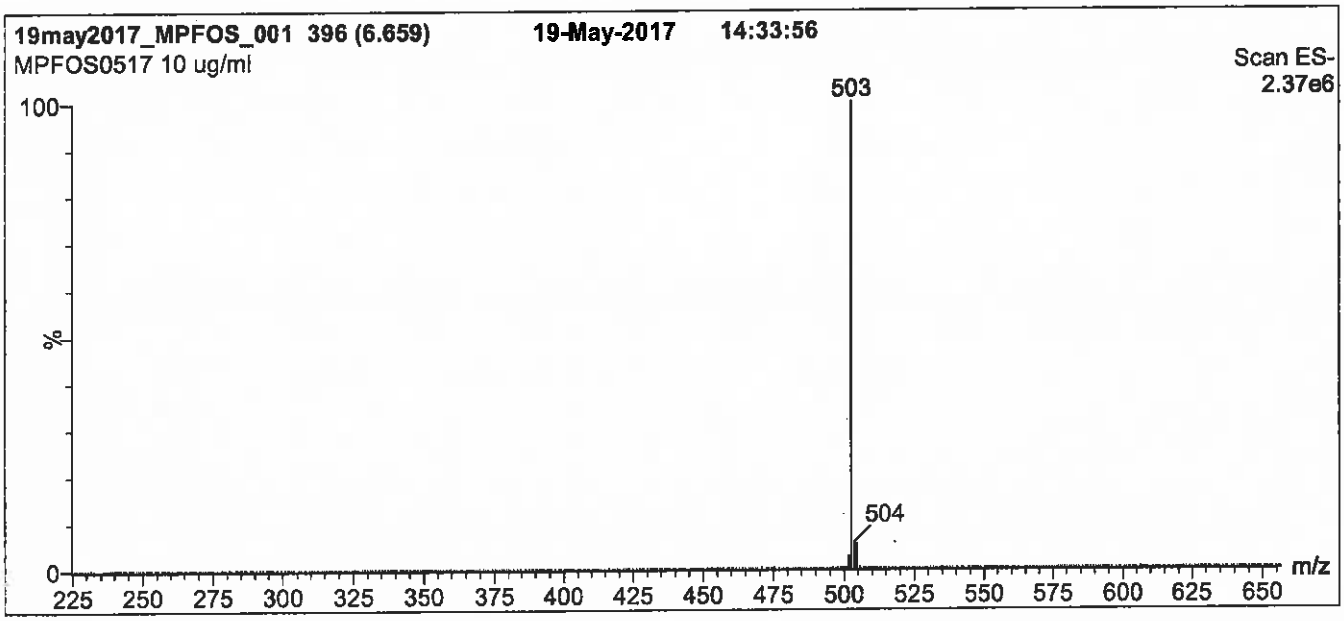
Figure 1: **MPFOS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

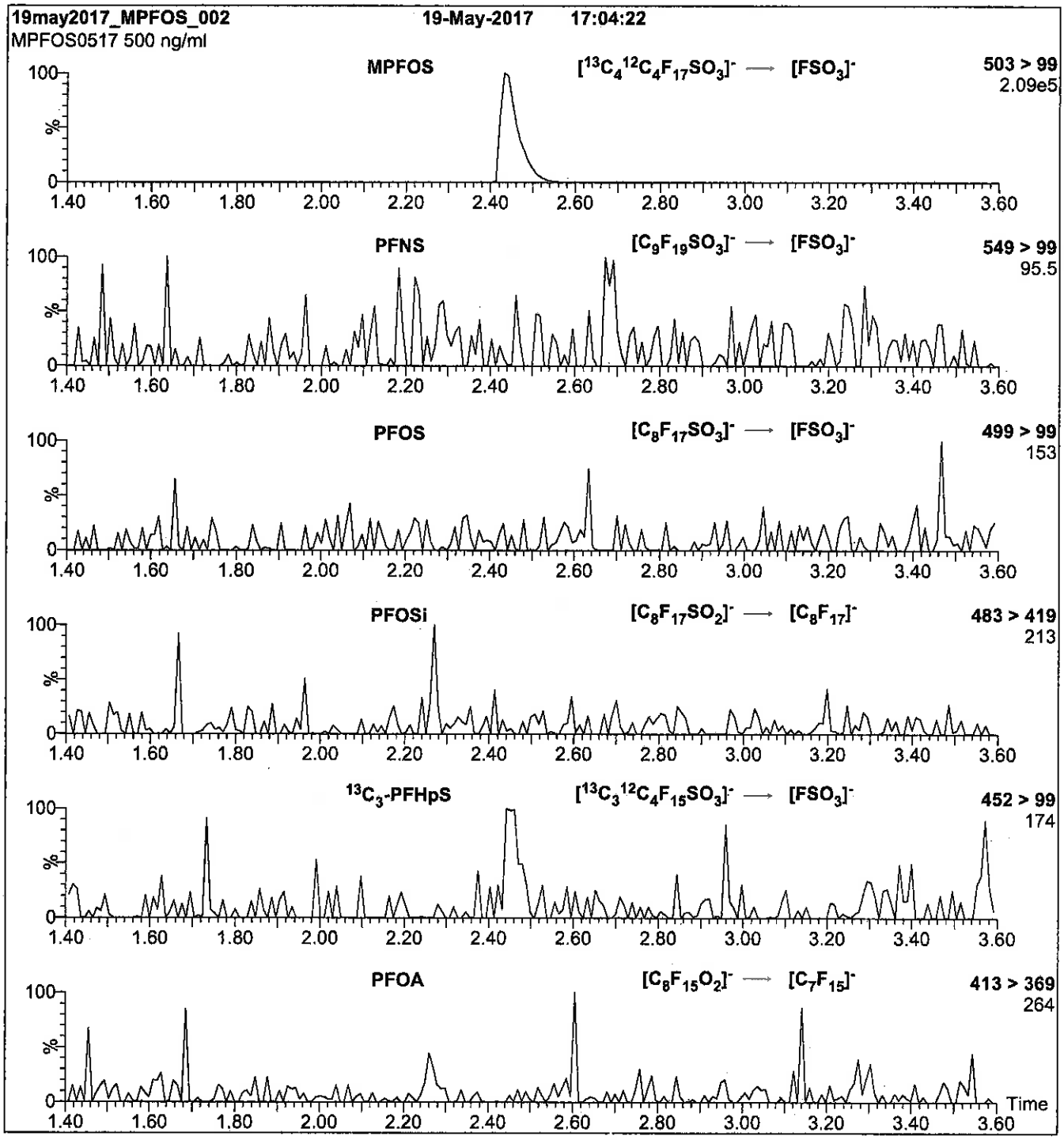
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

Injection: Direct loop injection
10 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 µl/min

MS Parameters

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

Reagent

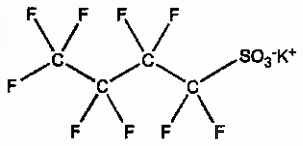
LCPFBSA_00002

D: 9/2/17 SKW

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

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



MOLECULAR FORMULA:	$C_4F_9SO_3K$	**MOLECULAR WEIGHT:**	338.19
CONCENTRATION:	50.0 ± 2.5 µg/ml (K salt) 44.2 ± 2.2 µg/ml (PFBS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	12/02/2016		
EXPIRY DATE: (mm/dd/yyyy)	12/02/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/05/2016 (mm/dd/yyyy)

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

INTENDED USE:

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UNCERTAINTY:

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

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TRACEABILITY:

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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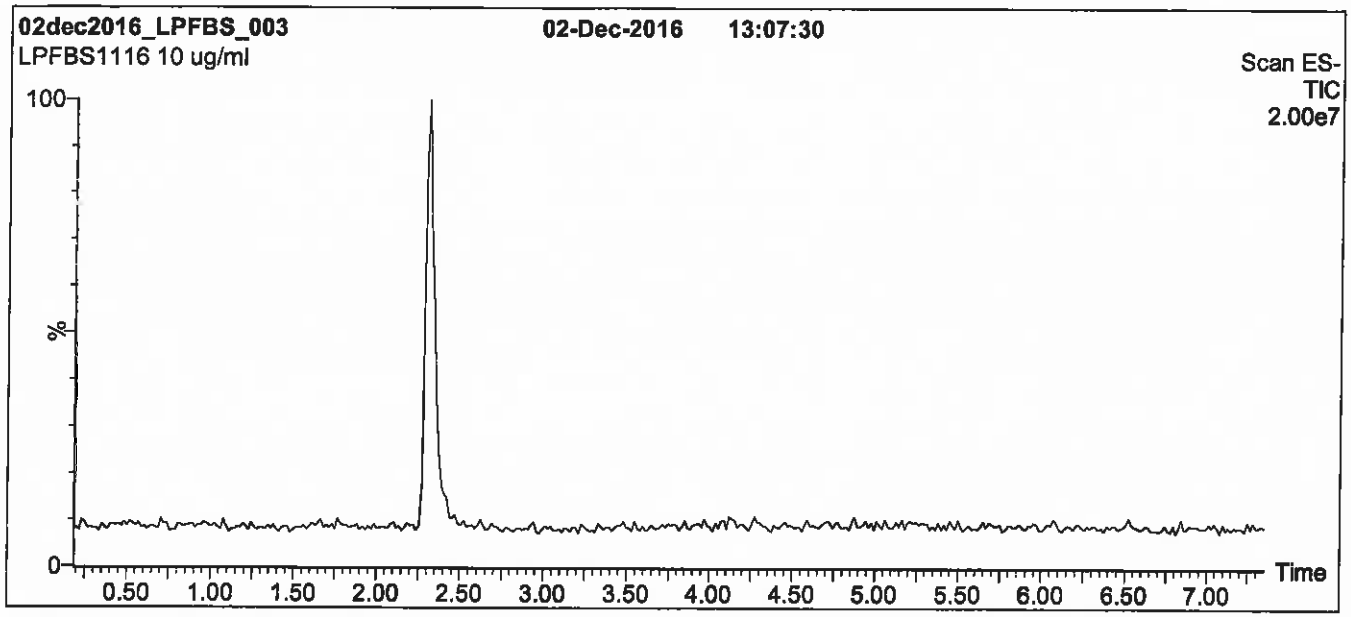
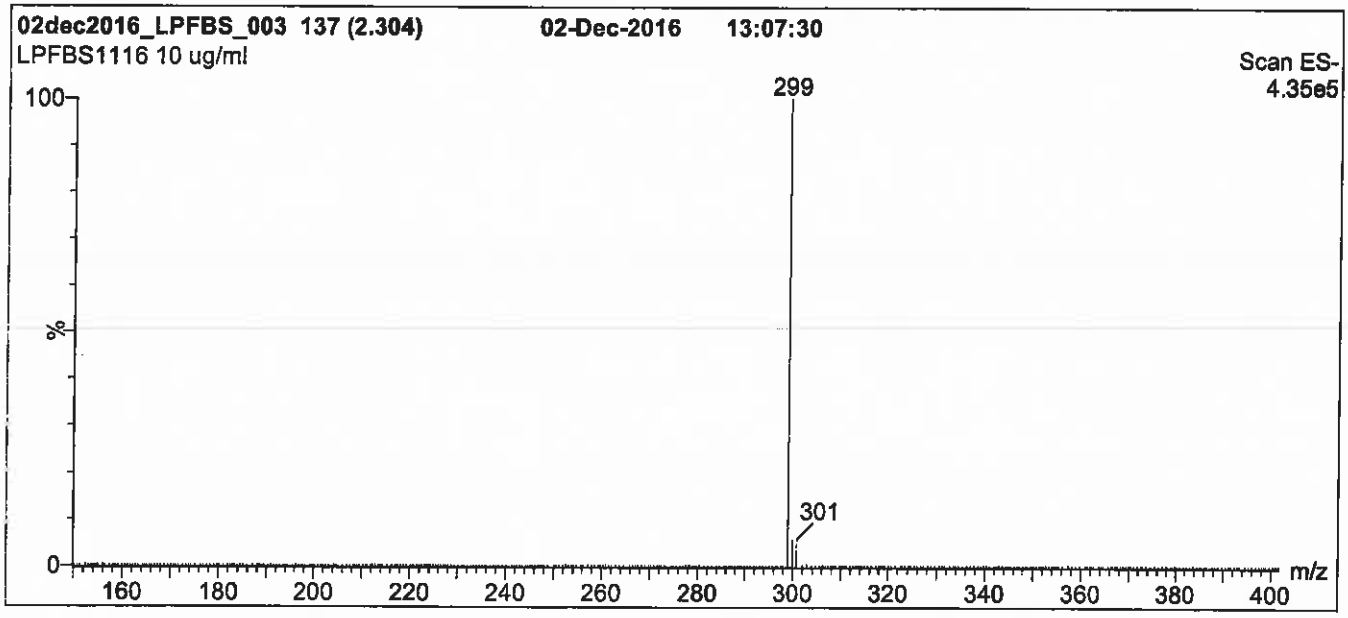
Figure 1: **L-PFBS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

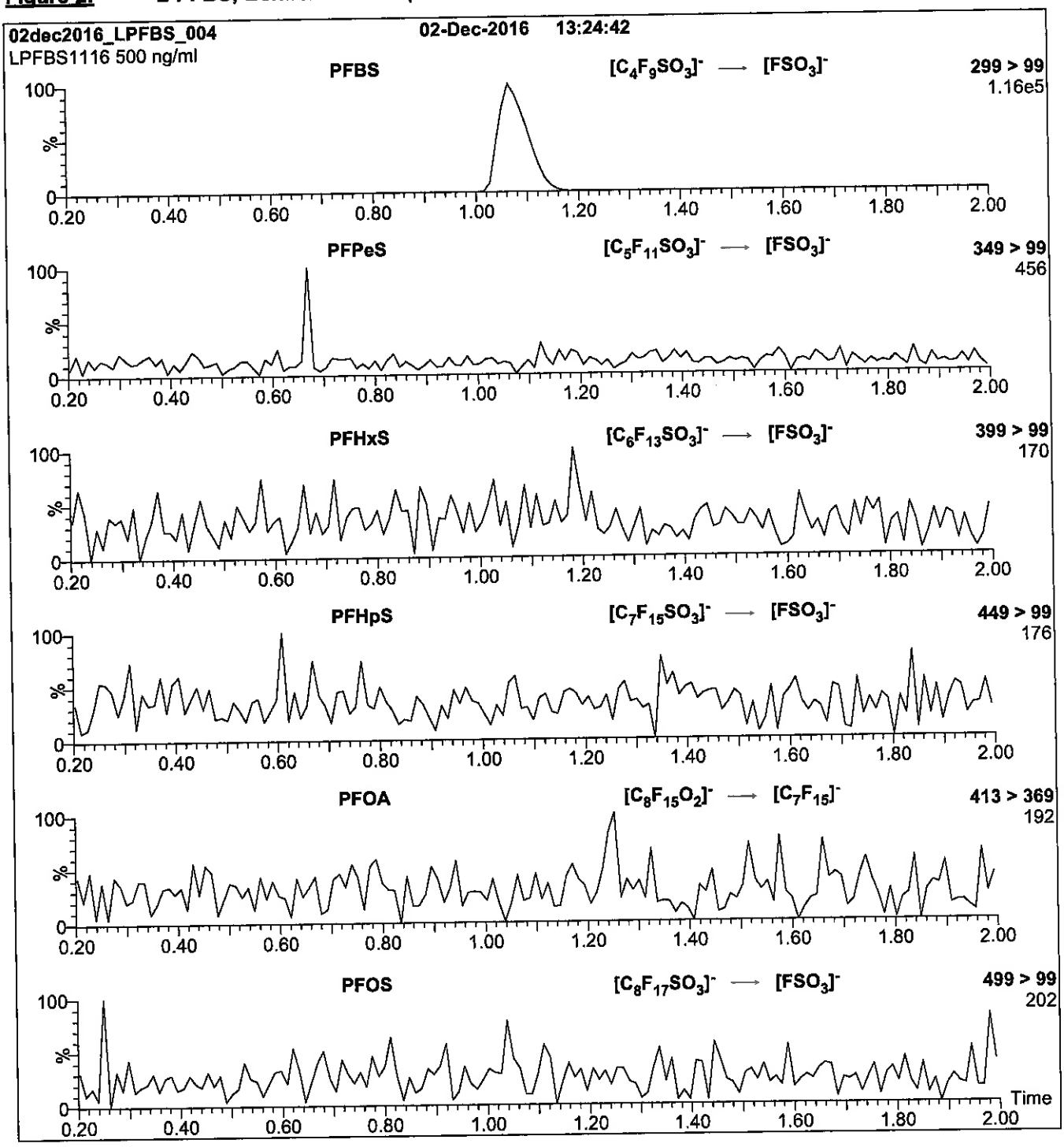
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFBS)

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

Flow: 300 µl/min

MS Parameters

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

Reagent

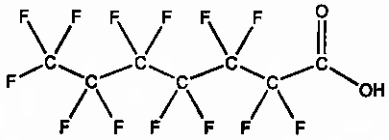
LCPFHpA_00009

D: 9/21/17 SRV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	PFHpA	**LOT NUMBER:**	PFHpA1216
COMPOUND:	Perfluoro-n-heptanoic acid		
STRUCTURE:		**CAS #:**	375-85-9



MOLECULAR FORMULA:	$C_7HF_{13}O_2$	**MOLECULAR WEIGHT:**	364.06
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	12/02/2016		
EXPIRY DATE: (mm/dd/yyyy)	12/02/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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 ±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:

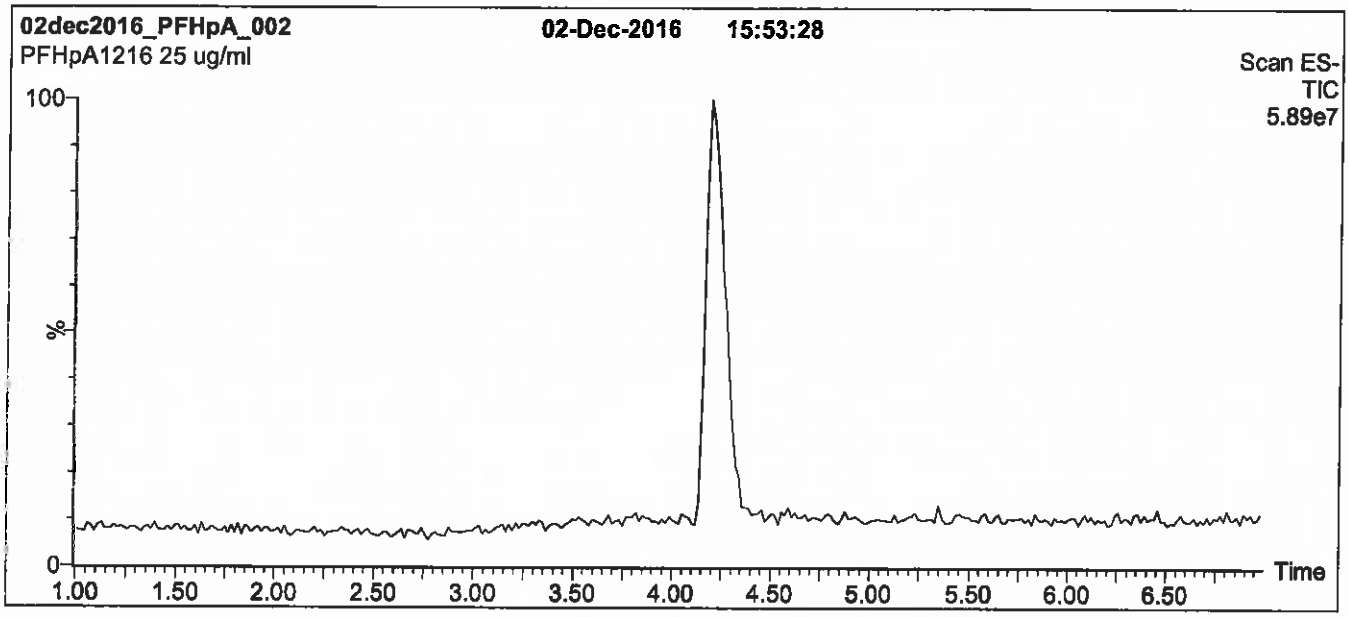
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

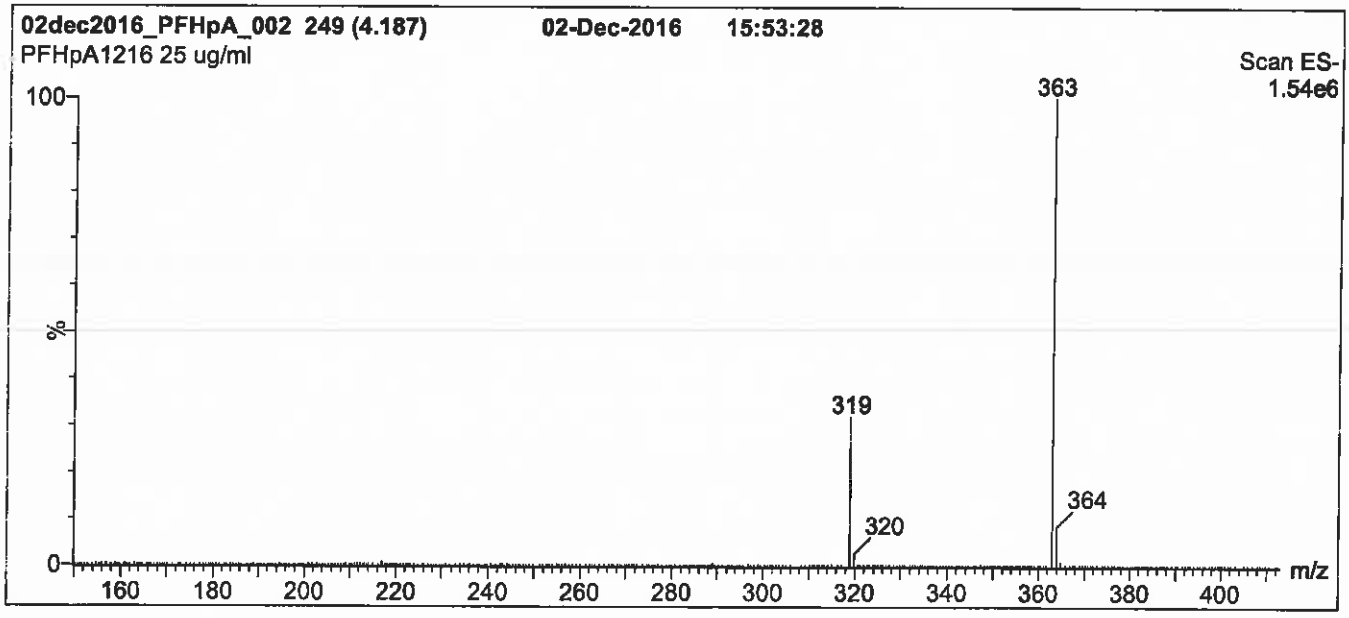
CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc 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

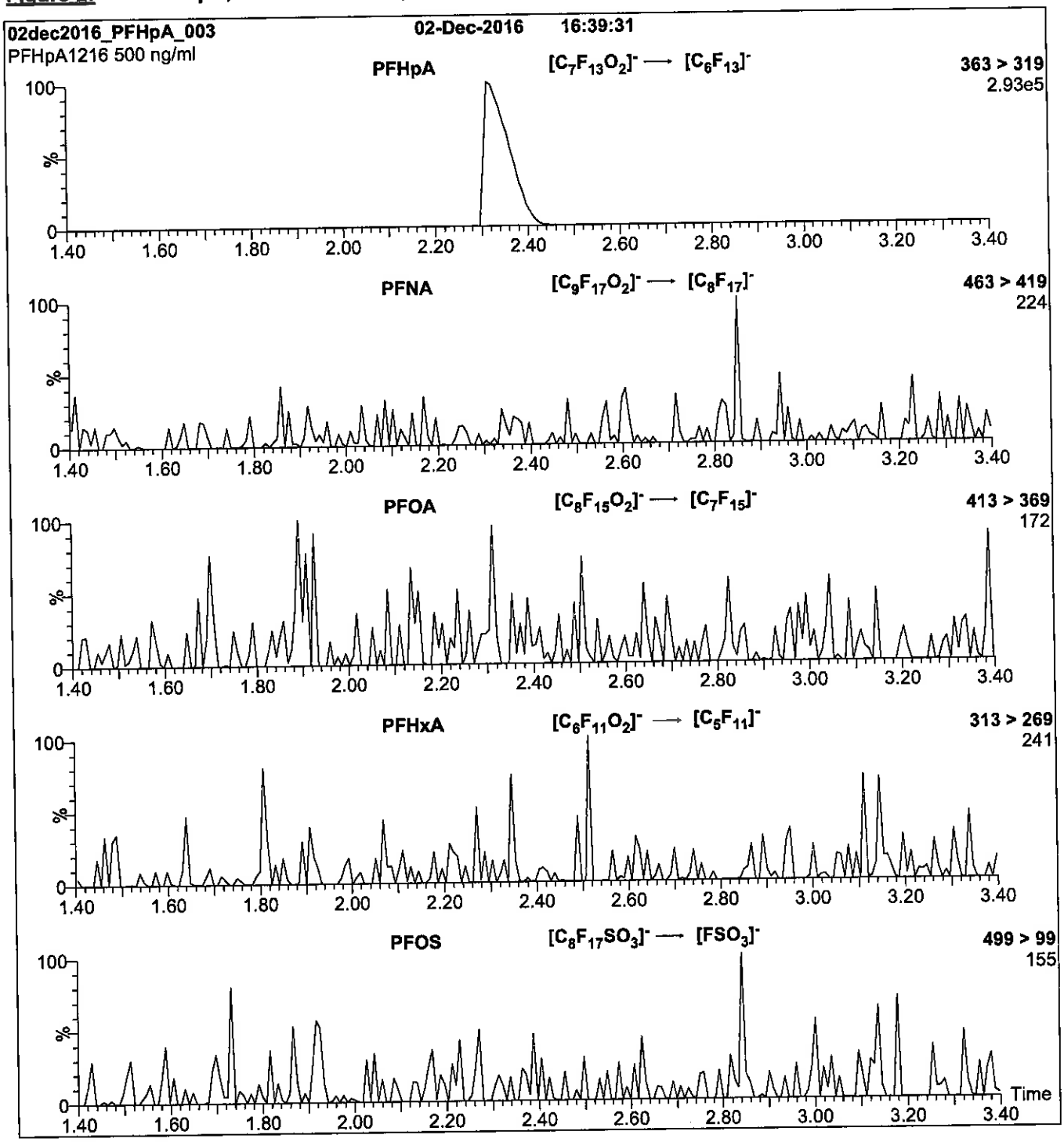
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFHxS-br_00005

P: 10/20 A SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

br-PFHxSK

Potassium Perfluorohexanesulfonate Solution/Mixture of Linear and Branched Isomers

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

DESCRIPTION:

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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 ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED

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

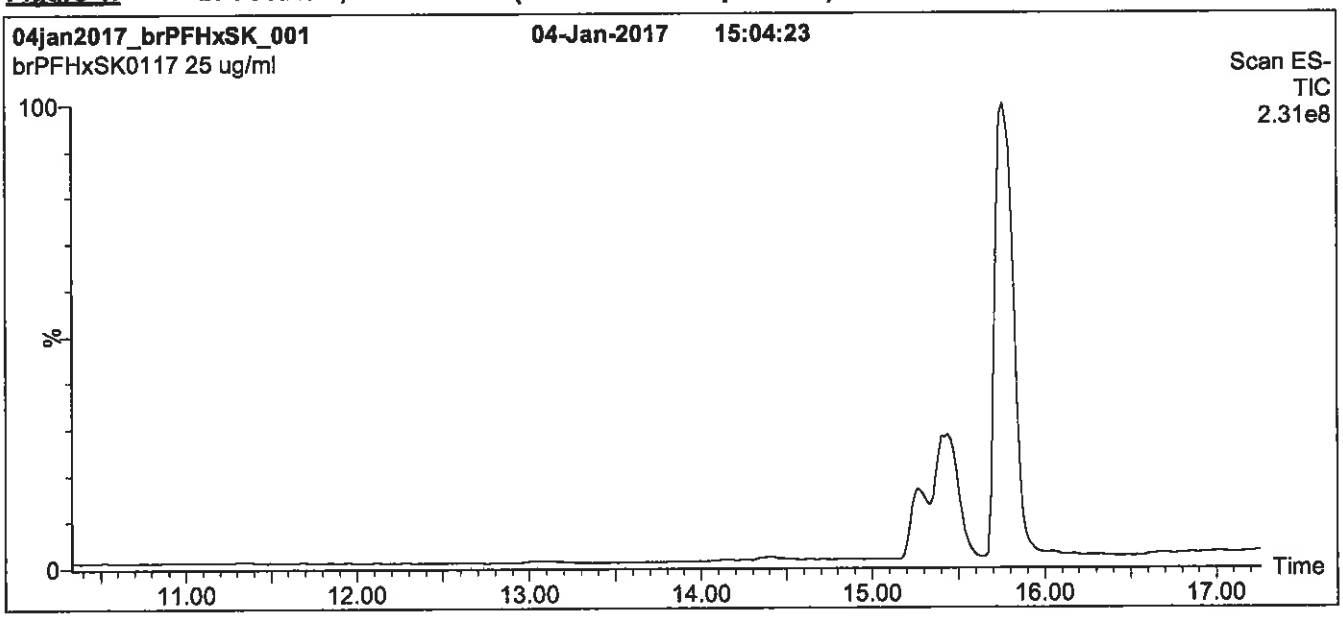
Table A: **br-PFHxSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

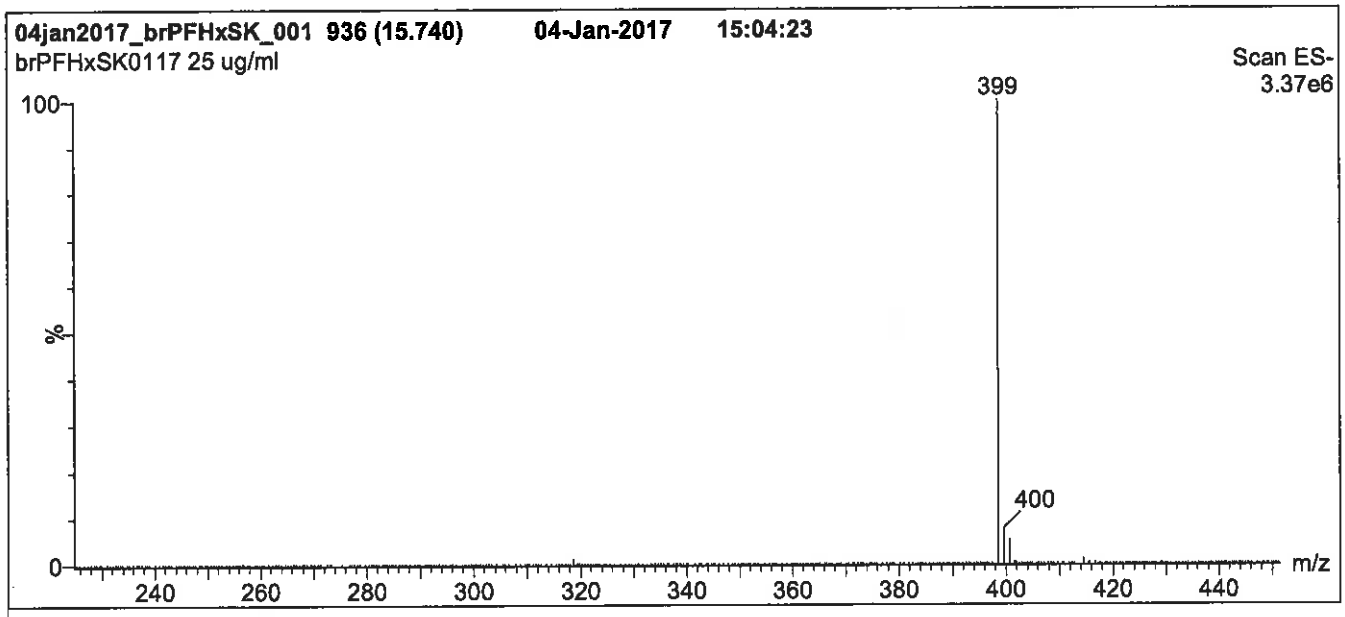
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-hexanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$CF_3CF_2CF_2CF_2\underset{\displaystyle CF_3}{\underset{\vert}{C}}FSO_3^-K^+$	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF_2\underset{\displaystyle CF_3}{\underset{\vert}{C}}FCF_2SO_3^-K^+$	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2\underset{\displaystyle CF_3}{\underset{\vert}{C}}FCF_2CF_2SO_3^-K^+$	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	$CF_3\underset{\displaystyle CF_3}{\underset{\vert}{C}}FCF_2CF_2CF_2SO_3^-K^+$	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	$CF_3\underset{\displaystyle CF_3}{\underset{\vert}{\overset{\displaystyle CF_3}{\overset{\vert}{C}}}}CF_2CF_2SO_3^-K^+$	0.2
7	Other Unidentified Isomers		0.5

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

Certified By: _____ **Date:** 01/20/2017
B.G. Chittim (mm/dd/yyyy)

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





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 20% (80:20 MeOH:ACN) / 80% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 50% organic over 14 min. Ramp to 90% organic over 3 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 20 min

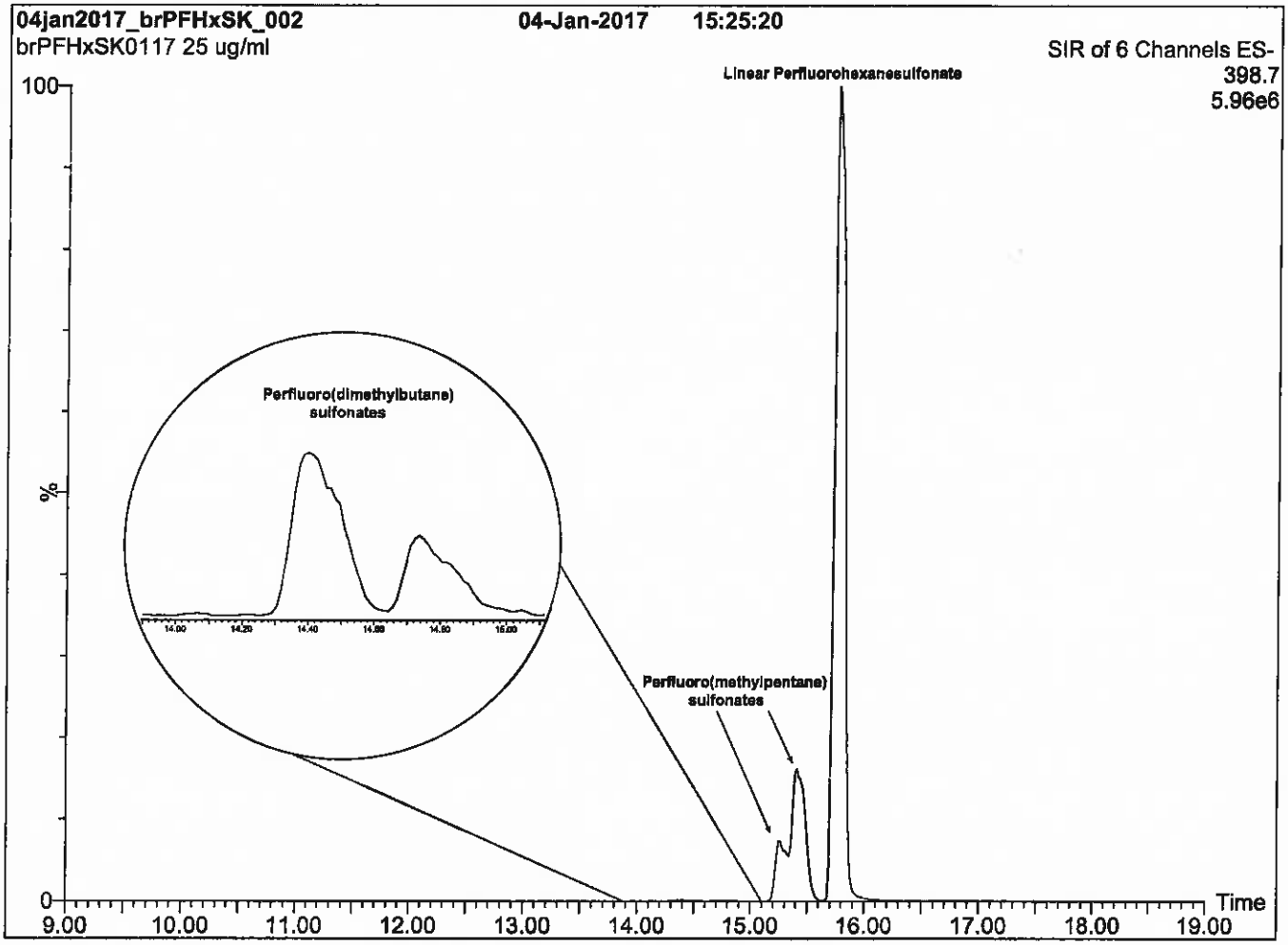
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 20% (80:20 MeOH:ACN) / 80% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 50% organic over 14 min. Ramp to 90% organic over 3 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 20 min

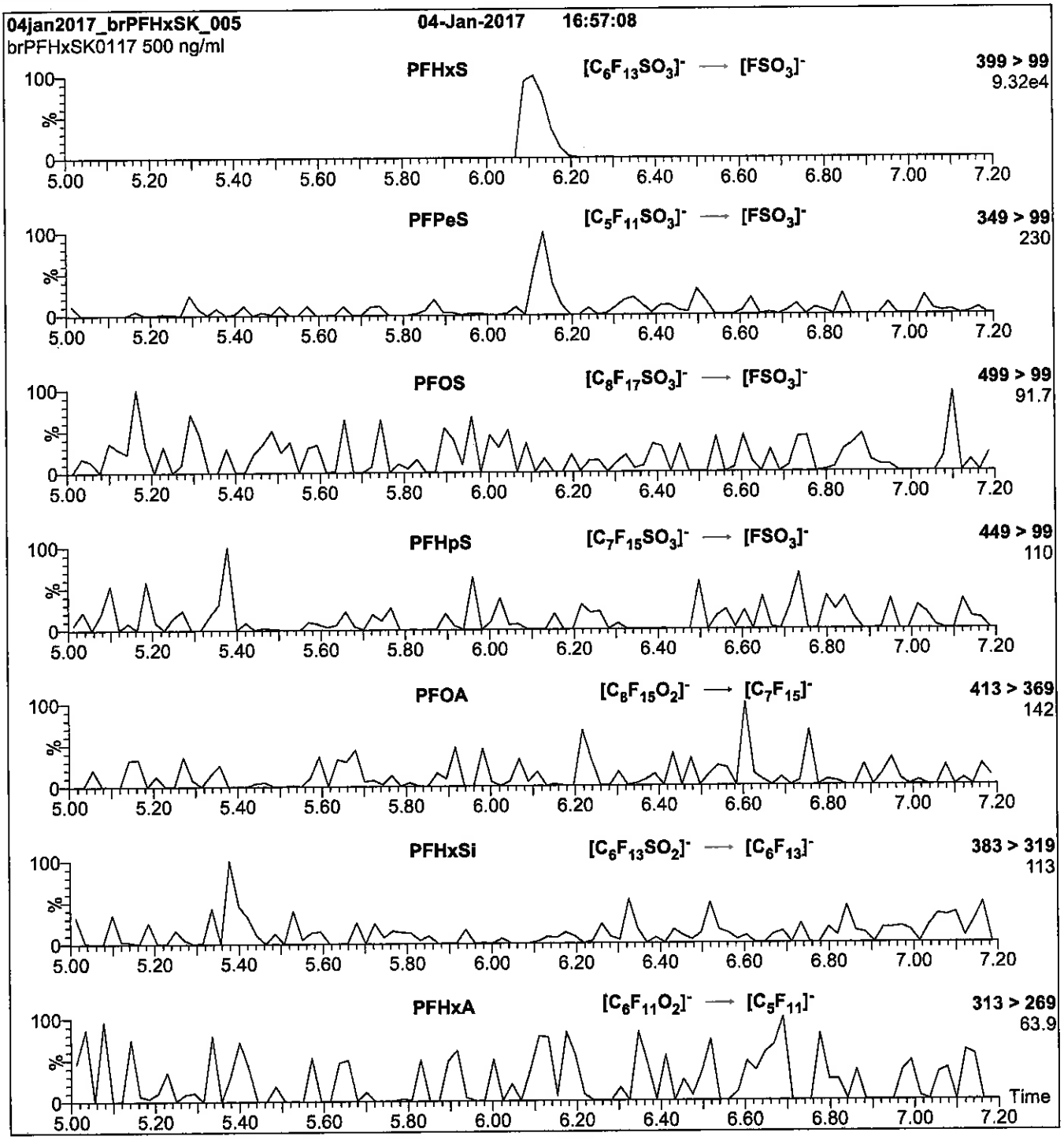
Flow: 300 µl/min

MS Parameters

Experiment: SIR (6 channels)

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

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



Conditions for Figure 3:

Injection: Direct loop injection
10 µl (500 ng/ml br-PFHxSK)

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

Flow: 300 µl/min

MS Parameters

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

Reagent

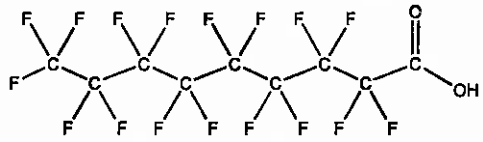
LCPFNA_00009

r: 9/21/17 SKJ

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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



MOLECULAR FORMULA:	$C_9HF_{17}O_2$	**MOLECULAR WEIGHT:**	464.08
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	07/20/2017		
EXPIRY DATE: (mm/dd/yyyy)	07/20/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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

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

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UNCERTAINTY:

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

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

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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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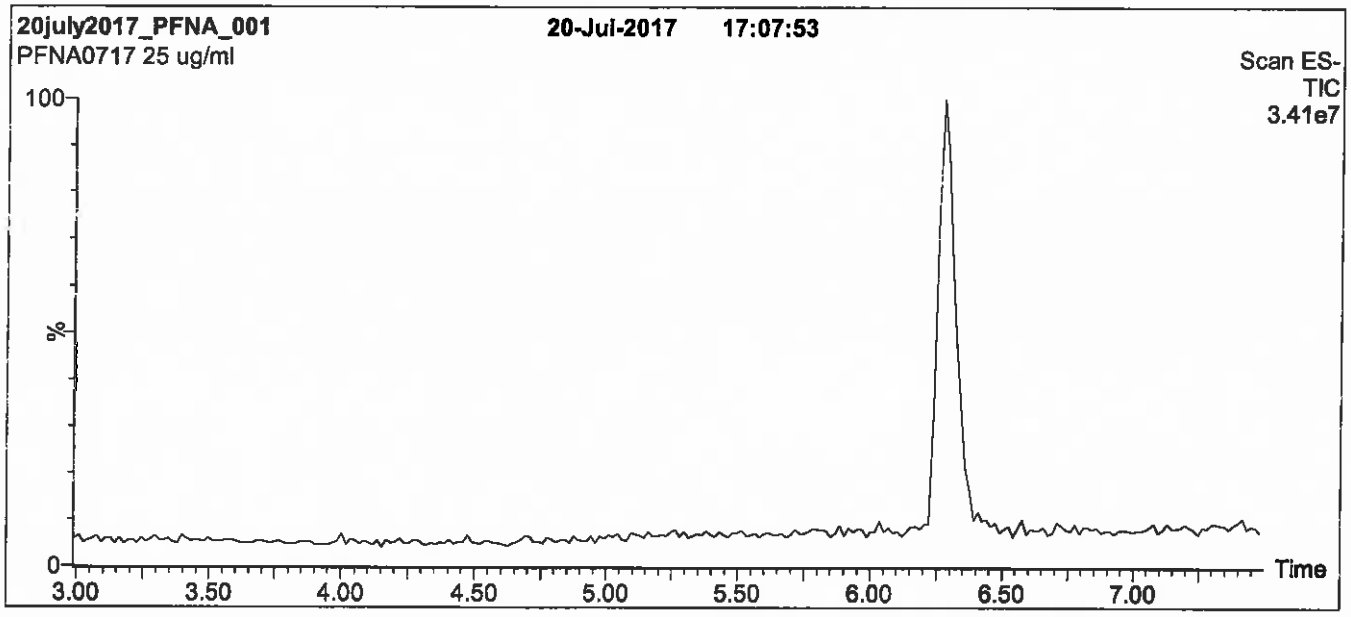
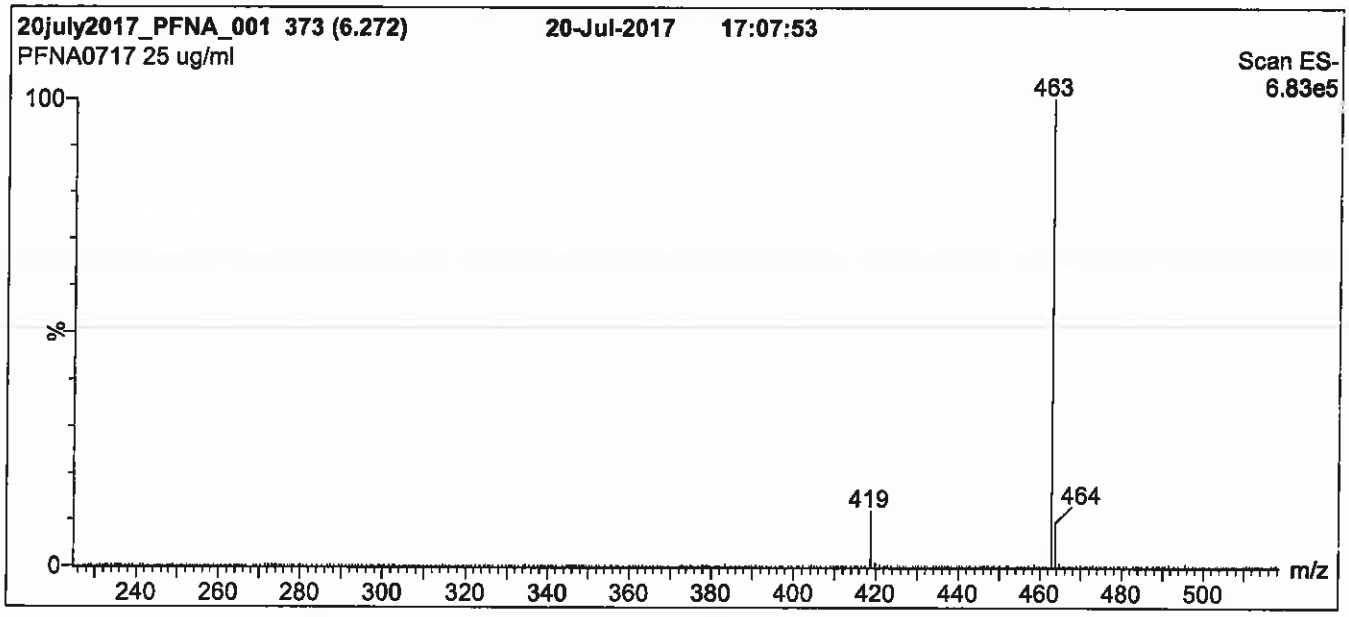
Figure 1: **PFNA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Hold for 1 min. Ramp to 90% organic over 7 min and hold for 1 min before returning to initial conditions in 0.5 min.
Time: 10 min

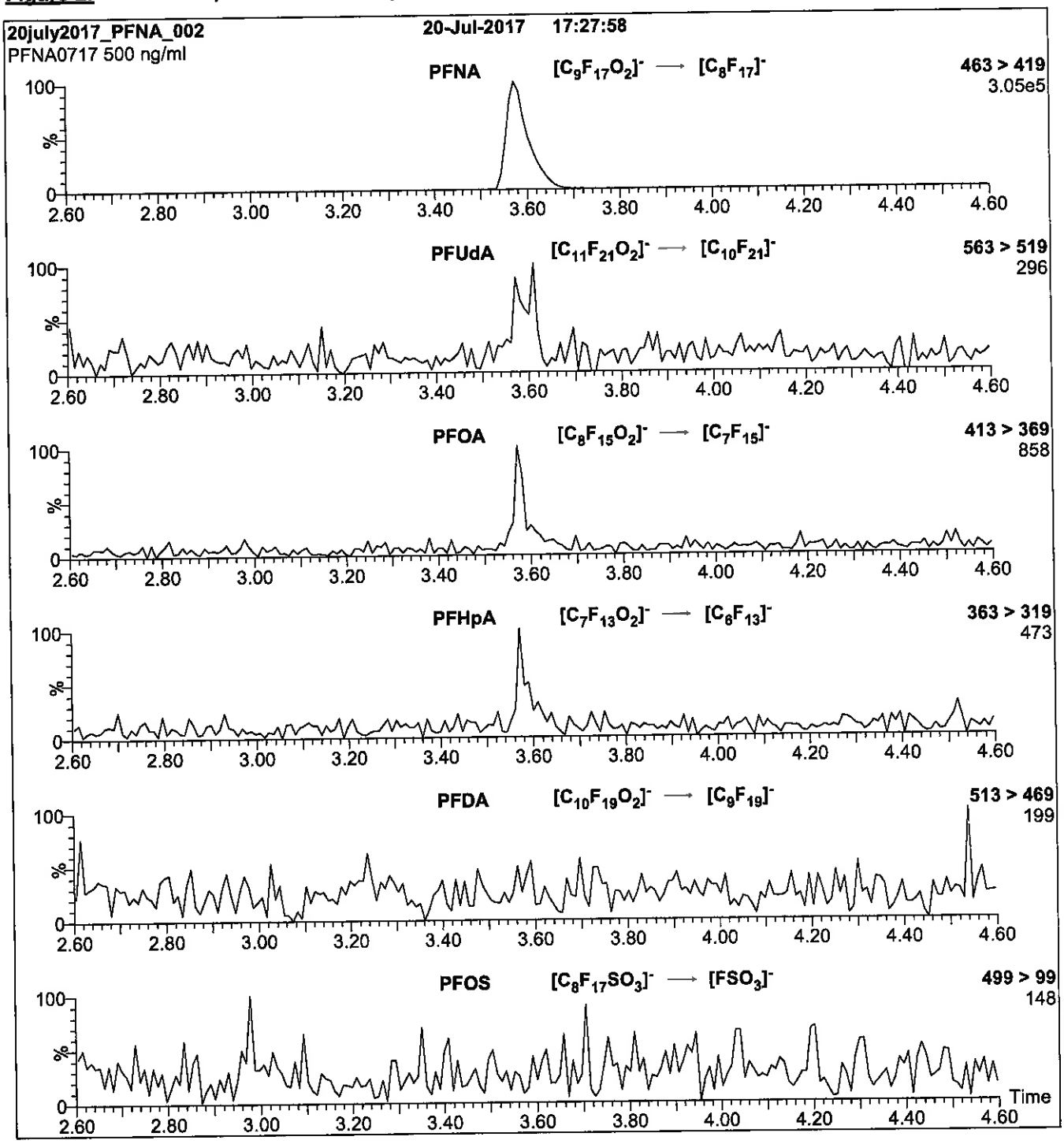
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

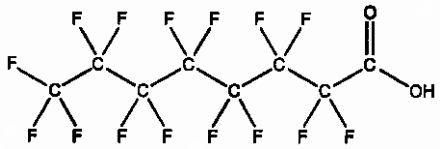
LCPFOA_00010

P: 10/2017 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

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



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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/28/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

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

INTENDED USE:

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

HAZARDS:

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

SYNTHESIS / CHARACTERIZATION:

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

HOMOGENEITY:

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

UNCERTAINTY:

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

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

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

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 ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

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

EXPIRY DATE / PERIOD OF VALIDITY:

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

LIMITED WARRANTY:

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

QUALITY MANAGEMENT:

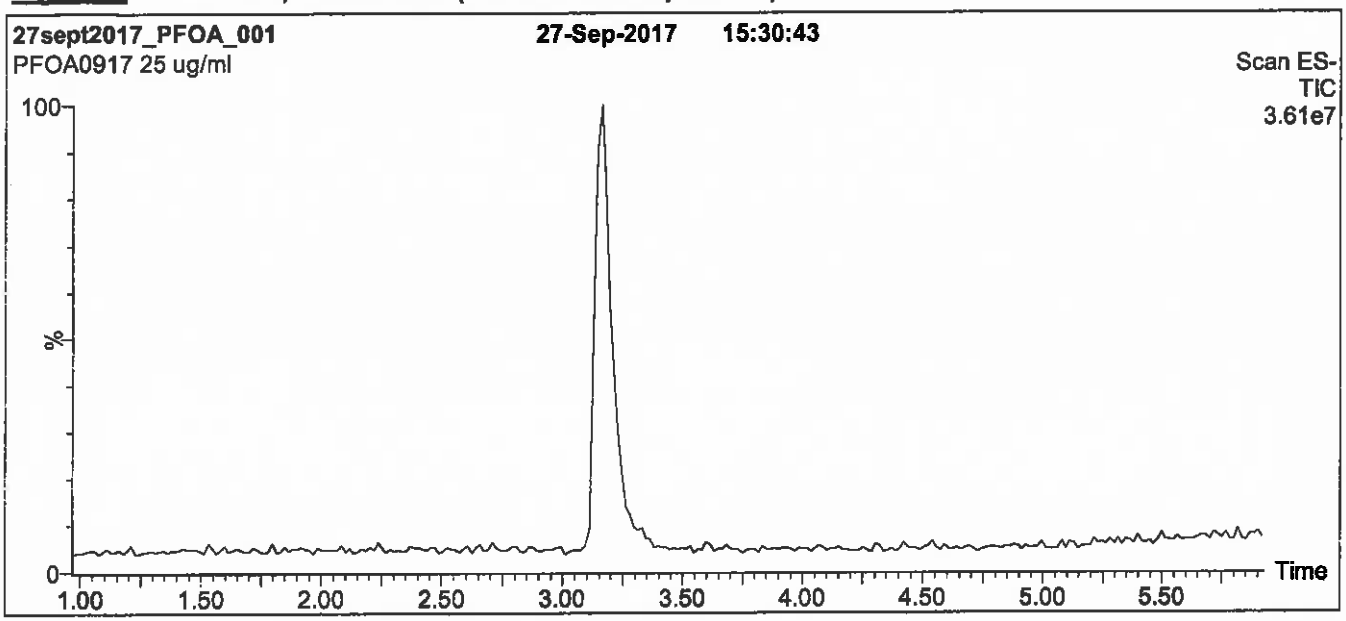
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

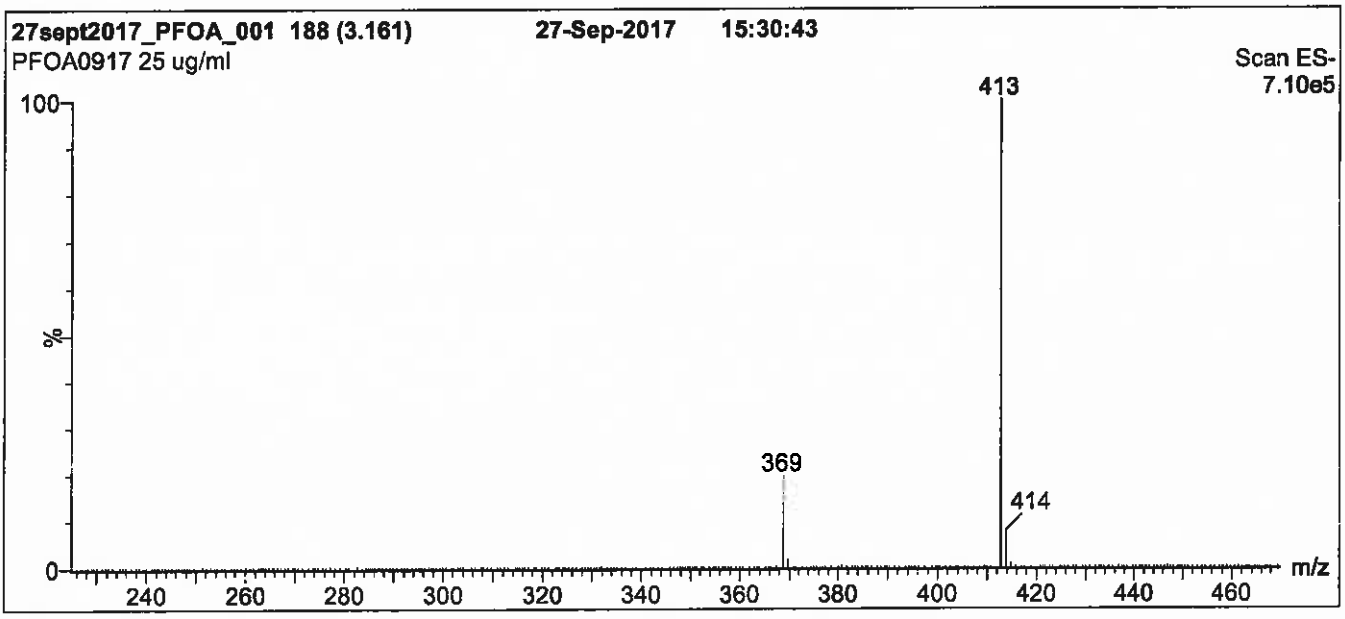
CALA

ANAB ACCREDITED

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

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





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

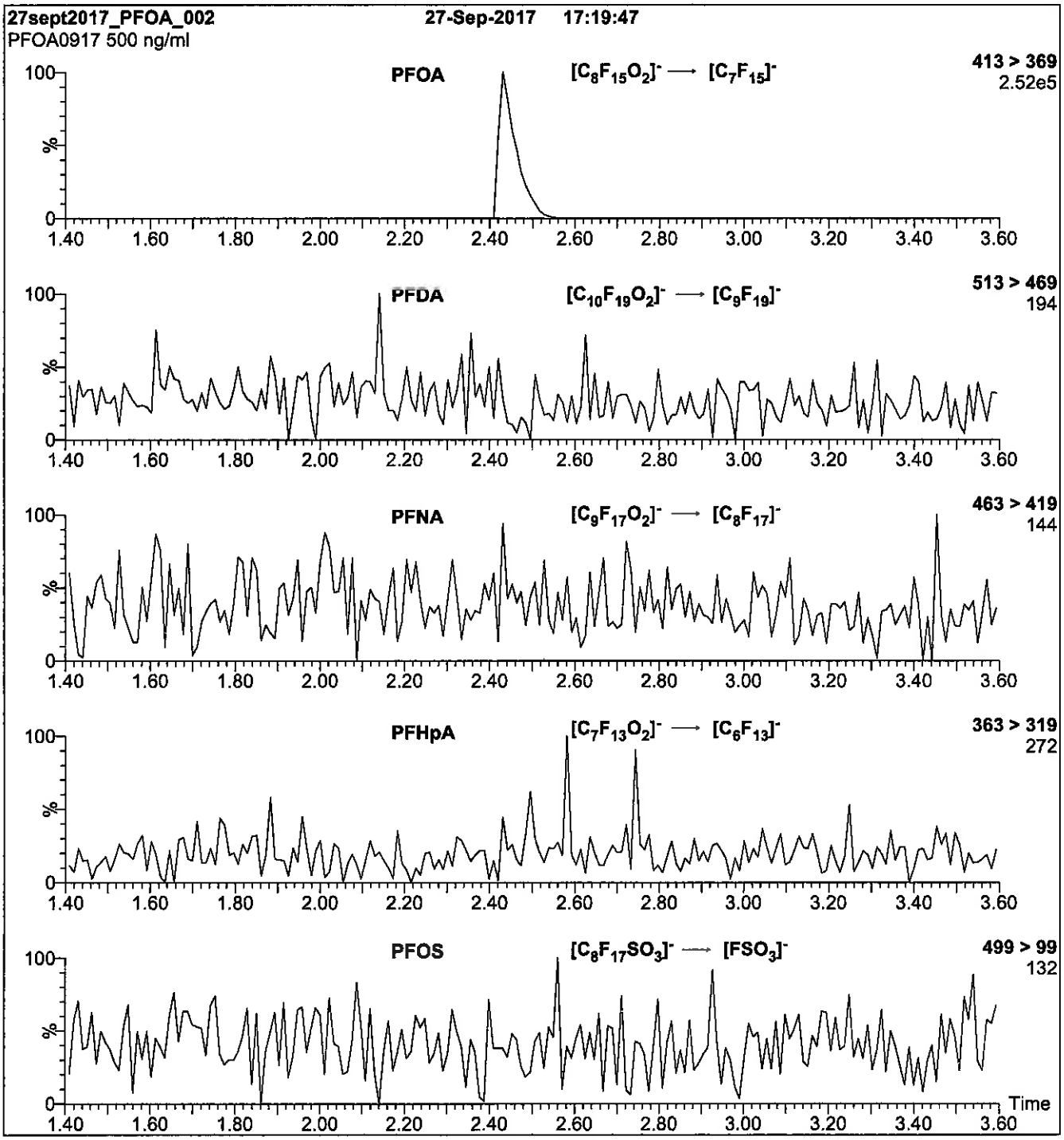
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

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

Flow: 300 µl/min

MS Parameters

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

Reagent

LCPFOS-br_00005

P: 10/2017 SKV

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

br-PFOSK

Potassium Perfluorooctanesulfonate Solution/Mixture of Linear and Branched Isomers

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

DESCRIPTION:

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

DOCUMENTATION/ DATA ATTACHED:

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

ADDITIONAL INFORMATION:

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

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HOMOGENEITY:

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

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

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

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 ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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

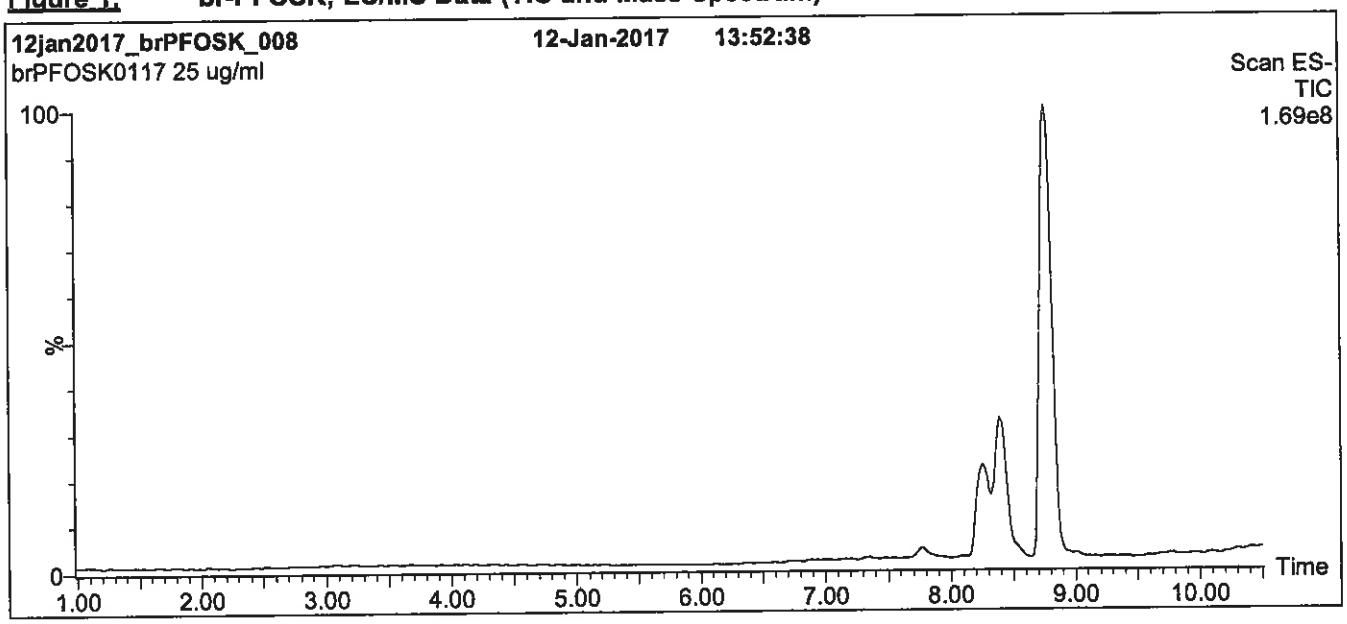
Table A: **br-PFOSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

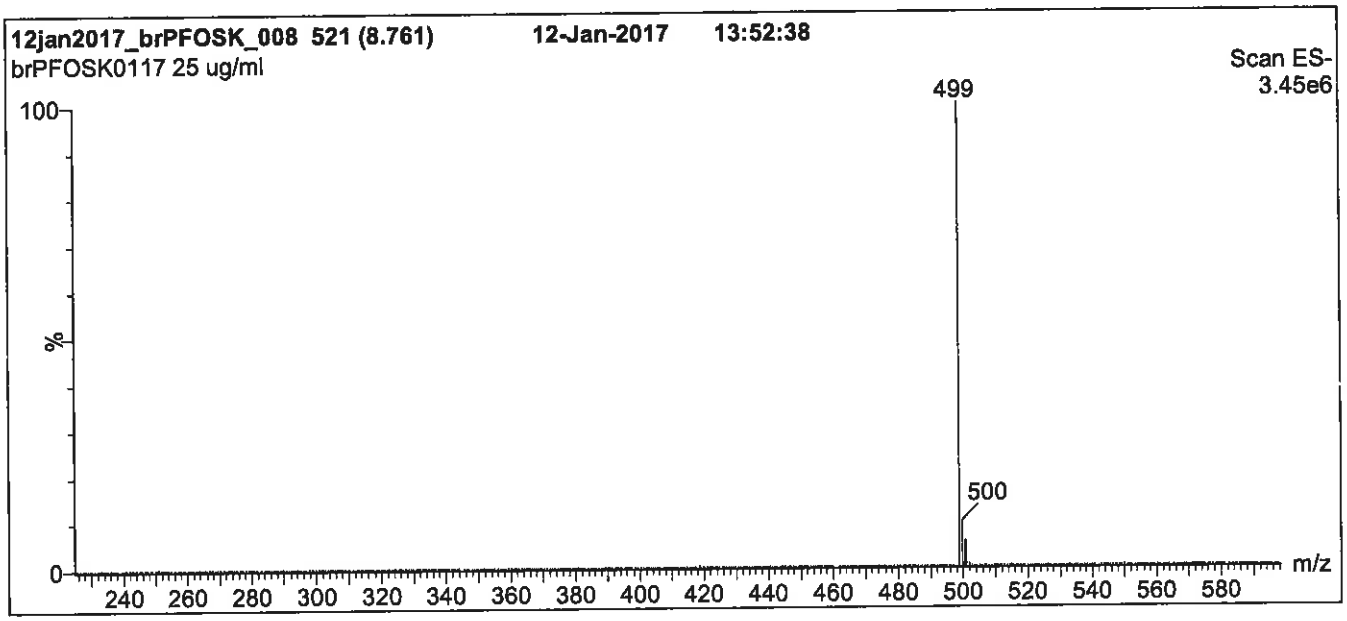
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-octanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$CF_3CF_2CF_2CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2CF_2CF_2SO_3^-K^+$	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3C(CF_3)CF_2CF_2CF_2CF_2SO_3^-K^+$	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3CF_2C(CF_3)CF_2CF_2CF_2SO_3^-K^+$	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2CF_2SO_3^-K^+$	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3CF(CF_3)CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	0.07

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

Certified By: B.G. Chittim **Date:** 01/20/2017 (mm/dd/yyyy)

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





Conditions for Figure 1:

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

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 12 min and hold for 2 min.
Return to initial conditions over 0.5 min.
Time: 16 min

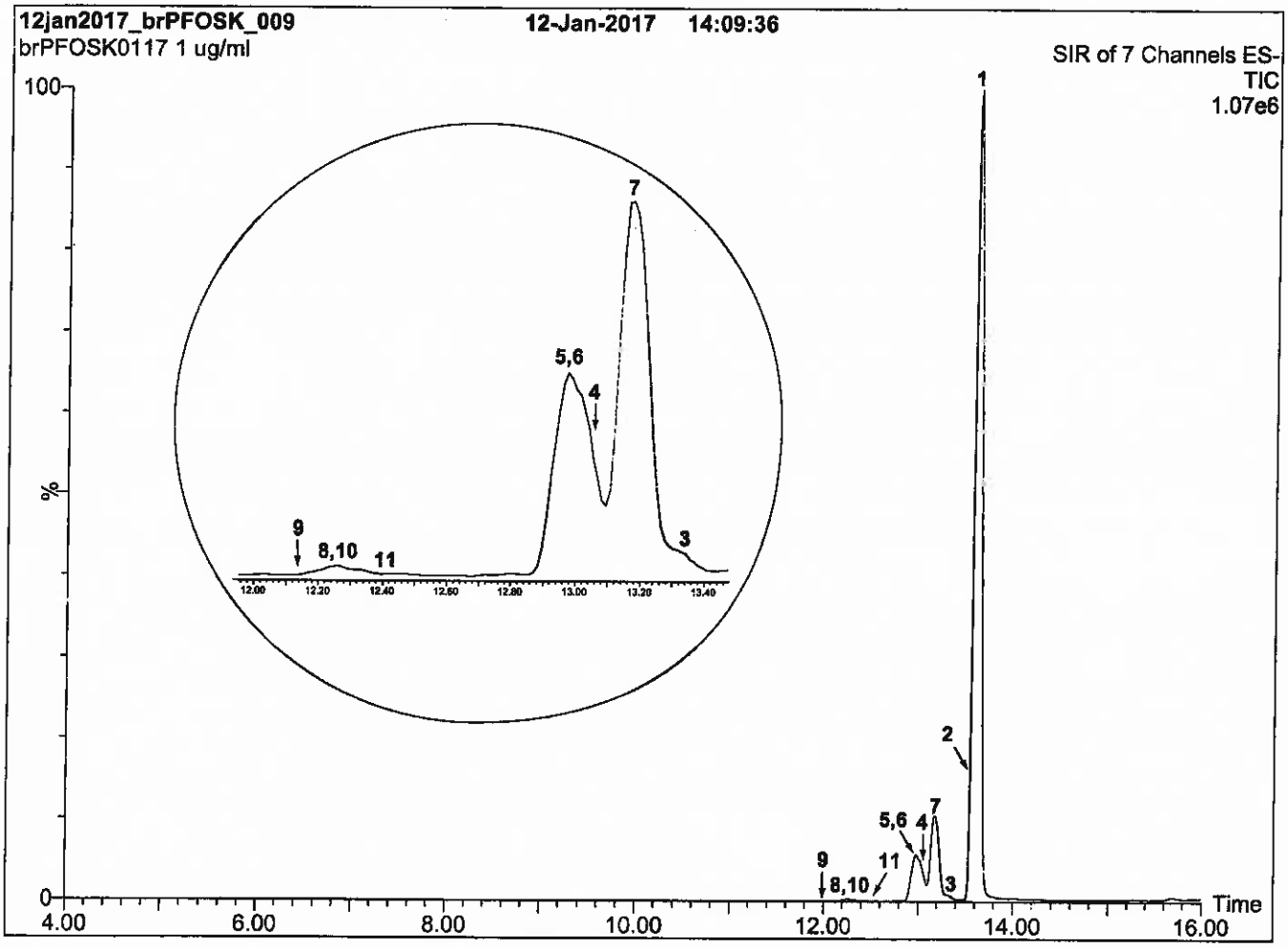
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

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

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



Conditions for Figure 2:

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

Chromatographic Conditions:

Column: Acquity UPLC BEH Shield RP_{18} (1.7 µm, 2.1 x 100 mm)

Injection: 1.0 µg/ml of br-PFOSK

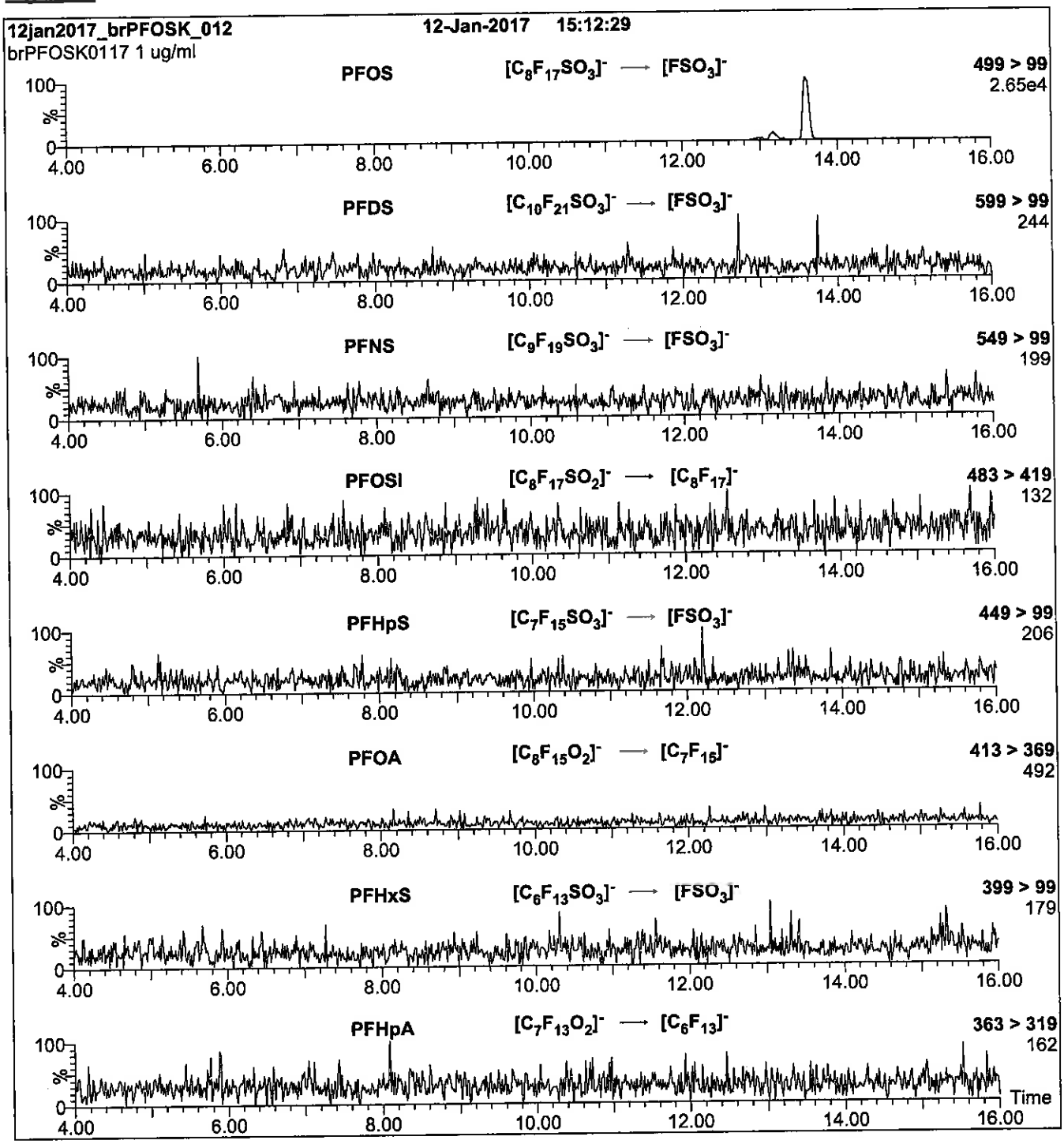
Mobile Phase: Gradient
45% (80:20 MeOH:ACN) / 55% H_2O (both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 15 min and hold for 3 min.
Return to initial conditions over 1 min.
Time: 20 min

Flow: 300 µl/min

MS Conditions:

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

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



Conditions for Figure 3:

Injection: On-column

Mobile phase: Same as Figure 2

Flow: 300 µl/min

MS Parameters

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

Method 537 DOD

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

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
NAWC-041818-RW-260	320-38340-1	97	85
NAWC-041818-FRB-260	320-38340-2	98	85
NAWC-041818-RW-228	320-38340-3	96	84
NAWC-041818-FRB-228	320-38340-4	95	91
	MB 320-219207/1-A	96	88
	LCS 320-219207/2-A	91	85
	LCSD 320-219207/3-A	94	88

	QC LIMITS
PFHxA = 13C2 PFHxA	70-130
PFDA = 13C2 PFDA	70-130

Column to be used to flag recovery values

FORM II 537

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 2018.04.29_537B_004.d

Lab ID: LCS 320-219207/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	132	121	92	70-130	M
Perfluorooctanoic acid (PFOA)	66.0	61.9	94	70-130	
Perfluorononanoic acid (PFNA)	66.0	57.7	87	70-130	
Perfluorohexanesulfonic acid (PFHxS)	100	98.6	99	70-130	
Perfluoroheptanoic acid (PFHpA)	32.0	29.6	93	70-130	
Perfluorobutanesulfonic acid (PFBS)	300	280	93	70-130	

Column to be used to flag recovery and RPD values

FORM III 537

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 2018.04.29_537B_005.d

Lab ID: LCSD 320-219207/3-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCSD CONCENTRATION (ng/L)	LCSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	132	121	92	0	30	70-130	M
Perfluorooctanoic acid (PFOA)	66.0	61.7	93	0	30	70-130	
Perfluorononanoic acid (PFNA)	66.0	57.7	87	0	30	70-130	
Perfluorohexanesulfonic acid (PFHxS)	100	101	101	2	30	70-130	
Perfluoroheptanoic acid (PFHpA)	32.0	29.9	93	1	30	70-130	
Perfluorobutanesulfonic acid (PFBS)	300	286	95	2	30	70-130	

Column to be used to flag recovery and RPD values

FORM III 537

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Lab File ID: 2018.04.29_537B_003.d Lab Sample ID: MB 320-219207/1-A

Matrix: Water Date Extracted: 04/23/2018 07:33

Instrument ID: A8_N Date Analyzed: 04/30/2018 01:13

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-219207/2-A	2018.04.29_537B_004.d	04/30/2018 01:18
	LCSD 320-219207/3-A	2018.04.29_537B_005.d	04/30/2018 01:23
NAWC-041818-RW-260	320-38340-1	2018.04.29_537B_006.d	04/30/2018 01:27
NAWC-041818-FRB-260	320-38340-2	2018.04.29_537B_007.d	04/30/2018 01:32
NAWC-041818-RW-228	320-38340-3	2018.04.29_537B_008.d	04/30/2018 01:37
NAWC-041818-FRB-228	320-38340-4	2018.04.29_537B_009.d	04/30/2018 01:41

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

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

GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 04/11/2018 12:09

Calibration ID: 38530

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		970041	1.86	2344935	2.10		
UPPER LIMIT		1455062	2.36	3517403	2.60		
LOWER LIMIT		485021	1.36	1172468	1.60		
LAB SAMPLE ID	CLIENT SAMPLE ID						
CCVL 320-217453/10		964533	1.87	2387973	2.10		
ICV 320-217453/12		1123391	1.86	2710764	2.10		
CCVL 320-220554/1		908315	1.87	2069824	2.12		
CCV 320-220561/1 CCVIS		946267	1.86	2192267	2.10		
MB 320-219207/1-A		1002403	1.87	2434296	2.11		
LCS 320-219207/2-A		1013642	1.87	2358409	2.10		
LCSD 320-219207/3-A		905314	1.87	2157796	2.11		
320-38340-1	NAWC-041818-RW-260	942927	1.85	2281223	2.09		
320-38340-2	NAWC-041818-FRB-260	1068058	1.86	2593181	2.10		
320-38340-3	NAWC-041818-RW-228	1068321	1.85	2455515	2.09		
320-38340-4	NAWC-041818-FRB-228	1130754	1.85	2645332	2.09		
CCV 320-220561/10 CCVIS		935993	1.85	2103256	2.09		

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

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

Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Sample No.: CCV 320-220561/1 Date Analyzed: 04/30/2018 01:04

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2018.04.29_537B_001 Heated Purge: (Y/N) N

Calibration ID: 38530

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		946267	1.86	2192267	2.10		
UPPER LIMIT		1324774	2.36	3069174	2.60		
LOWER LIMIT		662387	1.36	1534587	1.60		
LAB SAMPLE ID	CLIENT SAMPLE ID						
MB 320-219207/1-A		1002403	1.87	2434296	2.11		
LCS 320-219207/2-A		1013642	1.87	2358409	2.10		
LCSD 320-219207/3-A		905314	1.87	2157796	2.11		
320-38340-1	NAWC-041818-RW-260	942927	1.85	2281223	2.09		
320-38340-2	NAWC-041818-FRB-260	1068058	1.86	2593181	2.10		
320-38340-3	NAWC-041818-RW-228	1068321	1.85	2455515	2.09		
320-38340-4	NAWC-041818-FRB-228	1130754	1.85	2645332	2.09		

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

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

Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Sample No.: CCV 320-220561/10 Date Analyzed: 04/30/2018 01:46

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2018.04.29_537B_010 Heated Purge: (Y/N) N

Calibration ID: 38530

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		935993	1.85	2103256	2.09		
UPPER LIMIT		1310390	2.35	2944558	2.59		
LOWER LIMIT		655195	1.35	1472279	1.59		
LAB SAMPLE ID	CLIENT SAMPLE ID						
MB 320-219207/1-A		1002403	1.87	2434296	2.11		
LCS 320-219207/2-A		1013642	1.87	2358409	2.10		
LCSD 320-219207/3-A		905314	1.87	2157796	2.11		
320-38340-1	NAWC-041818-RW-260	942927	1.85	2281223	2.09		
320-38340-2	NAWC-041818-FRB-260	1068058	1.86	2593181	2.10		
320-38340-3	NAWC-041818-RW-228	1068321	1.85	2455515	2.09		
320-38340-4	NAWC-041818-FRB-228	1130754	1.85	2645332	2.09		

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

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

Column used to flag values outside QC limits

FORM VIII 537

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: NAWC-041818-RW-260 | Lab Sample ID: 320-38340-1

Matrix: Water | Lab File ID: 2018.04.29_537B_006.d

Analysis Method: 537 | Date Collected: 04/18/2018 12:10

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 255.7(mL) | Date Analyzed: 04/30/2018 01:27

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.: 220561 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	19	J M	39	16	6.6
335-67-1	Perfluorooctanoic acid (PFOA)	18	J	20	7.8	2.7
375-95-1	Perfluorononanoic acid (PFNA)	20	U M	23	20	7.8
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	8.8	J	29	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	5.5	J	9.8	3.9	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	16	J	88	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	97		70-130
STL00996	13C2 PFDA	85		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_006.d
Lims ID: 320-38340-A-1-A
Client ID: NAWC-041818-RW-260
Sample Type: Client
Inject. Date: 30-Apr-2018 01:27:54 ALS Bottle#: 4 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-38340-a-1-a
Misc. Info.: Plate: 1 Rack: 6
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:53:22 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

First Level Reviewer: barnettj Date: 30-Apr-2018 10:51:51

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.388	1.396	-0.008	1.000	349887	4.18		231	
298.90 > 99.00	1.388	1.396	-0.008	1.000	253448		1.38(0.00-0.00)	253	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.517	1.525	-0.008	1.000	977355	9.75		7030	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.669	1.669	0.0	1.000	295334	2.26		78.7	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.669	1.669	0.0	1.000	142750	1.41		15.2	
* 6 13C2-PFOA									
415.00 > 370.00	1.851	1.859	-0.008		942927	10.0		5111	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.859	1.859	0.0	1.000	469860	4.69		66.0	
413.00 > 169.00	1.851	1.859	-0.008	0.996	275527		1.71(0.00-0.00)	175	
* 7 13C4 PFOS									
503.00 > 80.00	2.094	2.102	-0.008		2281223	28.7		1051	
8 Perfluorooctane sulfonic acid									a
499.00 > 80.00	2.102	2.102	0.0	1.000	416328	4.91		62.9	a
499.00 > 99.00	2.094	2.102	-0.008	0.996	74143		5.62(0.00-0.00)	91.4	
9 Perfluorononanoic acid									M
463.00 > 419.00	2.109	2.117	-0.008	1.000	47513	0.5982		8.2	M
$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.269	0.0	1.000	678288	8.46		7608	

QC Flag Legend

Review Flags

M - Manually Integrated

a - User Assigned ID

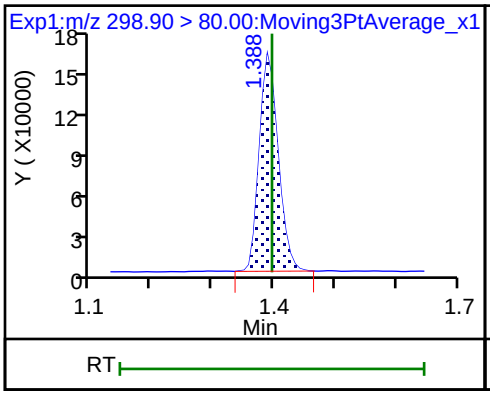
Report Date: 30-Apr-2018 10:53:27 Chrom Revision: 2.2 26-Apr-2018 11:26:08

TestAmerica Sacramento

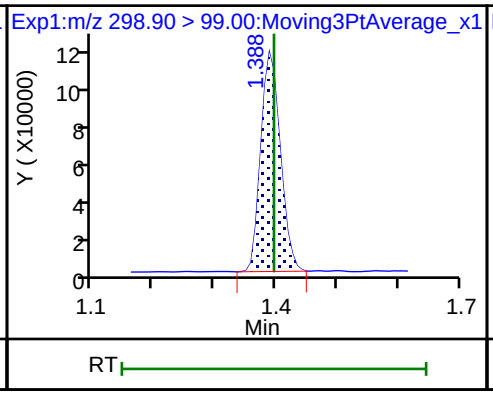
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_006.d

Injection Date:	30-Apr-2018 01:27:54	Instrument ID:	A8_N		
Lims ID:	320-38340-A-1-A	Lab Sample ID:	320-38340-1		
Client ID:	NAWC-041818-RW-260				
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		

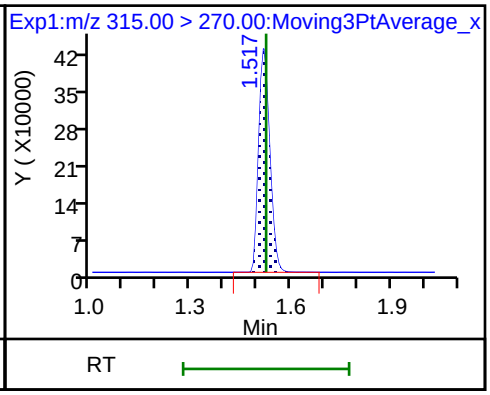
1 Perfluorobutanesulfonic acid



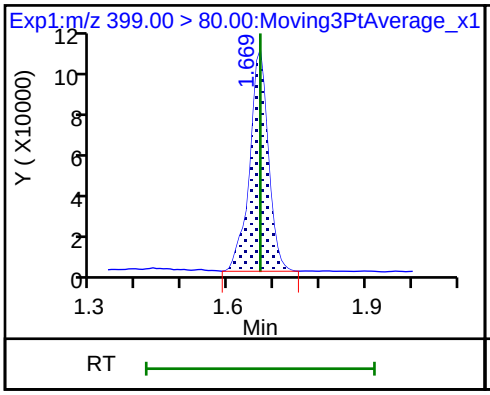
1 Perfluorobutanesulfonic acid



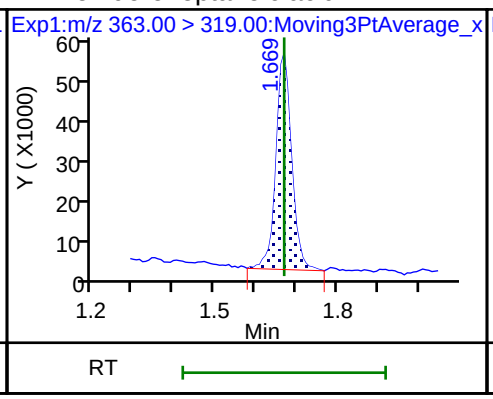
$ 2 13C2 PFHxA



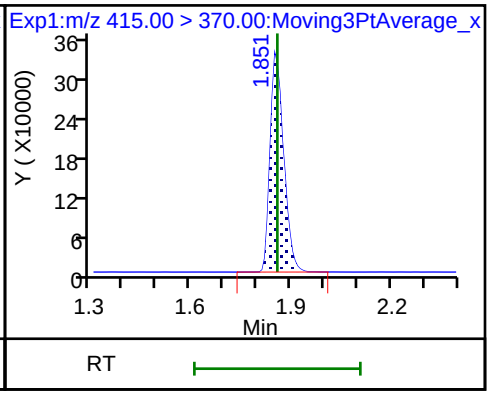
3 Perfluorohexanesulfonic acid



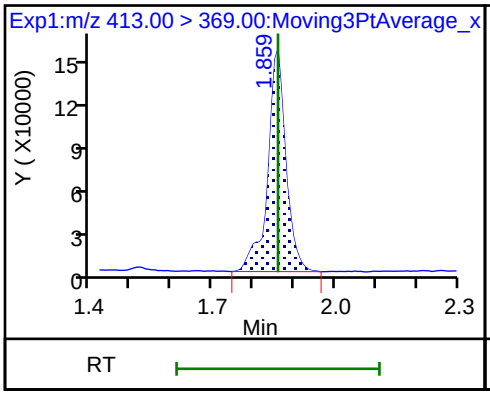
4 Perfluoroheptanoic acid



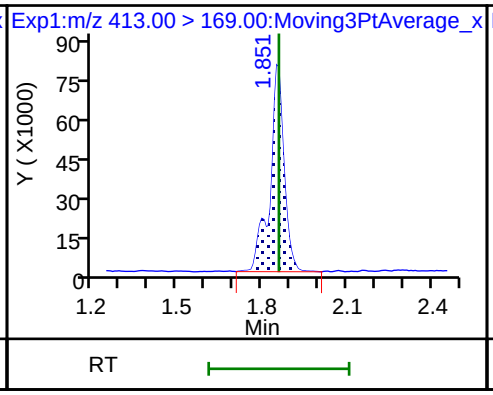
* 6 13C2-PFOA



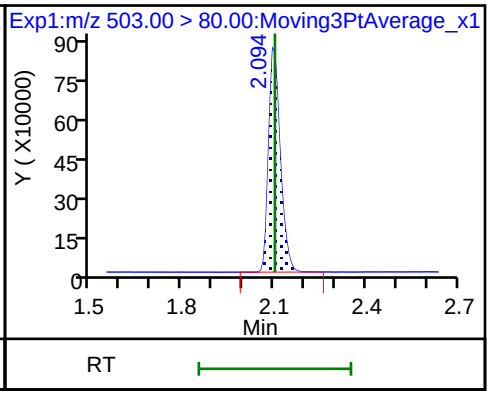
5 Perfluorooctanoic acid



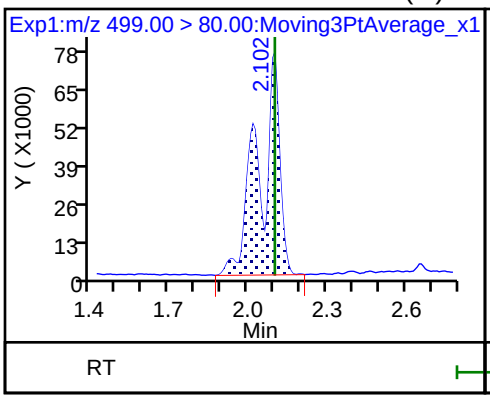
5 Perfluorooctanoic acid



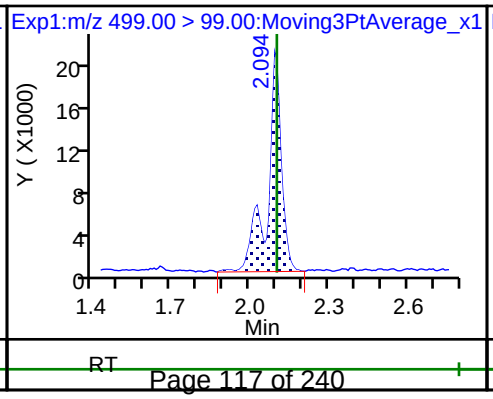
* 7 13C4 PFOS



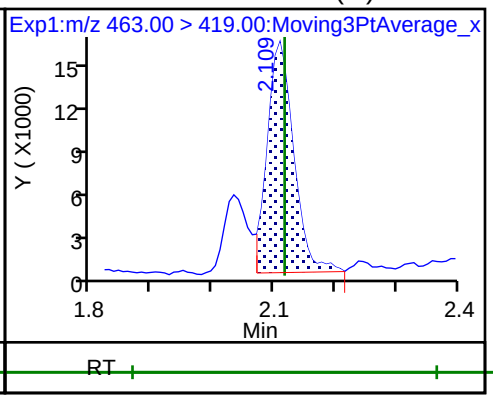
8 Perfluorooctane sulfonic acid (M)



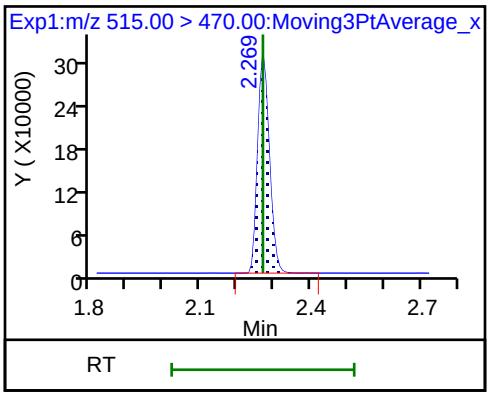
8 Perfluorooctane sulfonic acid



9 Perfluorononanoic acid (M)



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.269
Y (X10000)
30
24
18
12
6
0
1.8
2.1
2.4
2.7
Min
RT

TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_006.d
Lims ID: 320-38340-A-1-A
Client ID: NAWC-041818-RW-260
Sample Type: Client
Inject. Date: 30-Apr-2018 01:27:54 ALS Bottle#: 4 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-38340-a-1-a
Misc. Info.: Plate: 1 Rack: 6
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:53:22 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

First Level Reviewer: barnettj Date: 30-Apr-2018 10:51:51

Compound	Amount Added	Amount Recovered	% Rec.
$ 2 13C2 PFHxA	10.0	9.75	97.49
$ 10 13C2 PFDA	10.0	8.46	84.58

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

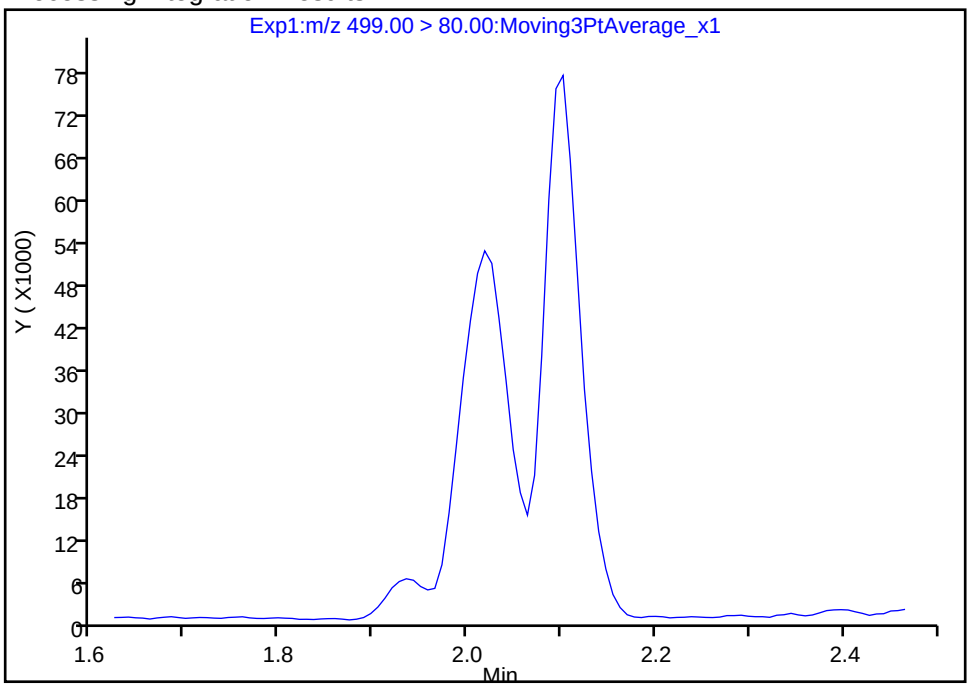
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_006.d				
Injection Date:	30-Apr-2018 01:27:54	Instrument ID:	A8_N		
Lims ID:	320-38340-A-1-A	Lab Sample ID:	320-38340-1		
Client ID:	NAWC-041818-RW-260				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	4	Worklist Smp#:	6
Injection 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

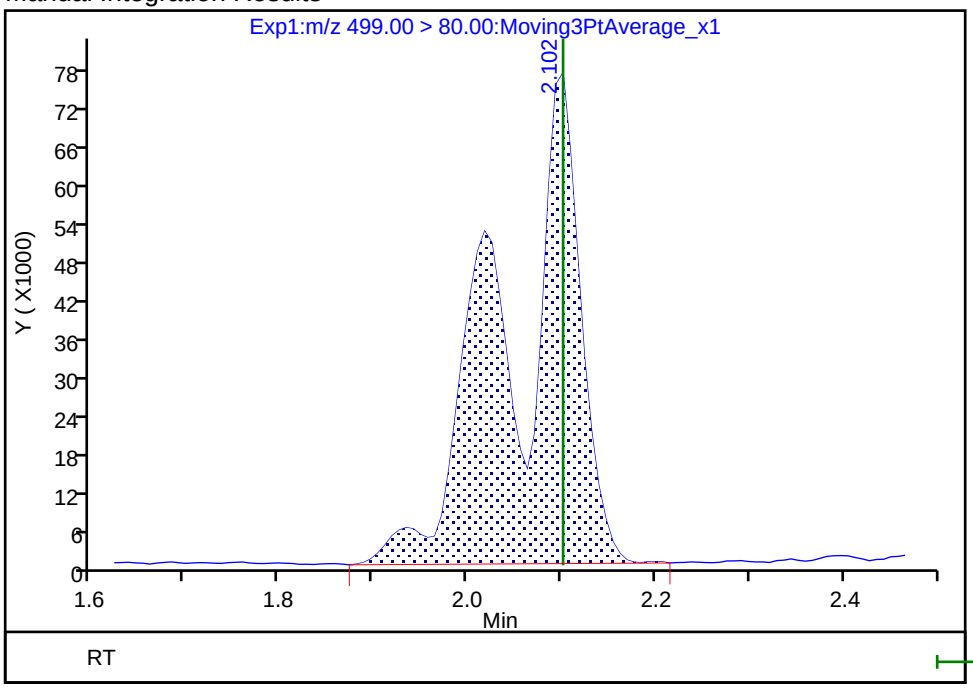
Not Detected
Expected RT: 2.10

Processing Integration Results



Manual Integration Results

RT: 2.10
Area: 416328
Amount: 4.909758
Amount Units: ng/ml



Reviewer: barnettj, 30-Apr-2018 10:51:30
Audit Action: Assigned Compound ID Audit Reason: Peak assignment corrected

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

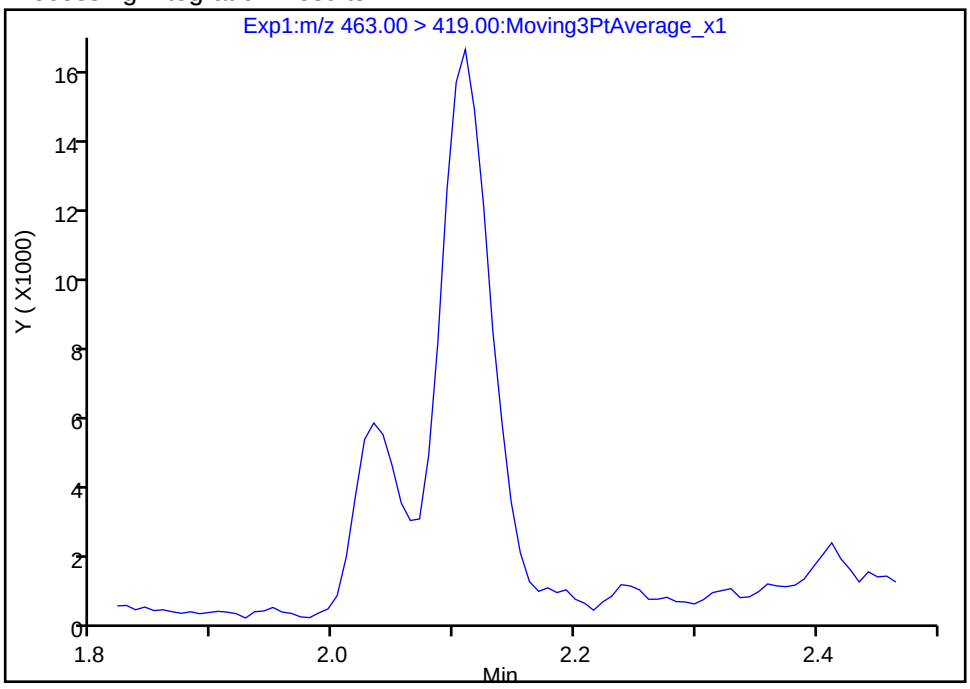
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_006.d				
Injection Date:	30-Apr-2018 01:27:54	Instrument ID:	A8_N		
Lims ID:	320-38340-A-1-A	Lab Sample ID:	320-38340-1		
Client ID:	NAWC-041818-RW-260				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	4	Worklist Smp#:	6
Injection 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

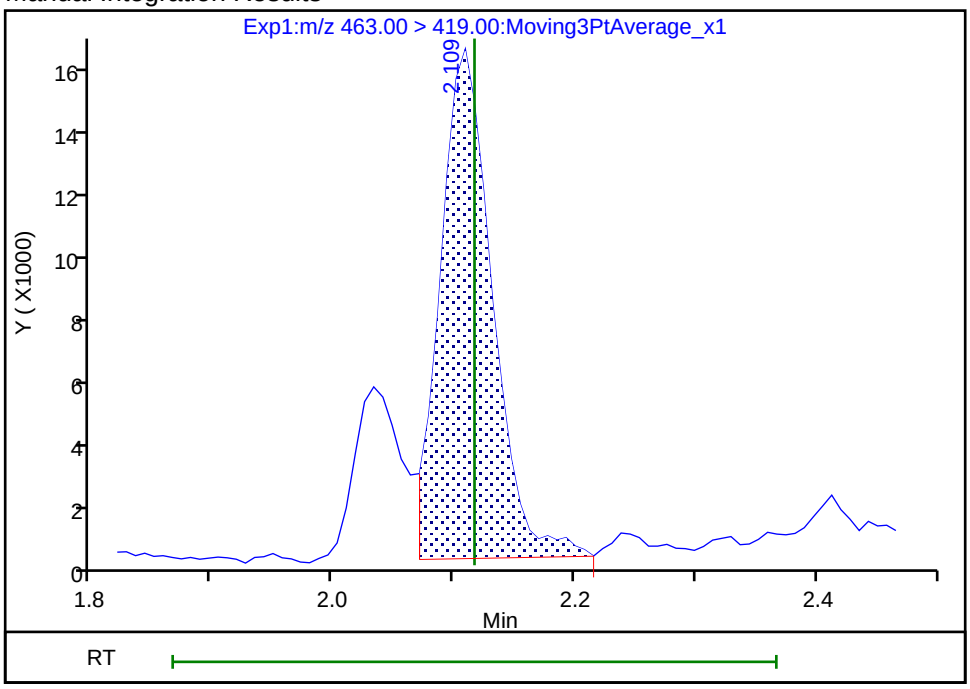
Not Detected
Expected RT: 2.12

Processing Integration Results



Manual Integration Results

RT: 2.11
Area: 47513
Amount: 0.598164
Amount Units: ng/ml



Reviewer: barnettj, 30-Apr-2018 10:51:43
Audit Action: Manually Integrated Audit Reason: Missed Peak

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: NAWC-041818-FRB-260 | Lab Sample ID: 320-38340-2

Matrix: Water | Lab File ID: 2018.04.29_537B_007.d

Analysis Method: 537 | Date Collected: 04/18/2018 12:05

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 252.7(mL) | Date Analyzed: 04/30/2018 01:32

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.: 220561 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	16	U	40	16	6.7
335-67-1	Perfluorooctanoic acid (PFOA)	7.9	U	20	7.9	2.8
375-95-1	Perfluorononanoic acid (PFNA)	20	U	24	20	7.9
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	30	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.0	U	9.9	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36	U	89	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	98		70-130
STL00996	13C2 PFDA	85		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_007.d
Lims ID: 320-38340-A-2-A
Client ID: NAWC-041818-FRB-260
Sample Type: Client
Inject. Date: 30-Apr-2018 01:32:36 ALS Bottle#: 5 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-38340-a-2-a
Misc. Info.: Plate: 1 Rack: 6
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:53:22 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
$ 2 13C2 PFHxA									
315.00 > 270.00	1.517	1.525	-0.008	1.000	1108753	9.76		7743	
* 6 13C2-PFOA									
415.00 > 370.00	1.859	1.859	0.0		1068058	10.0		5771	
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.102	0.0		2593181	28.7		1337	
$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.269	0.0	1.000	771183	8.49		7485	

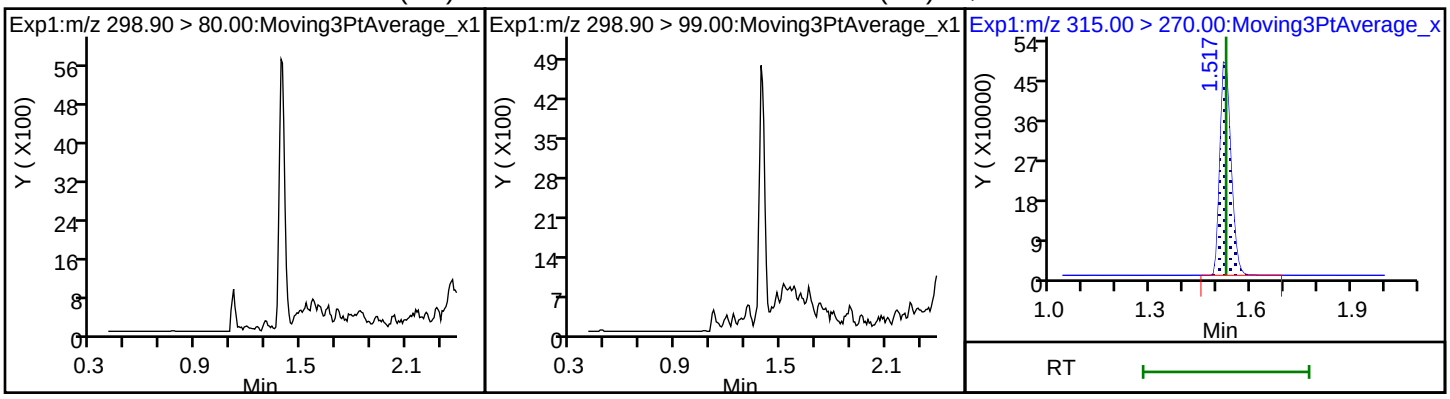
Report Date: 30-Apr-2018 10:53:28 Chrom Revision: 2.2 26-Apr-2018 11:26:08

TestAmerica Sacramento

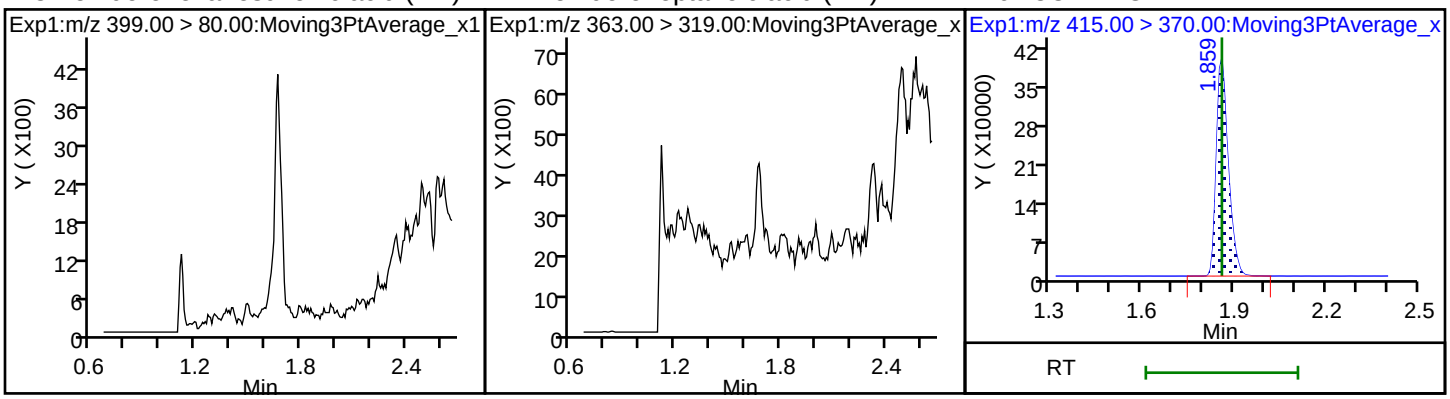
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_007.d

Injection Date:	30-Apr-2018 01:32:36	Instrument ID:	A8_N		
Lims ID:	320-38340-A-2-A	Lab Sample ID:	320-38340-2		
Client ID:	NAWC-041818-FRB-260				
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		

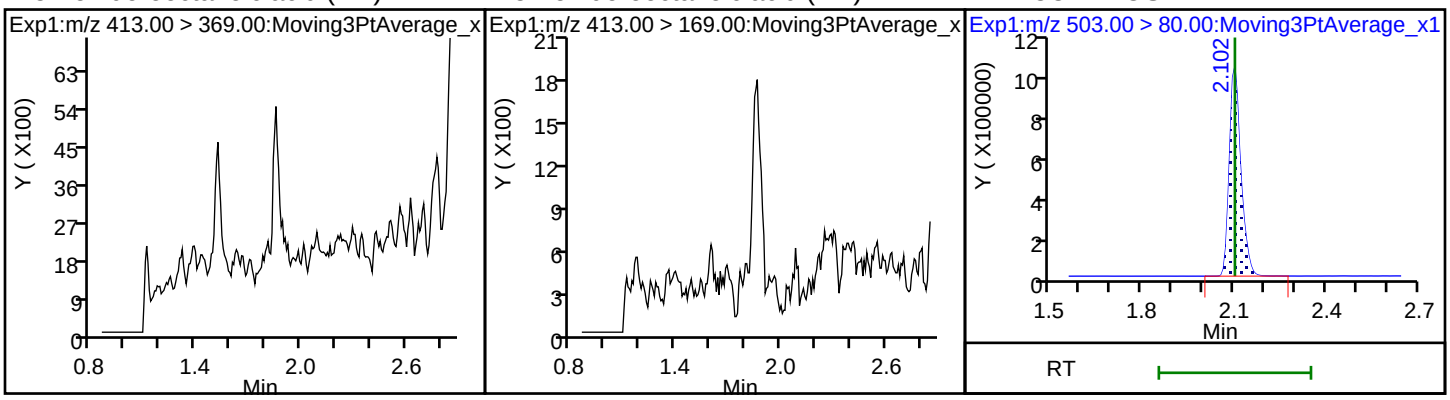
1 Perfluorobutanesulfonic acid (ND) 1 Perfluorobutanesulfonic acid (ND) $ 2 13C2 PFHxA



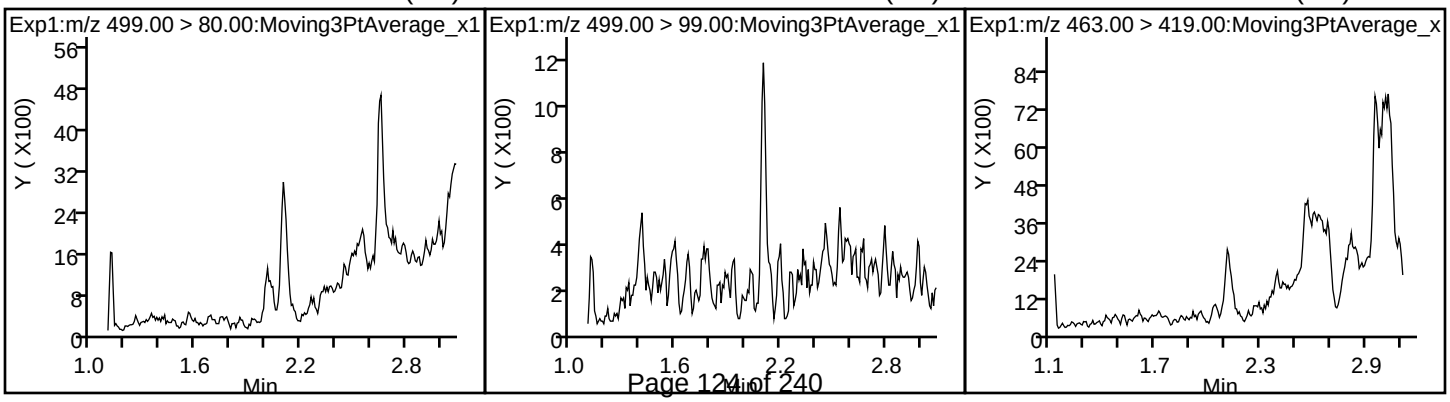
3 Perfluorohexanesulfonic acid (ND) 4 Perfluoroheptanoic acid (ND) * 6 13C2-PFOA



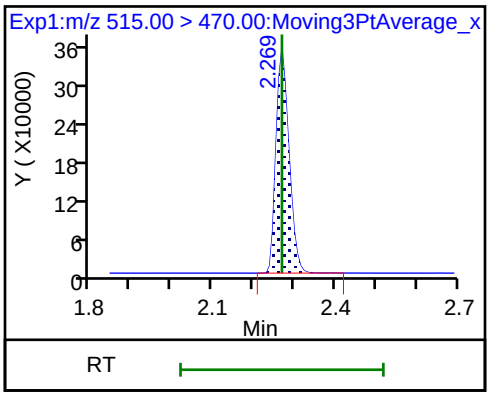
5 Perfluorooctanoic acid (ND) 5 Perfluorooctanoic acid (ND) * 7 13C4 PFOS



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



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.269
Y (X10000)
36
30
24
18
12
6
0
1.8
2.1
2.4
2.7
Min
RT

TestAmerica Sacramento
Recovery Report

Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_007.d				
Lims ID:	320-38340-A-2-A				
Client ID:	NAWC-041818-FRB-260				
Sample Type:	Client				
Inject. Date:	30-Apr-2018 01:32:36	ALS Bottle#:	5	Worklist Smp#:	7
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Sample Info:	320-38340-a-2-a				
Misc. Info.:	Plate: 1 Rack: 6				
Operator ID:	SACINSTLCMS01	Instrument ID:	A8_N		
Method:	\\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m				
Limit Group:	LC 537 ICAL				
Last Update:	30-Apr-2018 10:53:22	Calib Date:	11-Apr-2018 12:09:09		
Integrator:	Picker				
Quant Method:	Internal Standard	Quant By:	Initial Calibration		
Last ICal File:	\\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d				
Column 1 :			Det: EXP1		
Process Host:	XAWRK006				

Compound	Amount Added	Amount Recovered	% Rec.
$ 2 13C2 PFHxA	10.0	9.76	97.64
$ 10 13C2 PFDA	10.0	8.49	84.90

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: NAWC-041818-RW-228 | Lab Sample ID: 320-38340-3

Matrix: Water | Lab File ID: 2018.04.29_537B_008.d

Analysis Method: 537 | Date Collected: 04/18/2018 13:10

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 243.5(mL) | Date Analyzed: 04/30/2018 01:37

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 220561 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	J M	41	16	7.0
335-67-1	Perfluorooctanoic acid (PFOA)	21		21	8.2	2.9
375-95-1	Perfluorononanoic acid (PFNA)	21	U M	25	21	8.2
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	31	12	5.6
375-85-9	Perfluoroheptanoic acid (PFHpA)	7.9	J	10	4.1	2.0
375-73-5	Perfluorobutanesulfonic acid (PFBS)	38	J	92	37	17

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	96		70-130
STL00996	13C2 PFDA	84		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_008.d
Lims ID: 320-38340-A-3-A
Client ID: NAWC-041818-RW-228
Sample Type: Client
Inject. Date: 30-Apr-2018 01:37:17 ALS Bottle#: 6 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-38340-a-3-a
Misc. Info.: Plate: 1 Rack: 6
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:53:22 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

First Level Reviewer: barnettj Date: 30-Apr-2018 10:52:32

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.388	1.396	-0.008	1.000	834059	9.26		473	
298.90 > 99.00	1.388	1.396	-0.008	1.000	626364		1.33(0.00-0.00)	560	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.517	1.525	-0.008	1.000	1088661	9.58		7445	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.669	1.669	0.0	1.000	124894	0.8883		28.6	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.669	1.669	0.0	1.000	219260	1.91		23.1	
* 6 13C2-PFOA									
415.00 > 370.00	1.851	1.859	-0.008		1068321	10.0		6433	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.851	1.859	-0.008	1.000	587667	5.18		83.9	
413.00 > 169.00	1.851	1.859	-0.008	1.000	333721		1.76(0.00-0.00)	224	
* 7 13C4 PFOS									
503.00 > 80.00	2.094	2.102	-0.008		2455515	28.7		1037	
8 Perfluorooctane sulfonic acid									a
499.00 > 80.00	2.094	2.102	-0.008	1.000	324669	3.56		48.5	a
499.00 > 99.00	2.094	2.102	-0.008	1.000	61451		5.28(0.00-0.00)	67.0	
9 Perfluorononanoic acid									M
463.00 > 419.00	2.109	2.117	-0.008	1.000	65641	0.7294		12.2	M
$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.269	0.0	1.000	766196	8.43		7864	

QC Flag Legend

Review Flags

M - Manually Integrated

a - User Assigned ID

Report Date: 30-Apr-2018 10:53:28 Chrom Revision: 2.2 26-Apr-2018 11:26:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_008.d

Injection Date: 30-Apr-2018 01:37:17 Instrument ID: A8_N

Lims ID: 320-38340-A-3-A Lab Sample ID: 320-38340-3

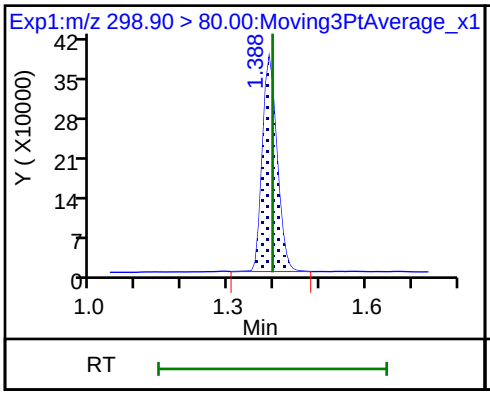
Client ID: NAWC-041818-RW-228

Operator ID: SACINSTLCMS01 ALS Bottle#: 6 Worklist Smp#: 8

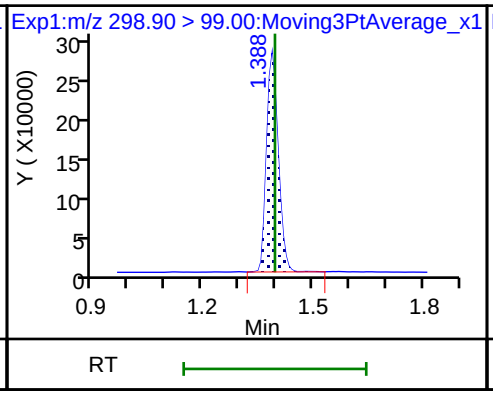
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

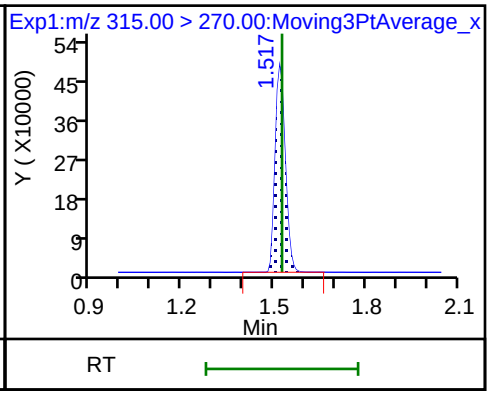
1 Perfluorobutanesulfonic acid



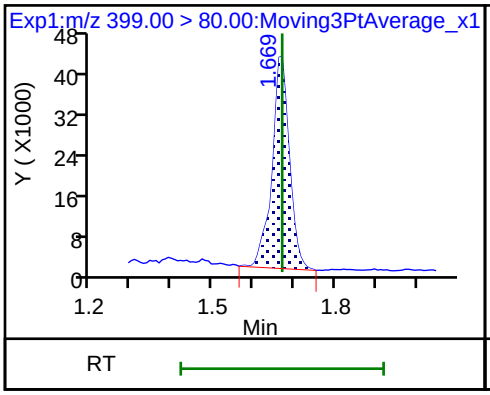
1 Perfluorobutanesulfonic acid



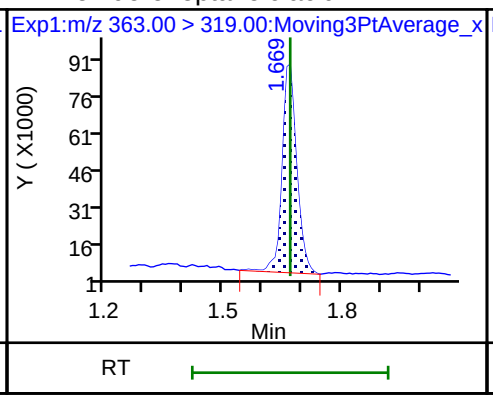
$ 2 13C2 PFHxA



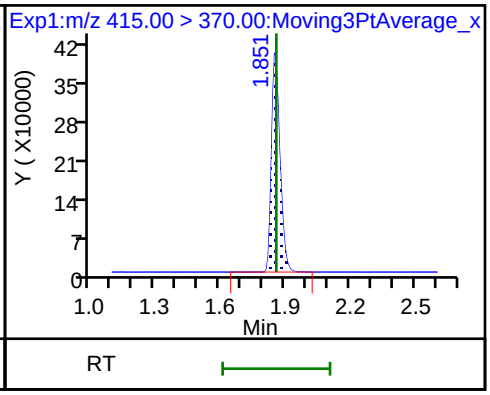
3 Perfluorohexanesulfonic acid



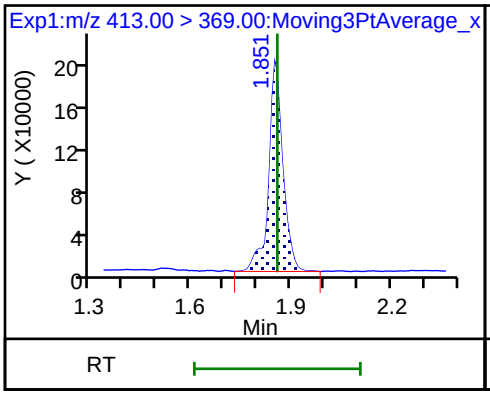
4 Perfluoroheptanoic acid



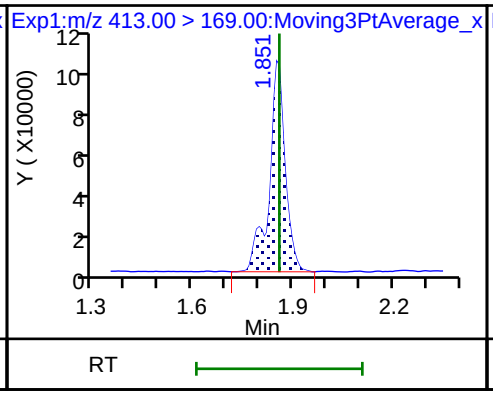
* 6 13C2-PFOA



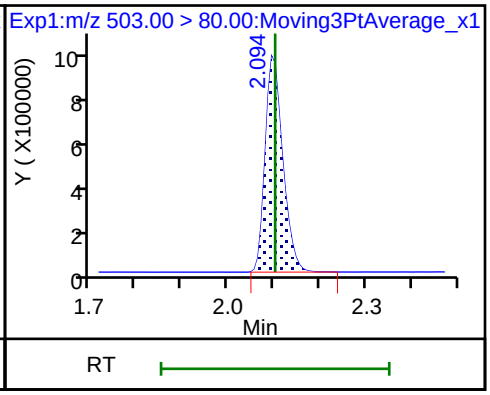
5 Perfluorooctanoic acid



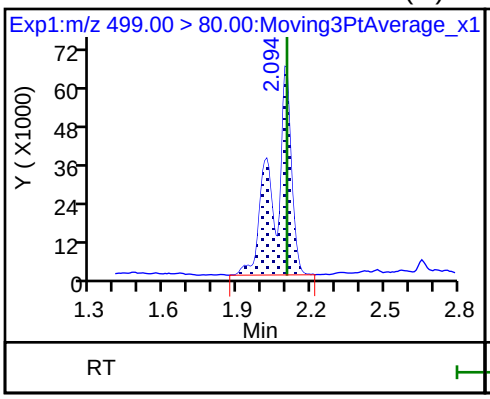
5 Perfluorooctanoic acid



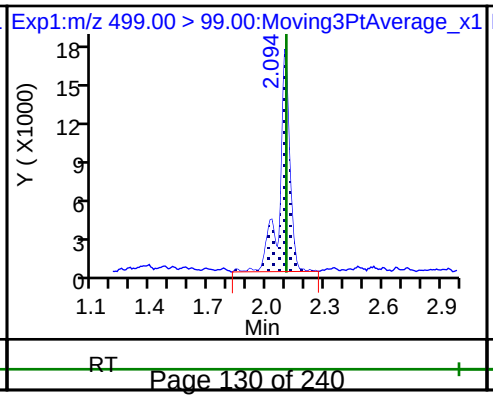
* 7 13C4 PFOS



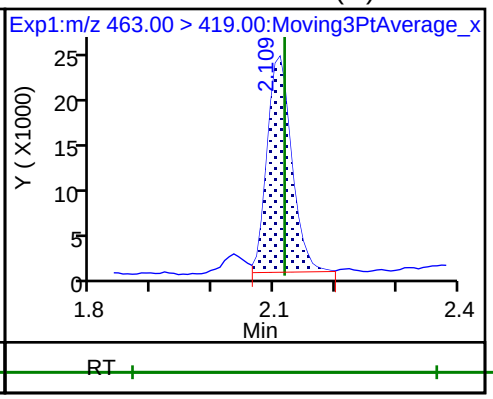
8 Perfluorooctane sulfonic acid (M)



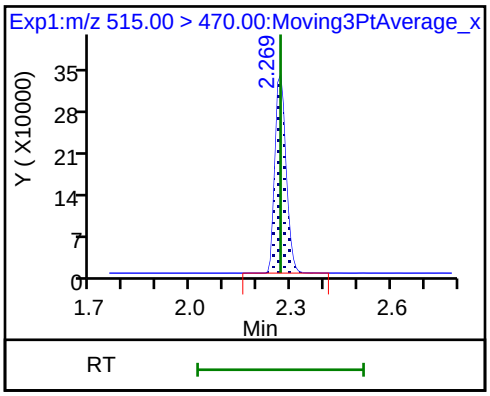
8 Perfluorooctane sulfonic acid



9 Perfluorononanoic acid (M)



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.269
Y (X10000)
35
28
21
14
7
0
1.7
2.0
2.3
2.6
Min
RT

TestAmerica Sacramento
Recovery Report

Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_008.d				
Lims ID:	320-38340-A-3-A				
Client ID:	NAWC-041818-RW-228				
Sample Type:	Client				
Inject. Date:	30-Apr-2018 01:37:17	ALS Bottle#:	6	Worklist Smp#:	8
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Sample Info:	320-38340-a-3-a				
Misc. Info.:	Plate: 1 Rack: 6				
Operator ID:	SACINSTLCMS01	Instrument ID:	A8_N		
Method:	\\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m				
Limit Group:	LC 537 ICAL				
Last Update:	30-Apr-2018 10:53:22	Calib Date:	11-Apr-2018 12:09:09		
Integrator:	Picker				
Quant Method:	Internal Standard	Quant By:	Initial Calibration		
Last ICal File:	\\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d				
Column 1 :			Det: EXP1		
Process Host:	XAWRK006				
First Level Reviewer: barnettj		Date:	30-Apr-2018 10:52:32		

Compound	Amount Added	Amount Recovered	% Rec.
$ 2 13C2 PFHxA	10.0	9.58	95.85
$ 10 13C2 PFDA	10.0	8.43	84.33

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

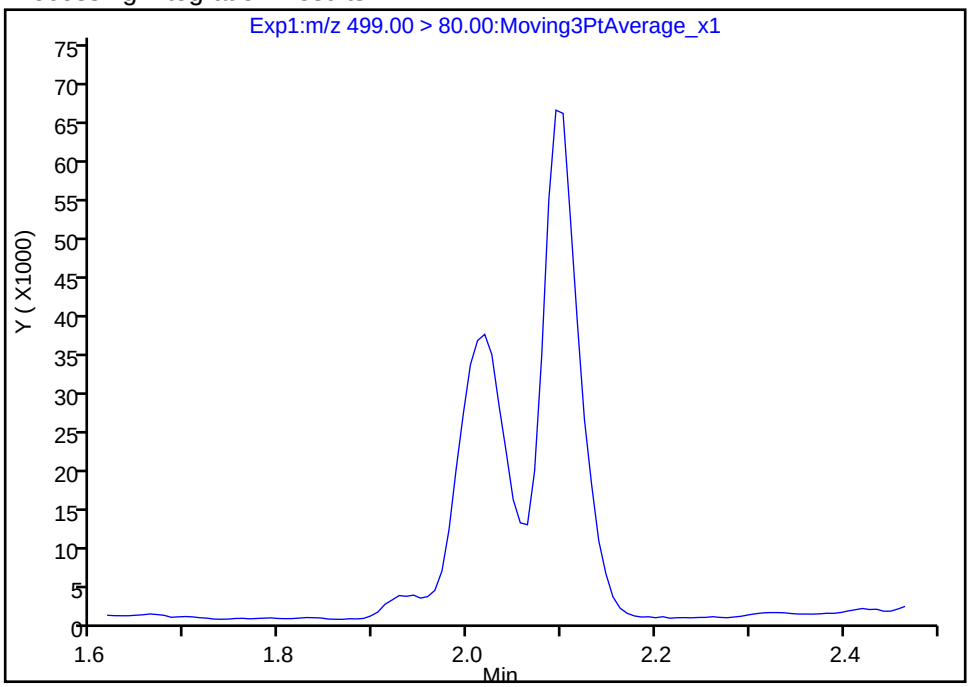
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_008.d				
Injection Date:	30-Apr-2018 01:37:17	Instrument ID:	A8_N		
Lims ID:	320-38340-A-3-A	Lab Sample ID:	320-38340-3		
Client ID:	NAWC-041818-RW-228				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	6	Worklist Smp#:	8
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	537_A8_N	Limit Group:	LC 537 ICAL		
Column:		Detector	EXP1		

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

Signal: 1

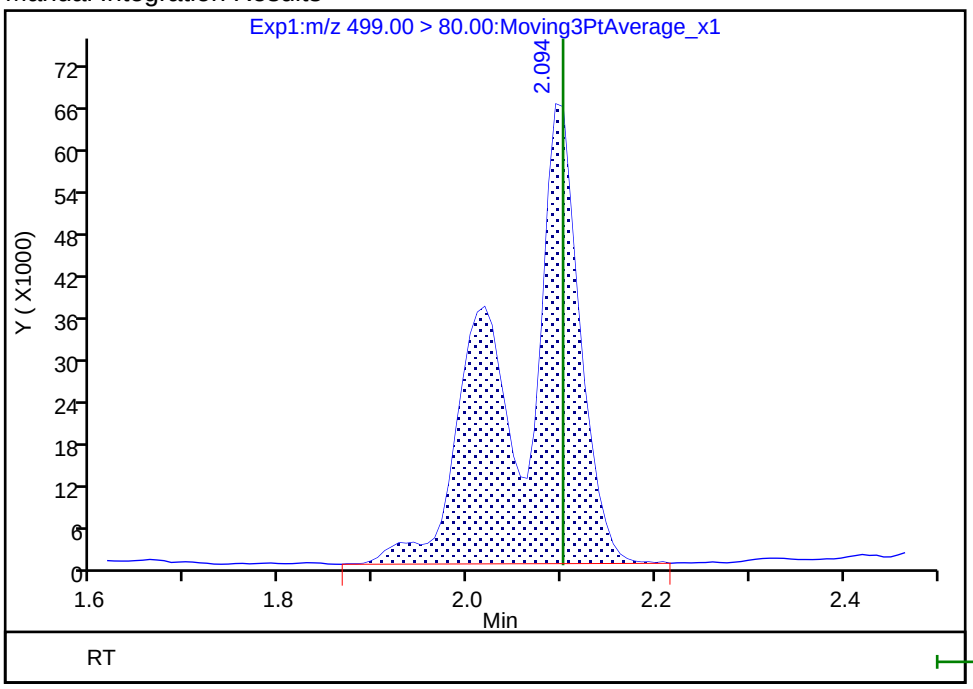
Not Detected
Expected RT: 2.10

Processing Integration Results



Manual Integration Results

RT: 2.09
Area: 324669
Amount: 3.557054
Amount Units: ng/ml



Reviewer: barnettj, 30-Apr-2018 10:52:04
Audit Action: Assigned Compound ID Audit Reason: Peak assignment corrected

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

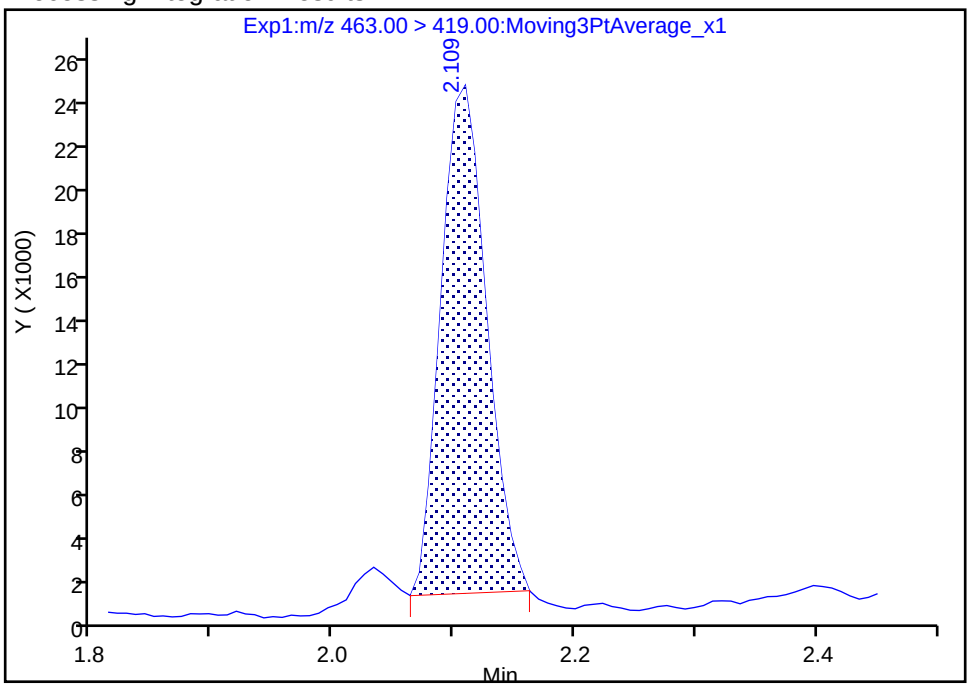
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_008.d				
Injection Date:	30-Apr-2018 01:37:17	Instrument ID:	A8_N		
Lims ID:	320-38340-A-3-A	Lab Sample ID:	320-38340-3		
Client ID:	NAWC-041818-RW-228				
Operator ID:	SACINSTLCMS01	ALS Bottle#:	6	Worklist Smp#:	8
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	537_A8_N	Limit Group:	LC 537 ICAL		
Column:		Detector	EXP1		

9 Perfluorononanoic acid, CAS: 375-95-1

Signal: 1

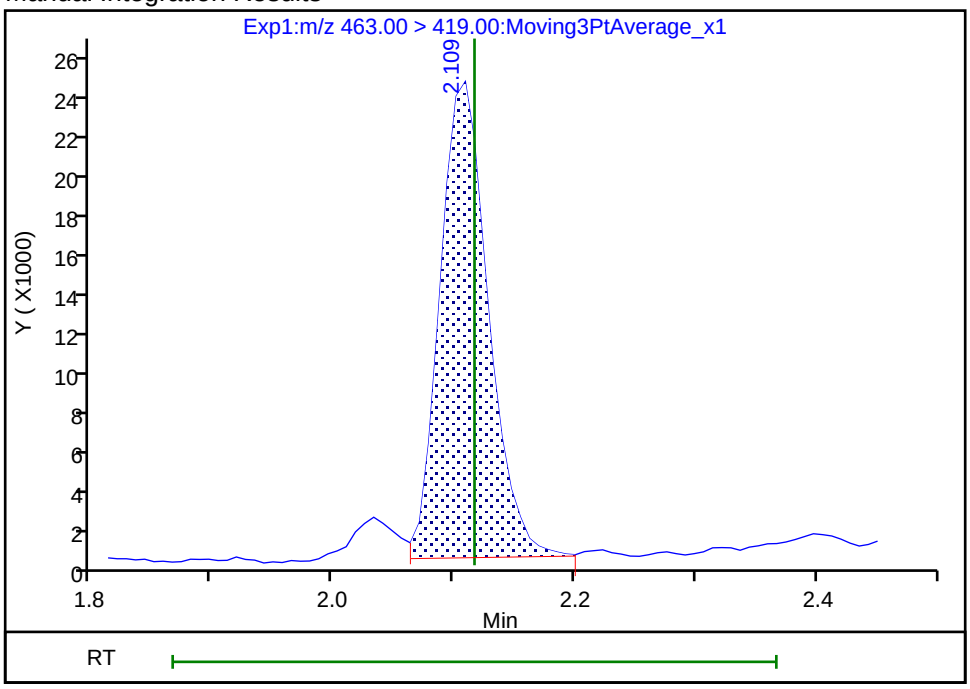
Processing Integration Results

RT: 2.11
Area: 59864
Amount: 0.665196
Amount Units: ng/ml



Manual Integration Results

RT: 2.11
Area: 65641
Amount: 0.729389
Amount Units: ng/ml



Reviewer: barnettj, 30-Apr-2018 10:52:26

Audit Action: Manually Integrated Audit Reason: Incomplete Integration

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: NAWC-041818-FRB-228 | Lab Sample ID: 320-38340-4

Matrix: Water | Lab File ID: 2018.04.29_537B_009.d

Analysis Method: 537 | Date Collected: 04/18/2018 13:05

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 247.5(mL) | Date Analyzed: 04/30/2018 01:41

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.: 220561 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	16	U	40	16	6.9
335-67-1	Perfluorooctanoic acid (PFOA)	8.1	U	20	8.1	2.8
375-95-1	Perfluorononanoic acid (PFNA)	20	U	24	20	8.1
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	30	12	5.6
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.0	U	10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36	U	91	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	95		70-130
STL00996	13C2 PFDA	91		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_009.d
Lims ID: 320-38340-A-4-A
Client ID: NAWC-041818-FRB-228
Sample Type: Client
Inject. Date: 30-Apr-2018 01:41:59 ALS Bottle#: 7 Worklist Smp#: 9
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-38340-a-4-a
Misc. Info.: Plate: 1 Rack: 6
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:53:22 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
$ 2 13C2 PFHxA									
315.00 > 270.00	1.517	1.525	-0.008	1.000	1144763	9.52		8245	
* 6 13C2-PFOA									
415.00 > 370.00	1.851	1.859	-0.008		1130754	10.0		6833	
* 7 13C4 PFOS									
503.00 > 80.00	2.094	2.102	-0.008		2645332	28.7		1388	
$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.269	0.0	1.000	873270	9.08		9082	

Report Date: 30-Apr-2018 10:53:29 Chrom Revision: 2.2 26-Apr-2018 11:26:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_009.d

Injection Date: 30-Apr-2018 01:41:59 Instrument ID: A8_N

Lims ID: 320-38340-A-4-A Lab Sample ID: 320-38340-4

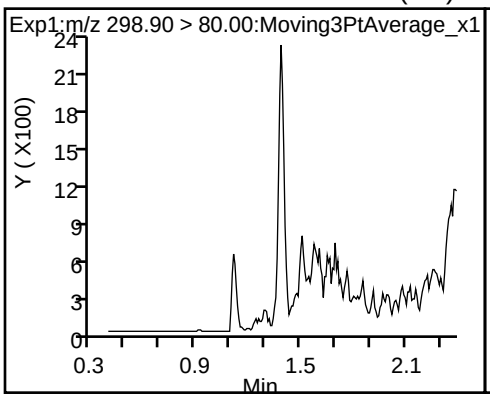
Client ID: NAWC-041818-FRB-228

Operator ID: SACINSTLCMS01 ALS Bottle#: 7 Worklist Smp#: 9

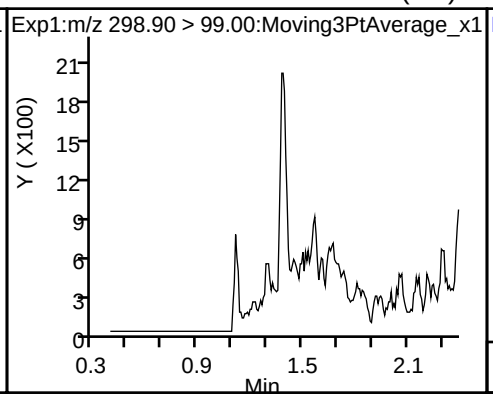
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

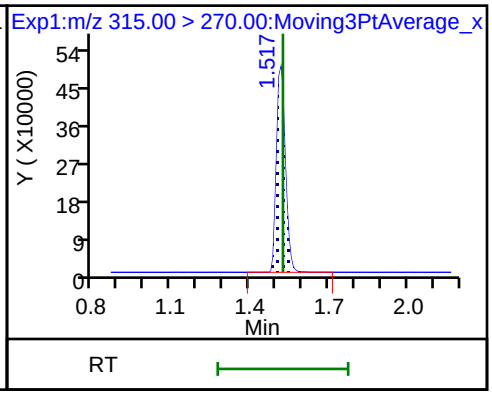
1 Perfluorobutanesulfonic acid (ND)



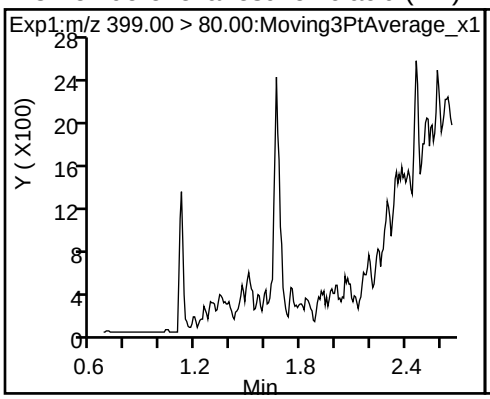
1 Perfluorobutanesulfonic acid (ND)



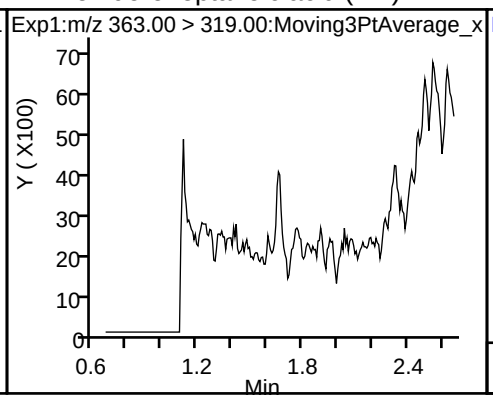
$ 2 13C2 PFHxA



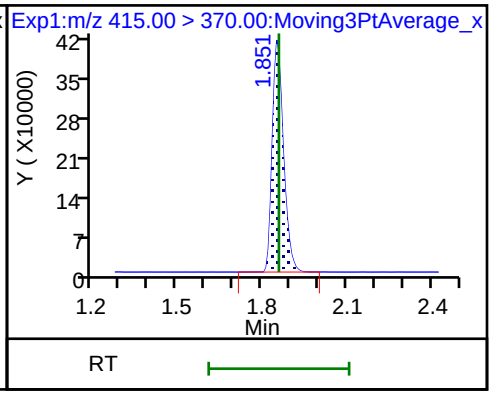
3 Perfluorohexanesulfonic acid (ND)



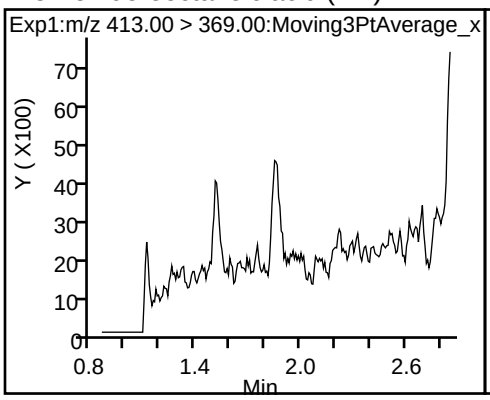
4 Perfluoroheptanoic acid (ND)



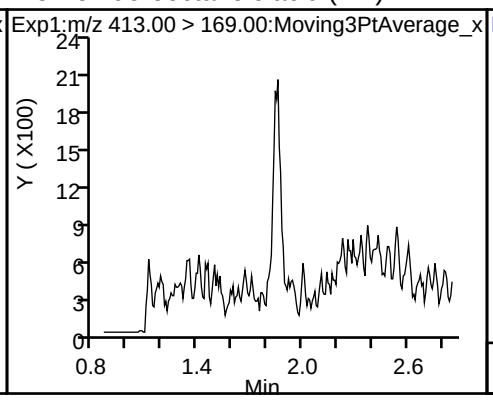
* 6 13C2-PFOA



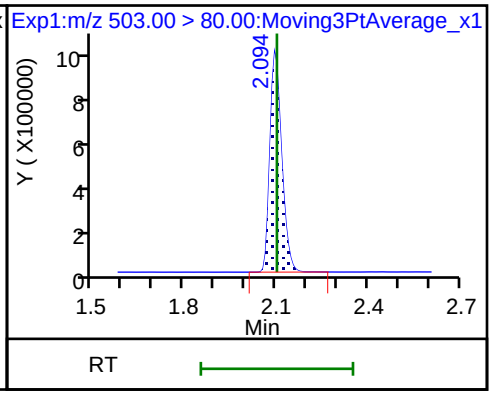
5 Perfluorooctanoic acid (ND)



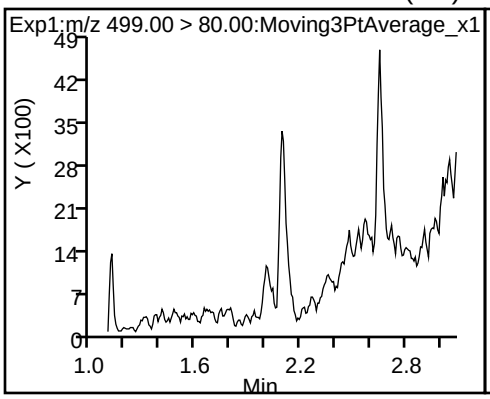
5 Perfluorooctanoic acid (ND)



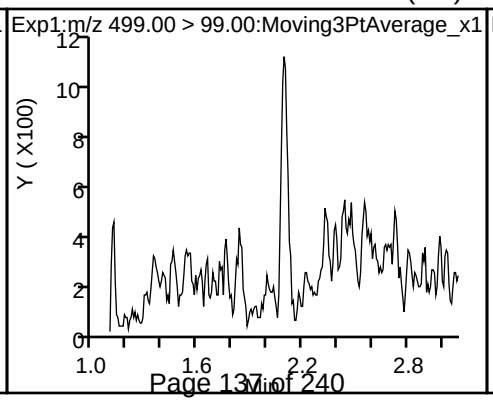
* 7 13C4 PFOS



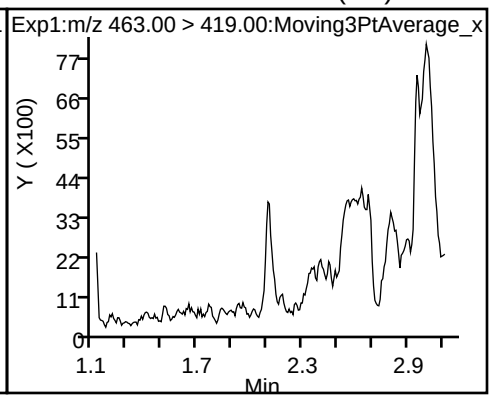
8 Perfluorooctane sulfonic acid (ND)



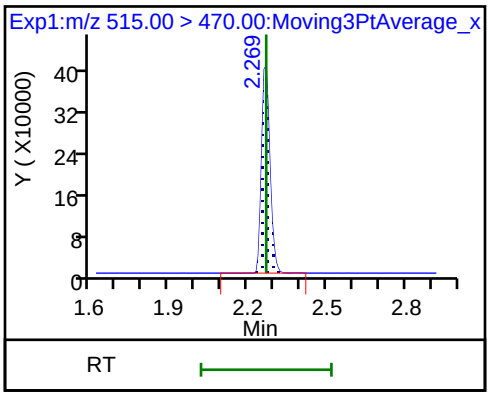
8 Perfluorooctane sulfonic acid (ND)



9 Perfluorononanoic acid (ND)



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.269
Y (X10000)
40
32
24
16
8
0
1.6
1.9
2.2
2.5
2.8
Min
RT

TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_009.d
Lims ID: 320-38340-A-4-A
Client ID: NAWC-041818-FRB-228
Sample Type: Client
Inject. Date: 30-Apr-2018 01:41:59 ALS Bottle#: 7 Worklist Smp#: 9
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: 320-38340-a-4-a
Misc. Info.: Plate: 1 Rack: 6
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:53:22 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

Compound	Amount Added	Amount Recovered	% Rec.
$ 2 13C2 PFHxA	10.0	9.52	95.22
$ 10 13C2 PFDA	10.0	9.08	90.81

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

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1 Analy Batch No.: 217453

SDG No.:

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

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

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-217453/3	2018.04.11_537ICALB_004.d
Level 2	IC 320-217453/4	2018.04.11_537ICALB_005.d
Level 3	IC 320-217453/5	2018.04.11_537ICALB_006.d
Level 4	IC 320-217453/6	2018.04.11_537ICALB_007.d
Level 5	IC 320-217453/7	2018.04.11_537ICALB_008.d
Level 6	IC 320-217453/8	2018.04.11_537ICALB_009.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanesulfonic acid (PFBS)	1.1422 0.9535	1.0952	1.0744	1.0454	1.0008	Ave		1.0519				6.4		30.0			
Perfluoroheptanoic acid (PFHpA)	1.0850 1.0447	1.0991	1.0649	1.0783	1.0702	Ave		1.0737				1.7		30.0			
Perfluorohexanesulfonic acid (PFHxS)	1.6457 1.6837	1.5988	1.6030	1.6384	1.6838	Ave		1.6422				2.3		30.0			
Perfluorooctanoic acid (PFOA)	1.0599 1.0325	1.0296	1.0703	1.0516	1.1300	Ave		1.0623				3.5		30.0			
Perfluorooctanesulfonic acid (PFOS)	1.0432 1.0989	1.0519	1.0326	1.0935	1.0764	Ave		1.0661				2.6		30.0			
Perfluorononanoic acid (PFNA)	0.8261 0.8363	0.8133	0.8488	0.8818	0.8480	Ave		0.8424				2.8		30.0			
13C2 PFHxA	1.0447 1.0648	1.0532	1.0875	1.0687	1.0602	Ave		1.0632				1.4		30.0			
13C2 PFDA	0.8513 0.8262	0.8714	0.8533	0.8487	0.8519	Ave		0.8505				1.7		30.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1 Analy Batch No.: 217453

SDG No.:

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

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

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-217453/3	2018.04.11_537ICALB_004.d
Level 2	IC 320-217453/4	2018.04.11_537ICALB_005.d
Level 3	IC 320-217453/5	2018.04.11_537ICALB_006.d
Level 4	IC 320-217453/6	2018.04.11_537ICALB_007.d
Level 5	IC 320-217453/7	2018.04.11_537ICALB_008.d
Level 6	IC 320-217453/8	2018.04.11_537ICALB_009.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5
Perfluorobutanesulfonic acid (PFBS)	PFOS	Ave	870696 13871852	1696932	4015148	8010147	10764182	9.00 180	20.0	45.0	90.1	135
Perfluoroheptanoic acid (PFHpA)	13PFOA	Ave	108741 1996261	218860	489075	1044752	1450463	0.960 19.4	2.16	4.86	9.72	14.6
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	418640 8226588	831963	2012030	4216387	6082352	3.00 60.5	6.72	15.1	30.2	45.4
Perfluorooctanoic acid (PFOA)	13PFOA	Ave	219100 4019004	417632	1001316	2075568	3119787	1.98 39.6	4.40	9.90	19.8	29.7
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	349354 7016962	715378	1693810	3678059	5081660	3.95 79.1	8.79	19.8	39.5	59.3
Perfluorononanoic acid (PFNA)	13PFOA	Ave	170770 3255374	329904	794076	1740422	2341235	1.98 39.6	4.40	9.90	19.8	29.7
13C2 PFHxA	13PFOA	Ave	1090690 1046576	970942	1027706	1065262	985534	10.0 10.0	10.0	10.0	10.0	10.0
13C2 PFDA	13PFOA	Ave	888742 812112	803402	806360	845990	791901	10.0 10.0	10.0	10.0	10.0	10.0

Curve Type Legend:
Ave = Average ISTD

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

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1 Analy Batch No.: 217453

SDG No.:

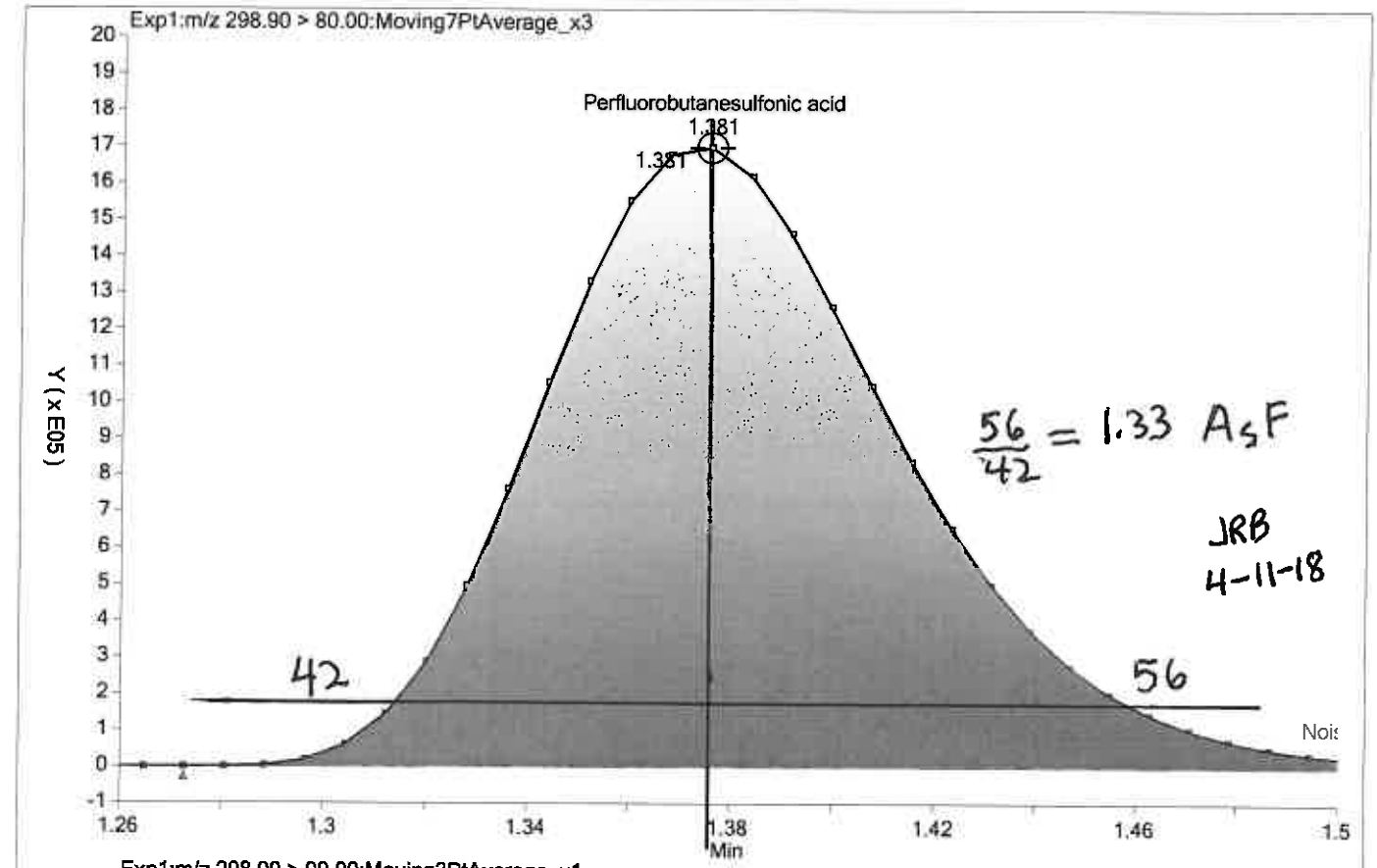
Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

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

Calibration Files:

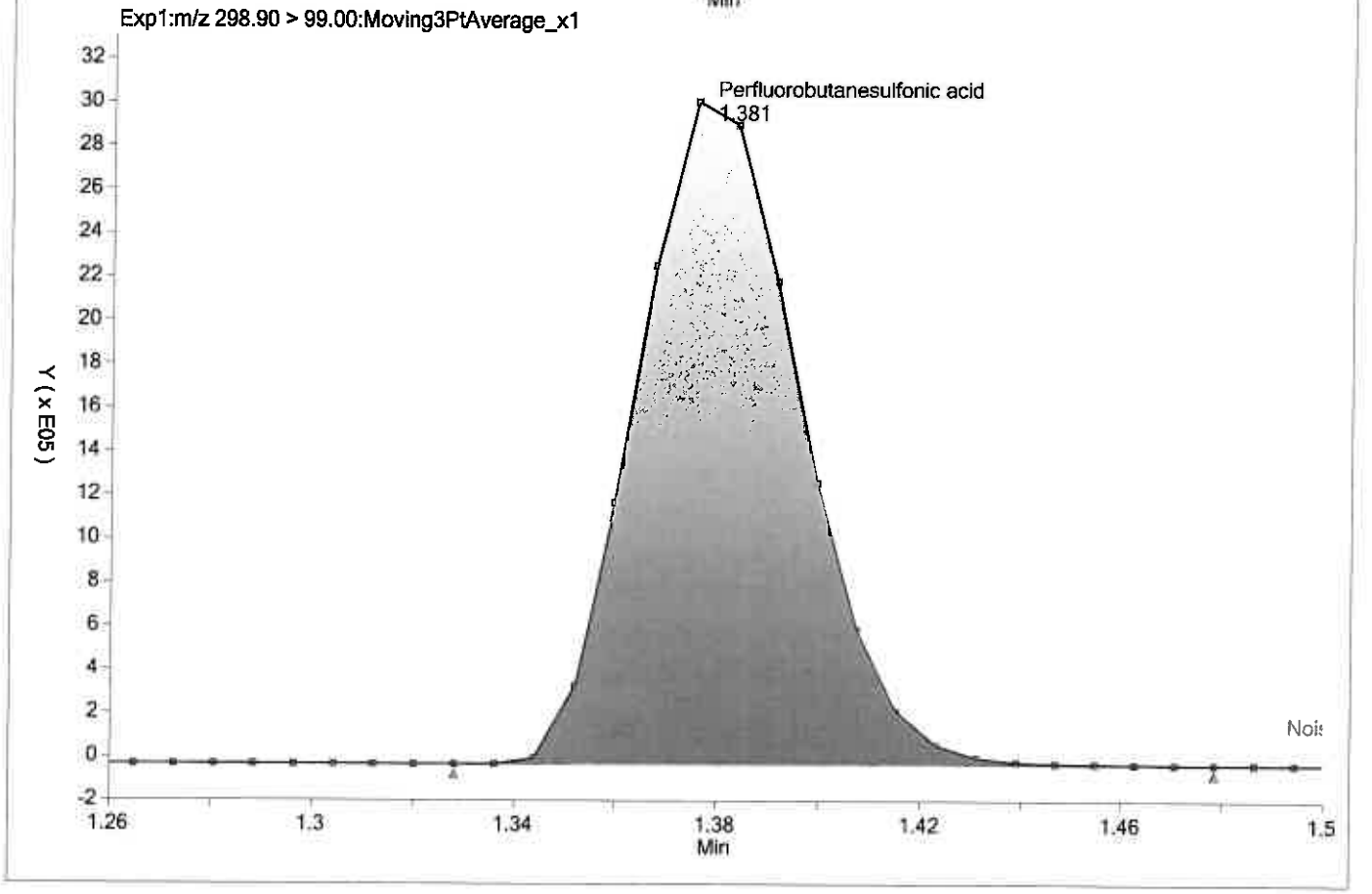
LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-217453/3	2018.04.11_537ICALB_004.d
Level 2	IC 320-217453/4	2018.04.11_537ICALB_005.d
Level 3	IC 320-217453/5	2018.04.11_537ICALB_006.d
Level 4	IC 320-217453/6	2018.04.11_537ICALB_007.d
Level 5	IC 320-217453/7	2018.04.11_537ICALB_008.d
Level 6	IC 320-217453/8	2018.04.11_537ICALB_009.d

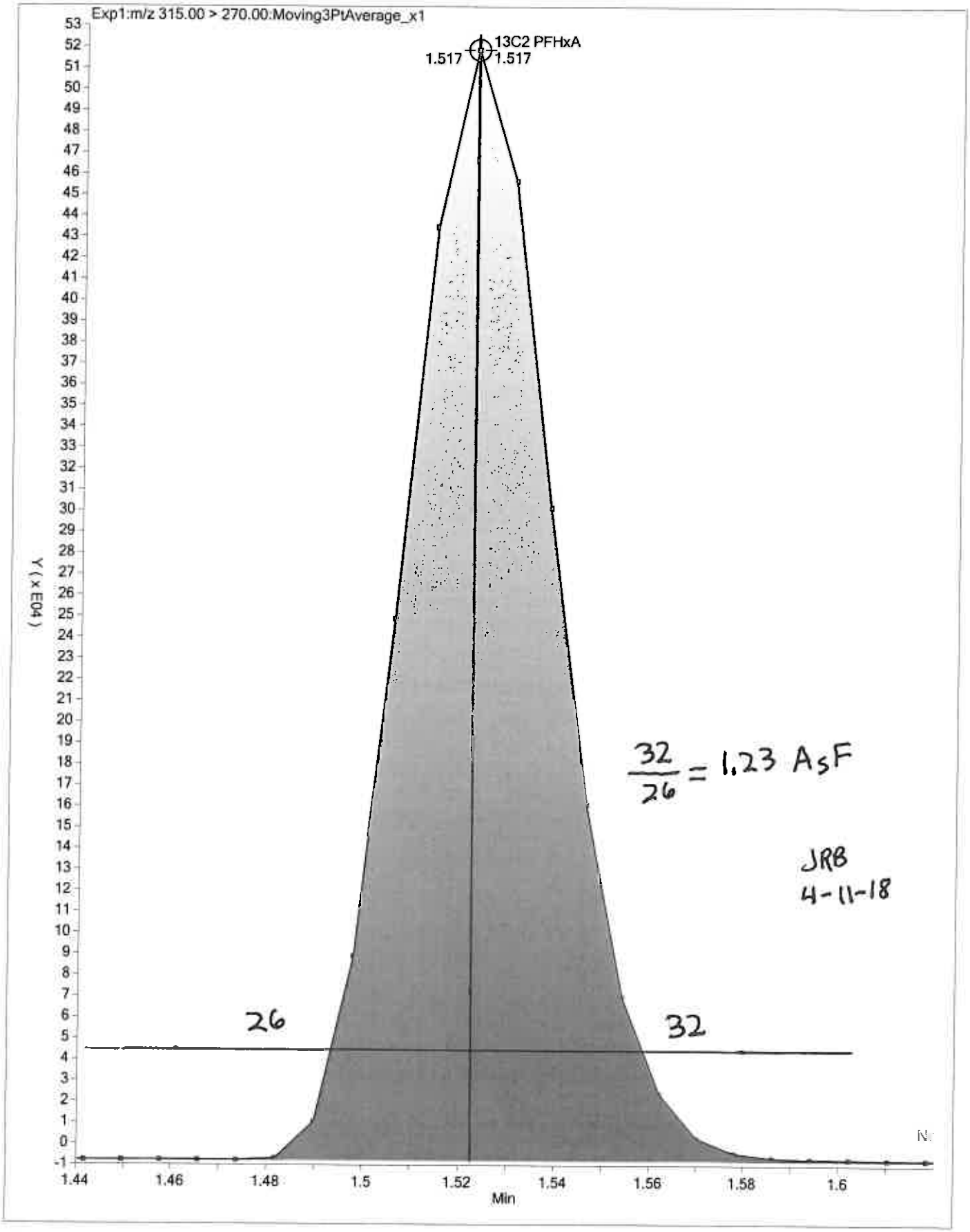
ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanesulfonic acid (PFBS)	8.6	4.1	2.1	-0.6	-4.9	-9.4	50	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	1.0	2.4	-0.8	0.4	-0.3	-2.7	50	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	0.2	-2.6	-2.4	-0.2	2.5	2.5	50	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	-0.2	-3.1	0.7	-1.0	6.4	-2.8	50	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	-2.1	-1.3	-3.1	2.6	1.0	3.1	50	30	30	30	30	30
Perfluorononanoic acid (PFNA)	-1.9	-3.5	0.8	4.7	0.7	-0.7	50	30	30	30	30	30
13C2 PFHxA	-1.7	-0.9	2.3	0.5	-0.3	0.1	30	30	30	30	30	30
13C2 PFDA	0.1	2.5	0.3	-0.2	0.2	-2.9	30	30	30	30	30	30



$\frac{56}{42} = 1.33$ A_SF

JRB
4-11-18




Exp1:m/z 315.00 > 270.00:Moving3PtAverage_x1
13C2 PFHxA
1.517
1.517
Y (x E04)
Min
26
32
32/26 = 1.23 AsF
JRB
4-11-18

TestAmerica Laboratories
Istd/Surrogate Recovery Report

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

Lims Batch: 217453
CCV IS Mode: Select Ical Level, Cal Level: 3
Non-Cal IS Mode: Last Ccal Sample

$ 2 13C2 PFHxA
$ 10 13C2 PFDA

Lab ID Inj Date	$ 2	$ 10	* 6 13C2-PFOA	* 7 13C4 PFOS
IS Std			1027183 1.87	2580682 2.11
#1 RB 11-Apr-2018 11:36:27			1.87 957389 93.2	2.12 2343443 90.8
#2 RB 11-Apr-2018 11:41:06			1.87 937814 91.3	2.11 2225117 86.2
IS Std				
#3 IC L1 11-Apr-2018 11:45:47	1.52 98.26	2.26 100.10	1.87 1044020> 100.0*	2.10 2429483> 100.0*
#4 IC L2 11-Apr-2018 11:50:27	1.51 99.06	2.26 102.50	1.87 921915> 88.3*	2.10 2220259> 91.4*
#5 IC L3 11-Apr-2018 11:55:08	1.52 102.30	2.26 100.30	1.87 945031> 90.5*	2.11 2380125> 98.0*
#6 IC L4 11-Apr-2018 11:59:48	1.52 100.50	2.26 99.79	1.87 996809> 95.5*	2.10 2440107> 100.4*
#7 IC L5 11-Apr-2018 12:04:29	1.52 99.72	2.26 100.20	1.87 929546> 89.0*	2.10 2283311> 94.0*
#8 IC L6 11-Apr-2018 12:09:09	1.51 100.10	2.25 97.15	1.86 982926> 94.1*	2.09 2316327> 95.3*
IS Std			945031 1.87	2380125 2.11
#9 RB 11-Apr-2018 12:13:50			1.86 919421 97.3	2.10 2344246 98.5
IS Std			996809 1.87	2440107 2.10
#10 CCVL 11-Apr-2018 12:18:29	1.52 97.44	2.26 103.40	1.87 964533 96.8	2.10 2387973 97.9
IS Std			964533 1.87	2387973 2.10
#11 ICB 11-Apr-2018 12:23:10			1.86 943600 97.8	2.09 2246875 94.1
IS Std			996809 1.87	2440107 2.10
#12 ICV 11-Apr-2018 12:27:50	1.51 92.99	2.25 91.91	1.86 1123391 112.7	2.10 2710764 111.1

13C2-PFOA

$$RPD = \frac{1044020 - 921915}{\left(\frac{1044020 + 921915}{2}\right)} \times 100 = 12.4$$

13C4-PFOS

$$RPD = \frac{2440107 - 2220259}{\left(\frac{2440107 + 2220259}{2}\right)} \times 100 = 9.43$$

JRB
4-11-18

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_004.d
Lims ID: IC L1
Client ID:
Sample Type: IC Calib Level: 1
Inject. Date: 11-Apr-2018 11:45:47 ALS Bottle#: 1 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L1_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub9

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 11-Apr-2018 12:35:27 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK015

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

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

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L1_00022 Amount Added: 1.00 Units: mL

Report Date: 11-Apr-2018 12:35:27 Chrom Revision: 2.2 13-Mar-2018 08:45:20

TestAmerica Sacramento

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

Injection Date: 11-Apr-2018 11:45:47 Instrument ID: A8_N

Lims ID: IC L1

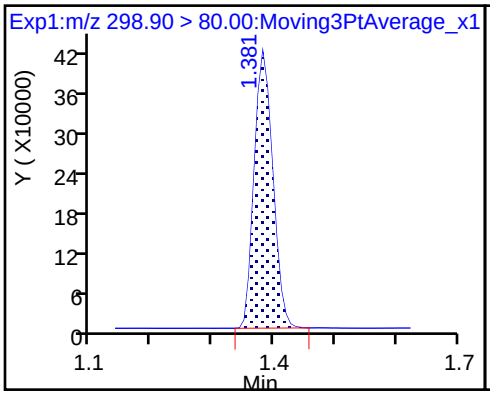
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 3

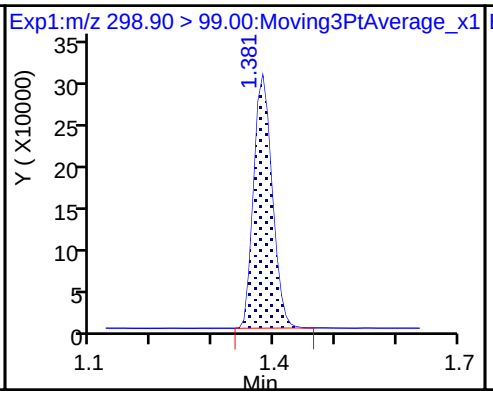
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

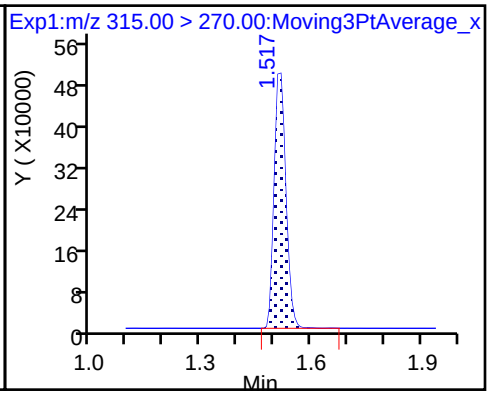
1 Perfluorobutanesulfonic acid



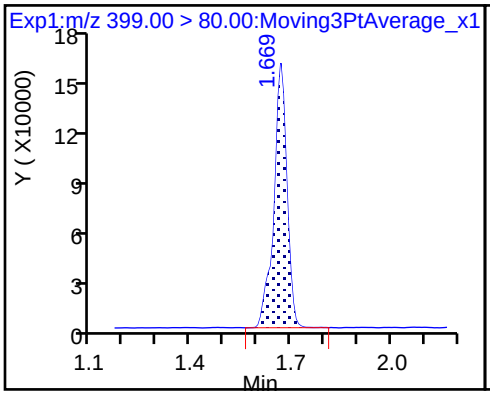
1 Perfluorobutanesulfonic acid



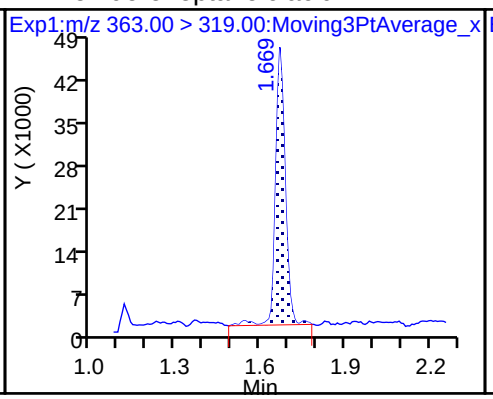
$ 2 13C2 PFHxA



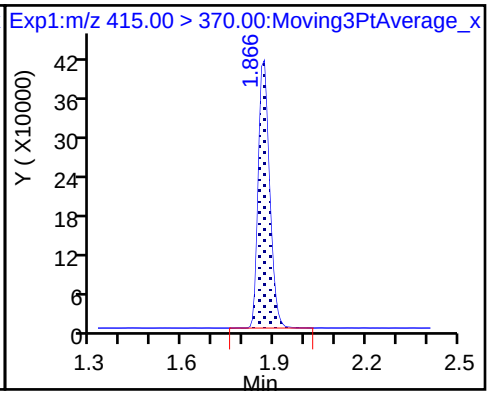
3 Perfluorohexanesulfonic acid



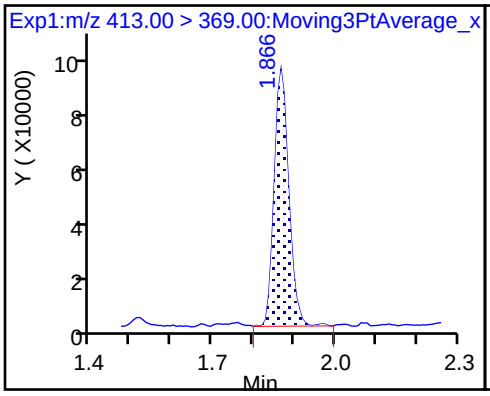
4 Perfluoroheptanoic acid



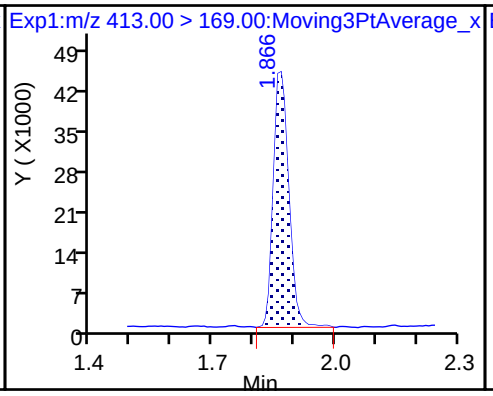
* 6 13C2-PFOA



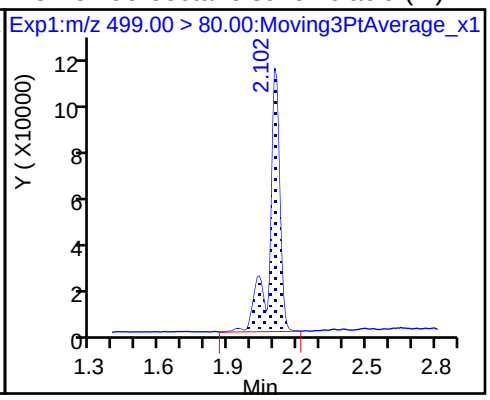
5 Perfluorooctanoic acid



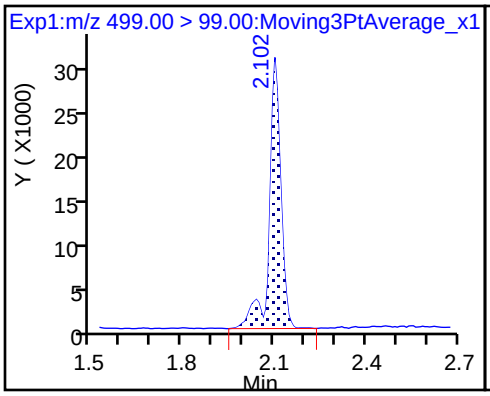
5 Perfluorooctanoic acid



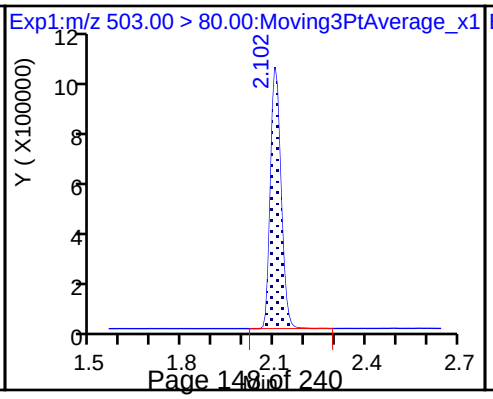
8 Perfluorooctane sulfonic acid (M)



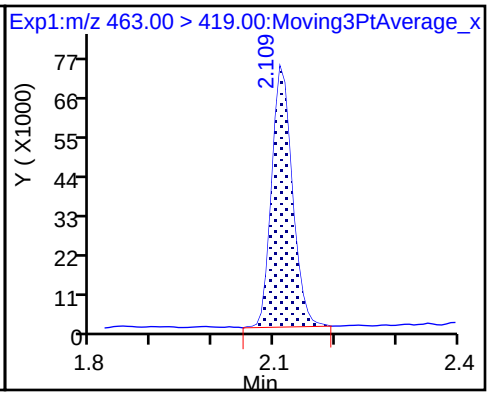
8 Perfluorooctane sulfonic acid



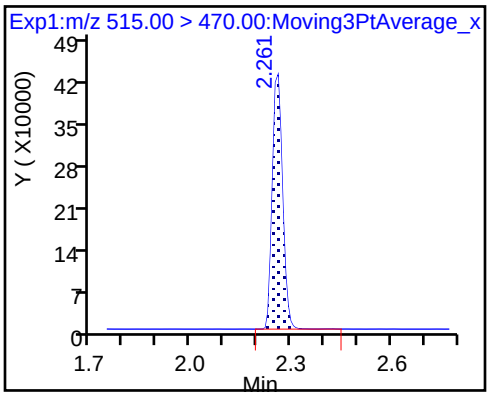
* 7 13C4 PFOS



9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.261
Y (X10000)
49
42
35
28
21
14
7
0
1.7
2.0
2.3
2.6
Min

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

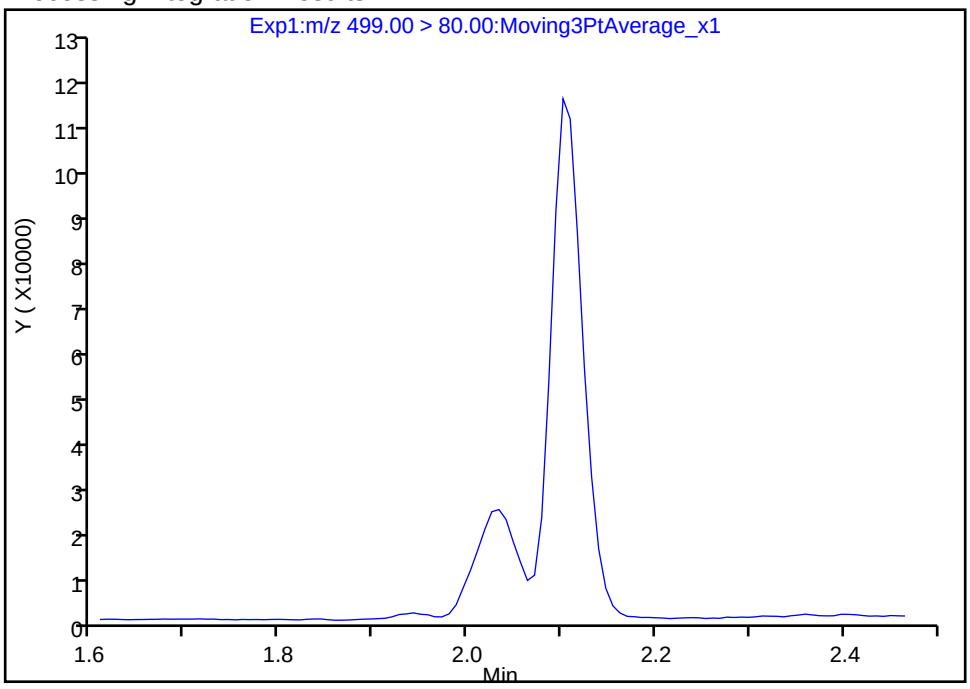
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_004.d
Injection Date: 11-Apr-2018 11:45:47 Instrument ID: A8_N
Lims ID: IC L1
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: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

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

Signal: 1

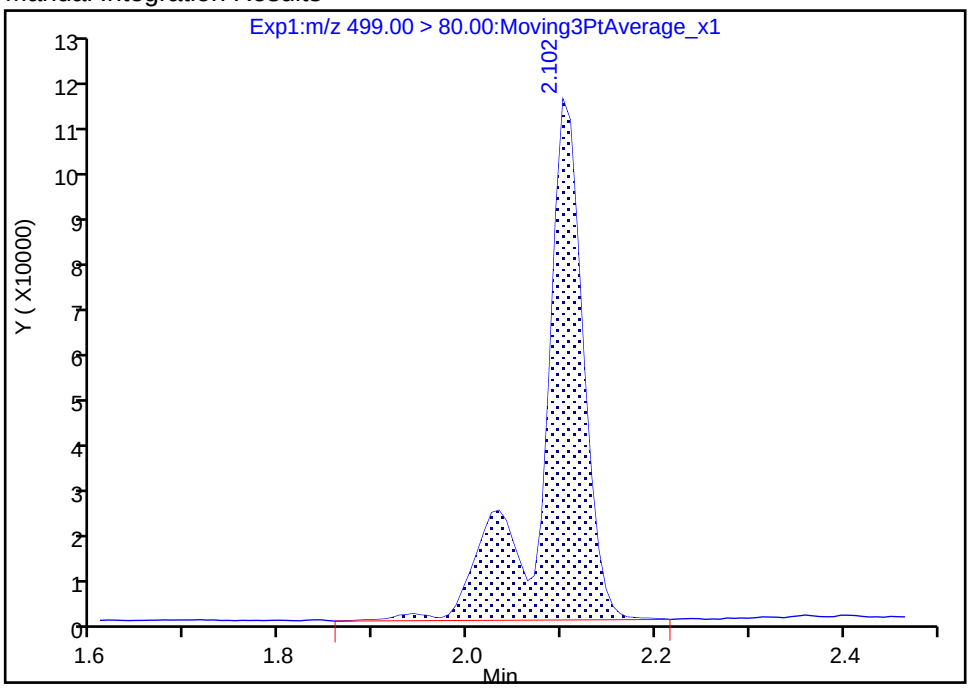
Not Detected
Expected RT: 2.09

Processing Integration Results



Manual Integration Results

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



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

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_005.d
Lims ID: IC L2
Client ID:
Sample Type: IC Calib Level: 2
Inject. Date: 11-Apr-2018 11:50:27 ALS Bottle#: 2 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L2_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub9

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 11-Apr-2018 12:35:28 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK015

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

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

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L2_00022 Amount Added: 1.00 Units: mL

Report Date: 11-Apr-2018 12:35:28 Chrom Revision: 2.2 13-Mar-2018 08:45:20

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_005.d

Injection Date: 11-Apr-2018 11:50:27 Instrument ID: A8_N

Lims ID: IC L2

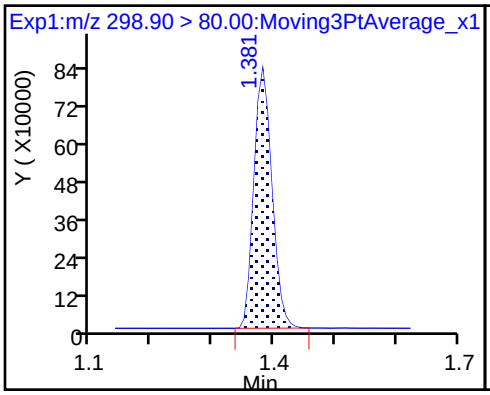
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 4

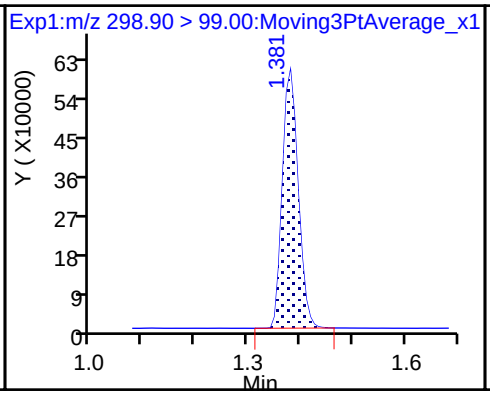
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

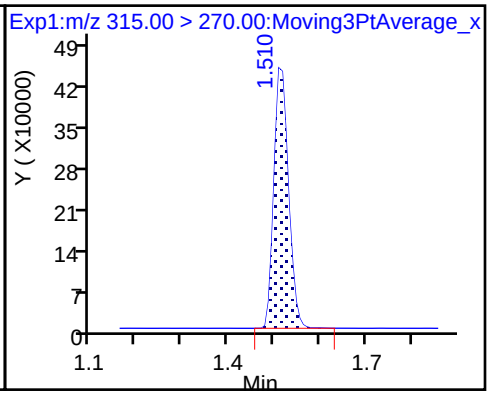
1 Perfluorobutanesulfonic acid



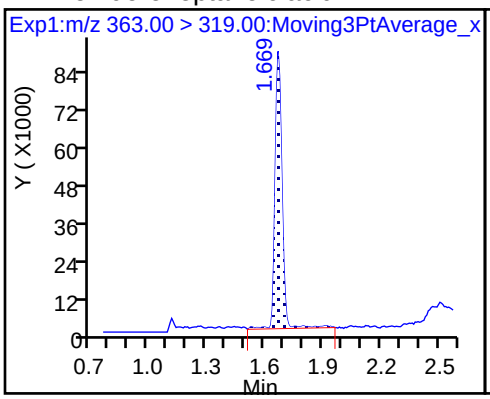
1 Perfluorobutanesulfonic acid



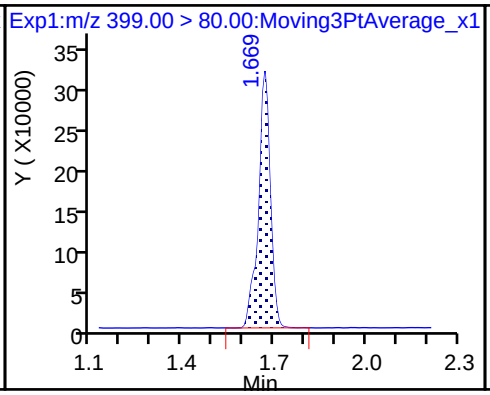
$ 2 13C2 PFHxA



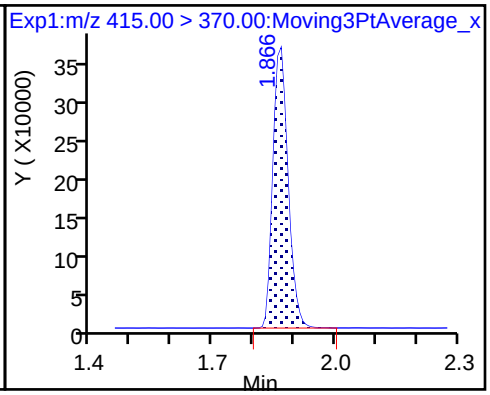
4 Perfluoroheptanoic acid



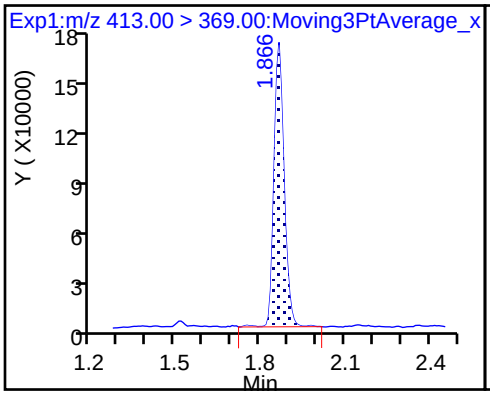
3 Perfluorohexanesulfonic acid



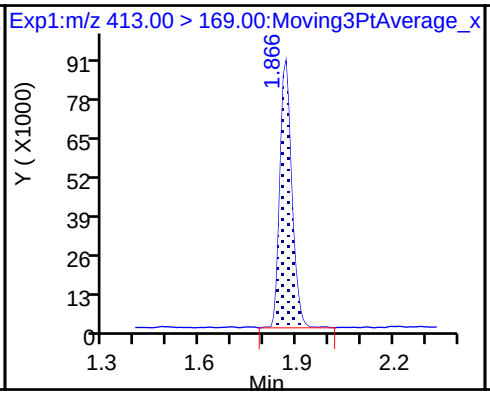
* 6 13C2-PFOA



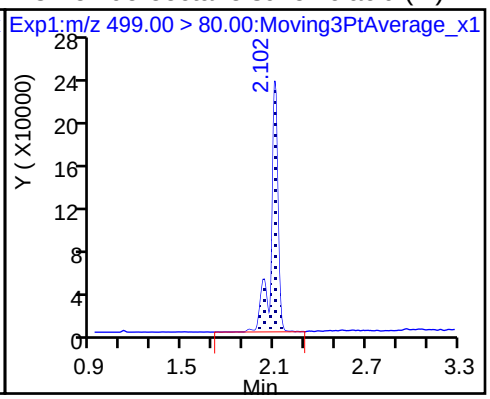
5 Perfluorooctanoic acid



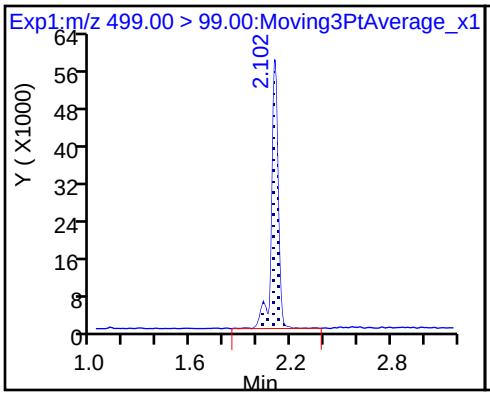
5 Perfluorooctanoic acid



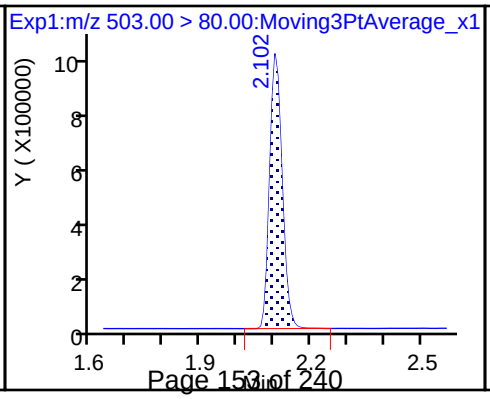
8 Perfluorooctane sulfonic acid (M)



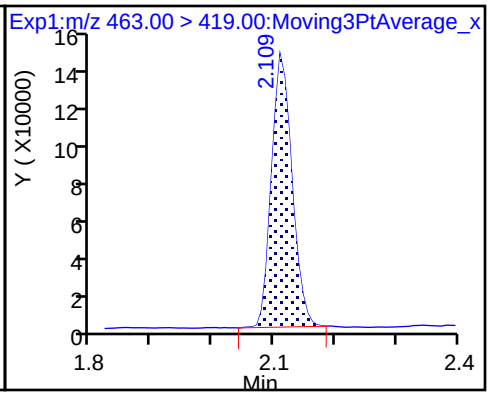
8 Perfluorooctane sulfonic acid



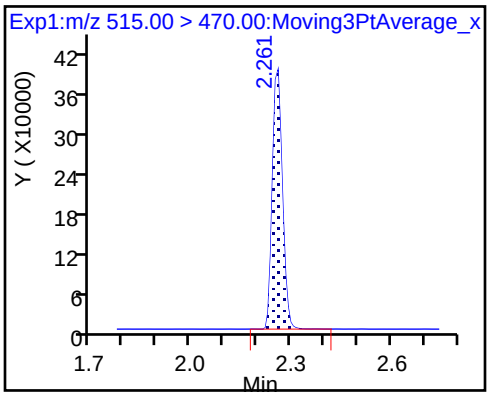
* 7 13C4 PFOS



9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.261
Y (X10000)
42
36
30
24
18
12
6
0
1.7
2.0
2.3
2.6
Min

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

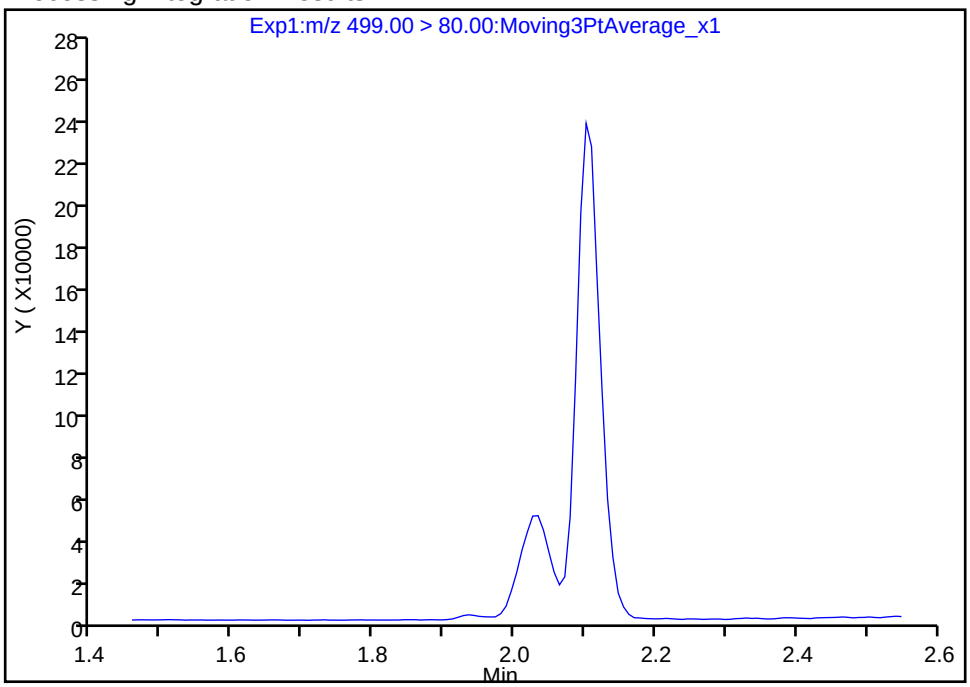
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_005.d
Injection Date: 11-Apr-2018 11:50:27 Instrument ID: A8_N
Lims ID: IC L2
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: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

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

Signal: 1

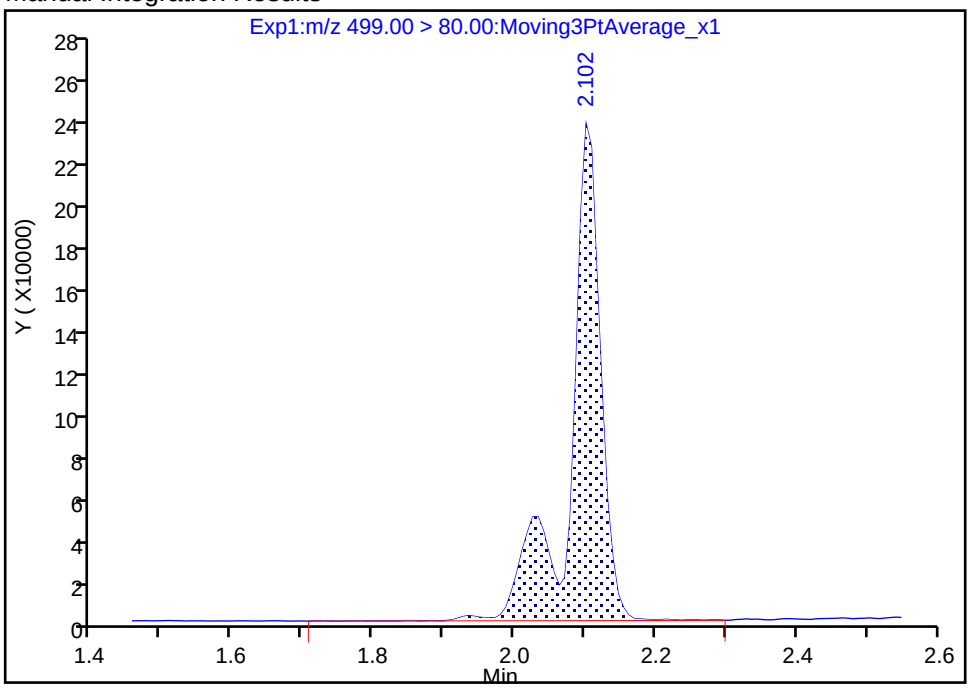
Not Detected
Expected RT: 2.09

Processing Integration Results



Manual Integration Results

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



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

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_006.d
Lims ID: IC L3
Client ID:
Sample Type: IC Calib Level: 3
Inject. Date: 11-Apr-2018 11:55:08 ALS Bottle#: 3 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L3_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub9

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 11-Apr-2018 12:35:29 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK015

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

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

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L3_00025 Amount Added: 1.00 Units: mL

Report Date: 11-Apr-2018 12:35:29 Chrom Revision: 2.2 13-Mar-2018 08:45:20

TestAmerica Sacramento

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

Injection Date: 11-Apr-2018 11:55:08 Instrument ID: A8_N

Lims ID: IC L3

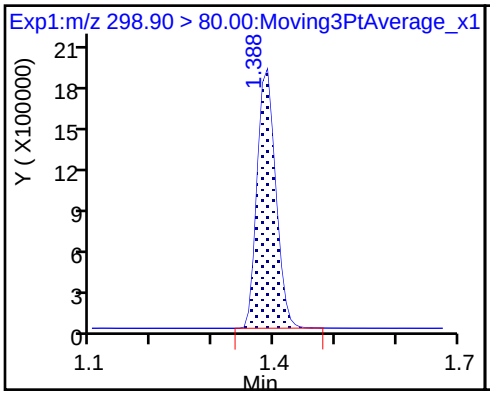
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 5

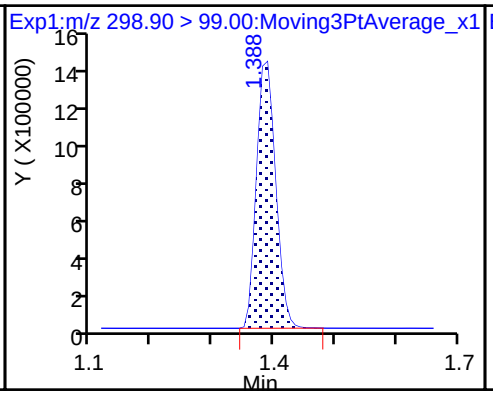
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

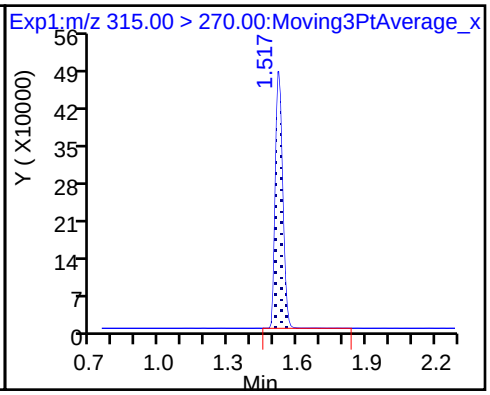
1 Perfluorobutanesulfonic acid



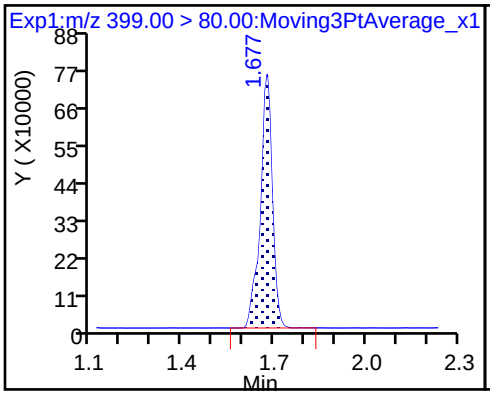
1 Perfluorobutanesulfonic acid



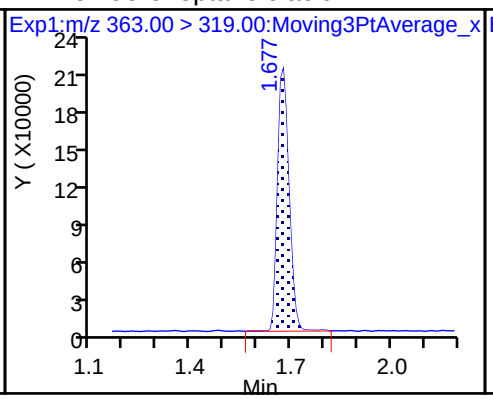
$ 2 13C2 PFHxA



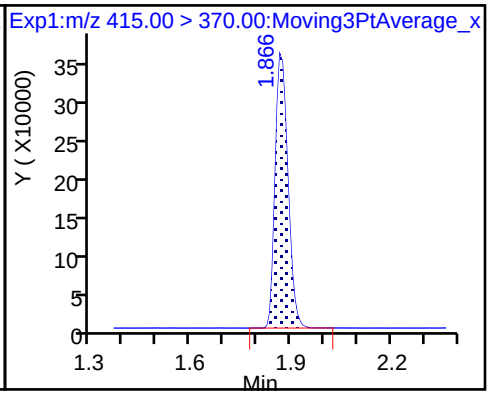
3 Perfluorohexanesulfonic acid



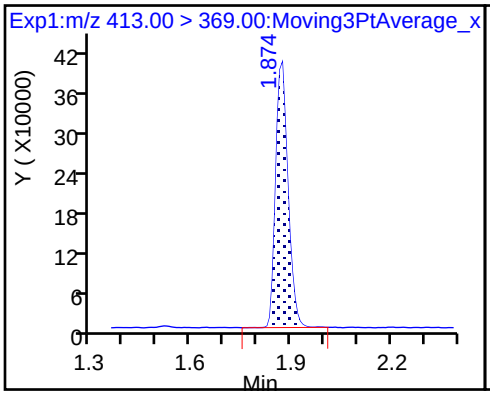
4 Perfluoroheptanoic acid



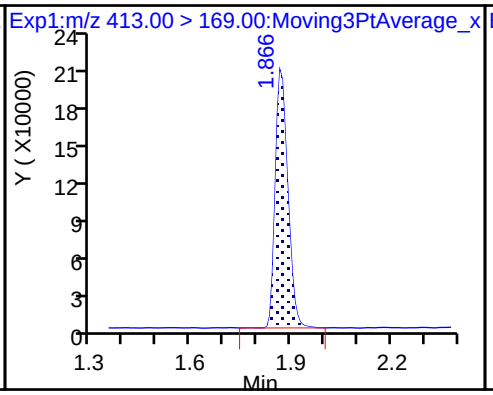
* 6 13C2-PFOA



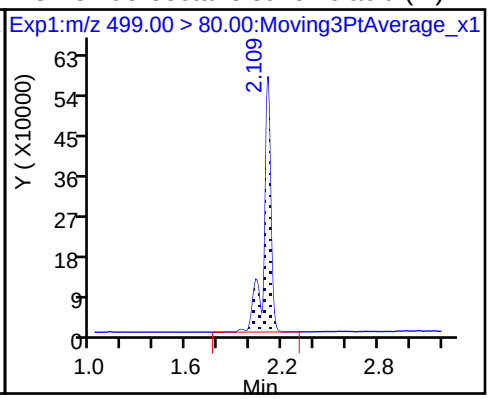
5 Perfluorooctanoic acid



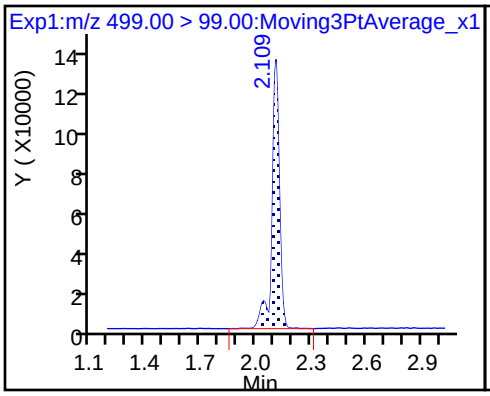
5 Perfluorooctanoic acid



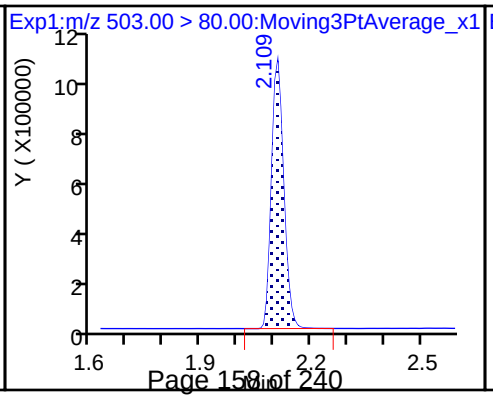
8 Perfluorooctane sulfonic acid (M)



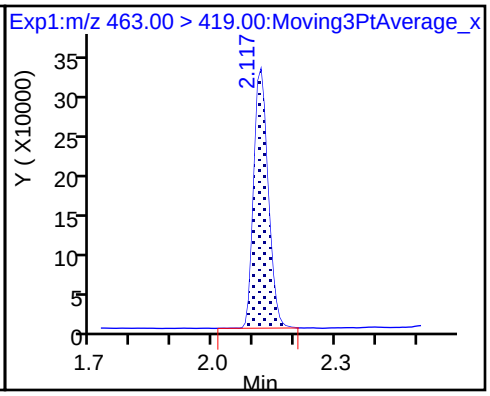
8 Perfluorooctane sulfonic acid



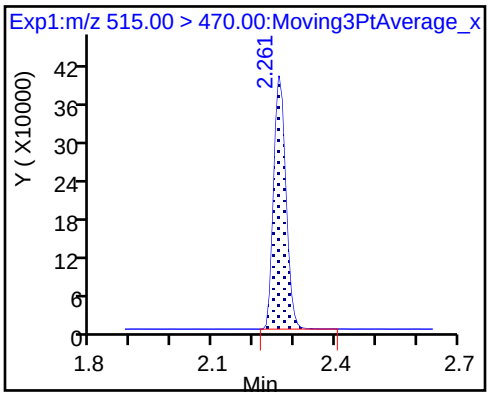
* 7 13C4 PFOS



9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.261
Y (X10000)
42
36
30
24
18
12
6
0
1.8
2.1
2.4
2.7
Min

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

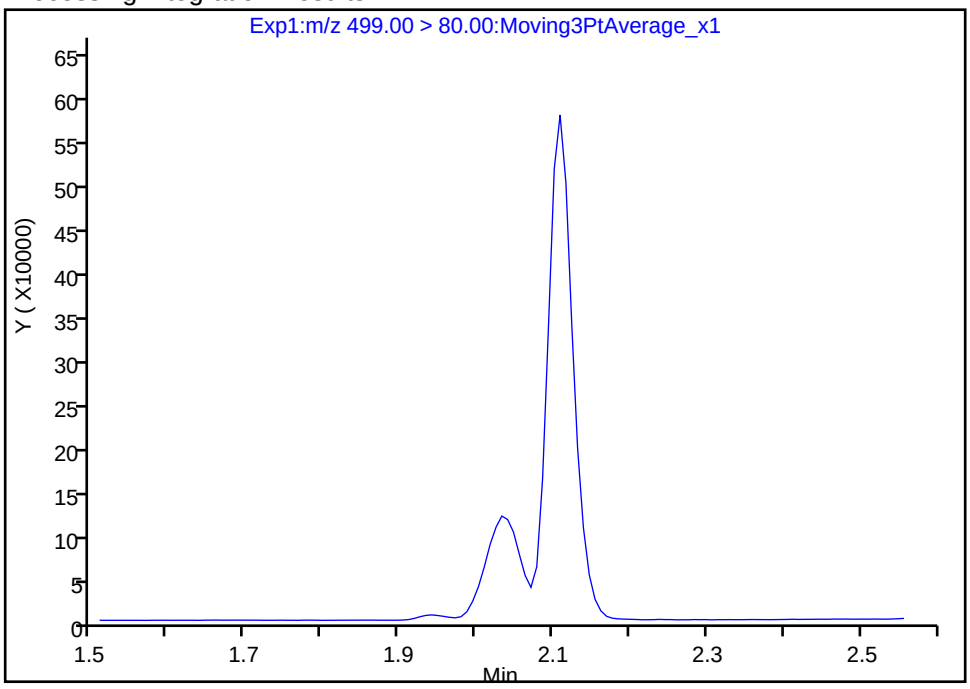
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_006.d
Injection Date: 11-Apr-2018 11:55:08 Instrument ID: A8_N
Lims ID: IC L3
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: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

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

Signal: 1

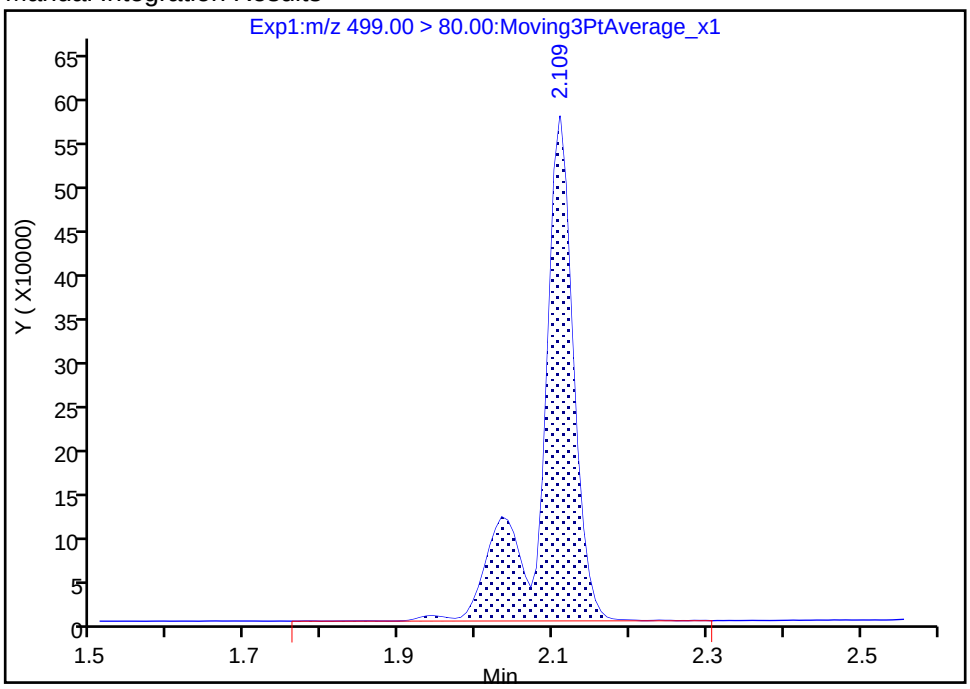
Not Detected
Expected RT: 2.09

Processing Integration Results



Manual Integration Results

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



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

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_007.d
Lims ID: IC L4
Client ID:
Sample Type: ICISAV Calib Level: 4
Inject. Date: 11-Apr-2018 11:59:48 ALS Bottle#: 4 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L4_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub9

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 11-Apr-2018 12:35:30 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK015

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

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

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L4_00022 Amount Added: 1.00 Units: mL

Report Date: 11-Apr-2018 12:35:31 Chrom Revision: 2.2 13-Mar-2018 08:45:20

TestAmerica Sacramento

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

Injection Date: 11-Apr-2018 11:59:48 Instrument ID: A8_N

Lims ID: IC L4

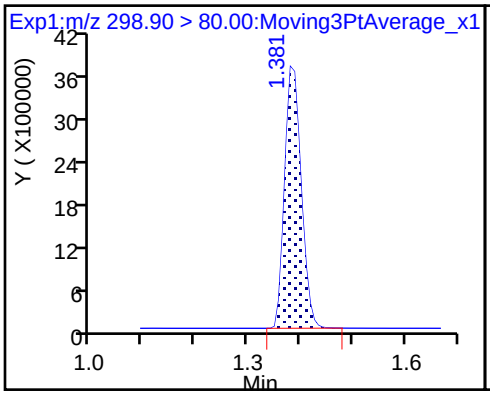
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 4 Worklist Smp#: 6

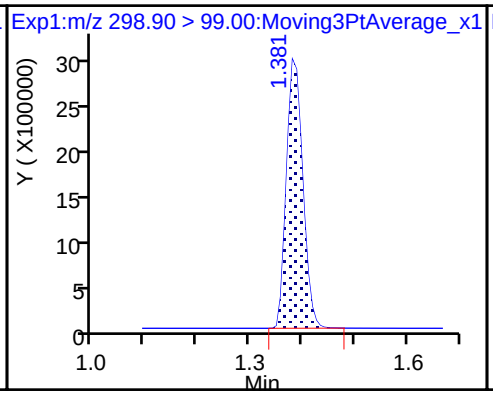
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

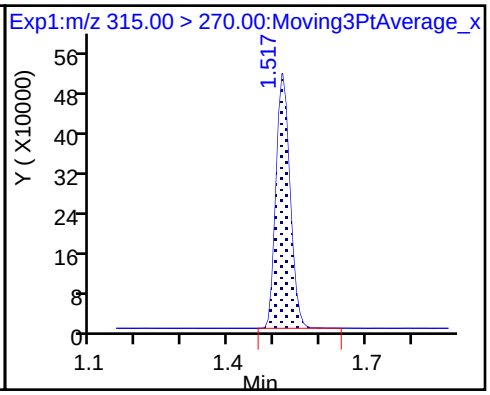
1 Perfluorobutanesulfonic acid



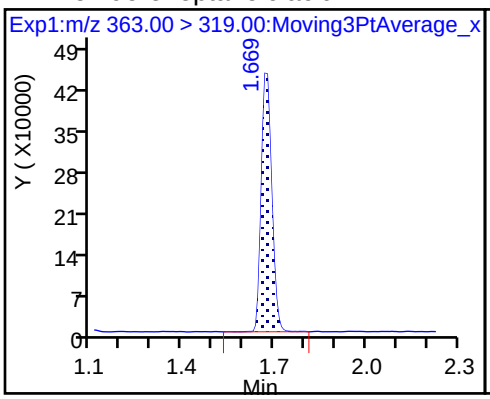
1 Perfluorobutanesulfonic acid



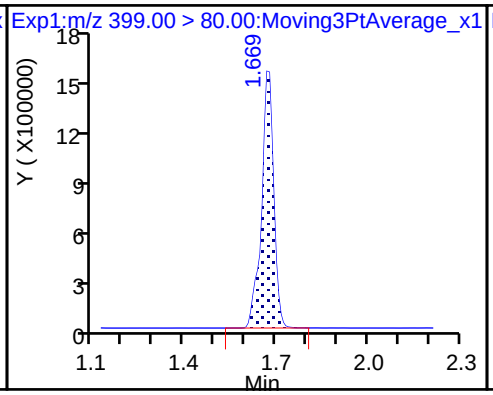
$ 2 13C2 PFHxA



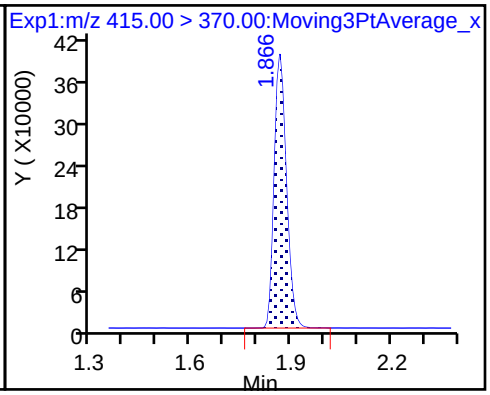
4 Perfluoroheptanoic acid



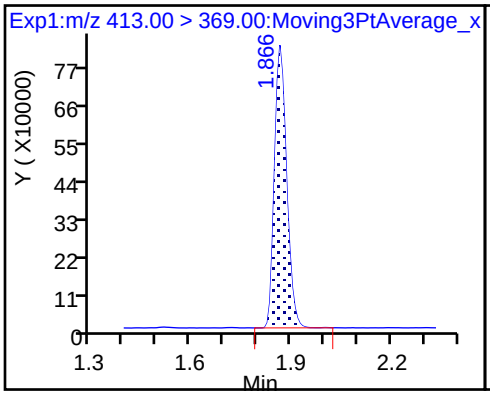
3 Perfluorohexanesulfonic acid



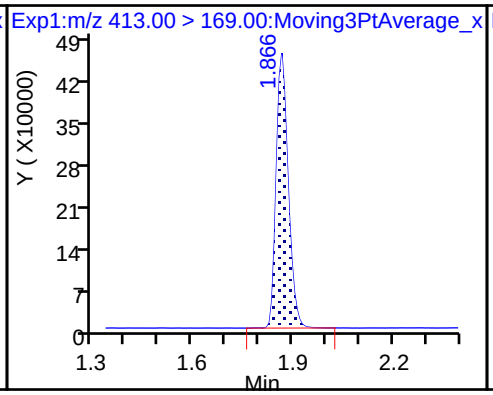
* 6 13C2-PFOA



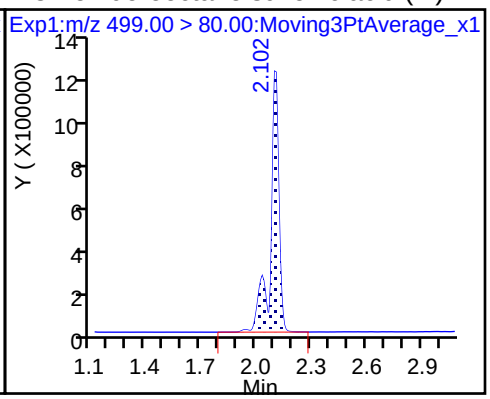
5 Perfluorooctanoic acid



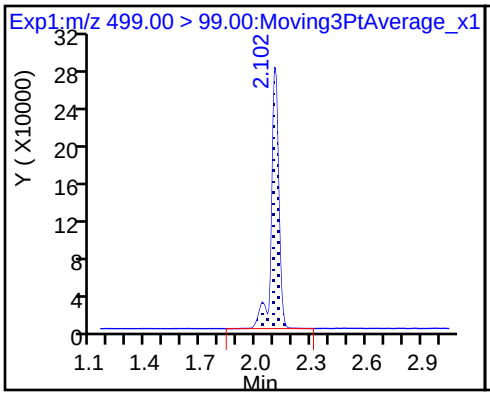
5 Perfluorooctanoic acid



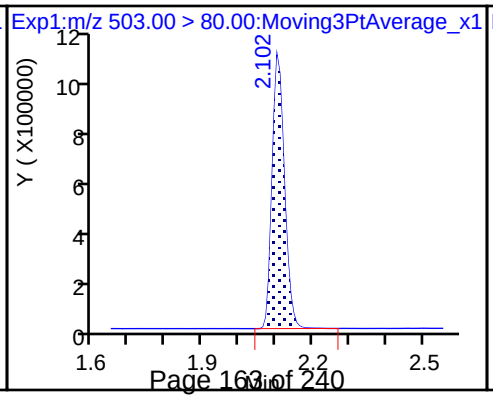
8 Perfluorooctane sulfonic acid (M)



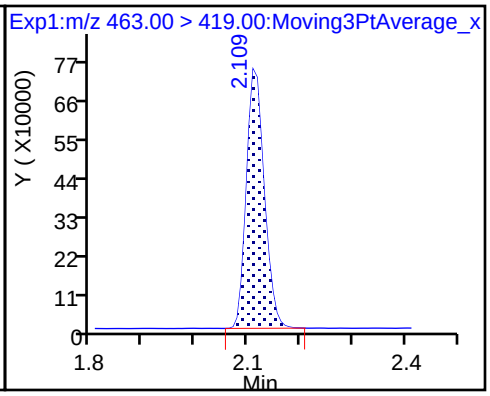
8 Perfluorooctane sulfonic acid



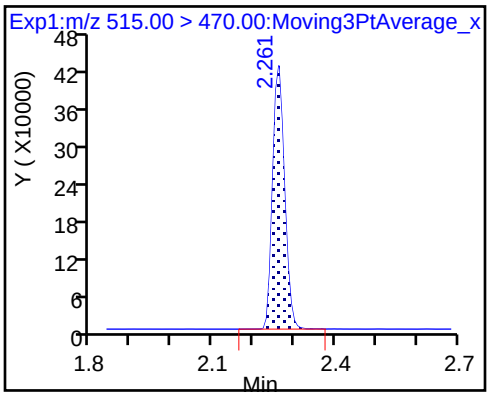
* 7 13C4 PFOS



9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.261
Y (X10000)
48
42
36
30
24
18
12
6
0
1.8
2.1
2.4
2.7
Min

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

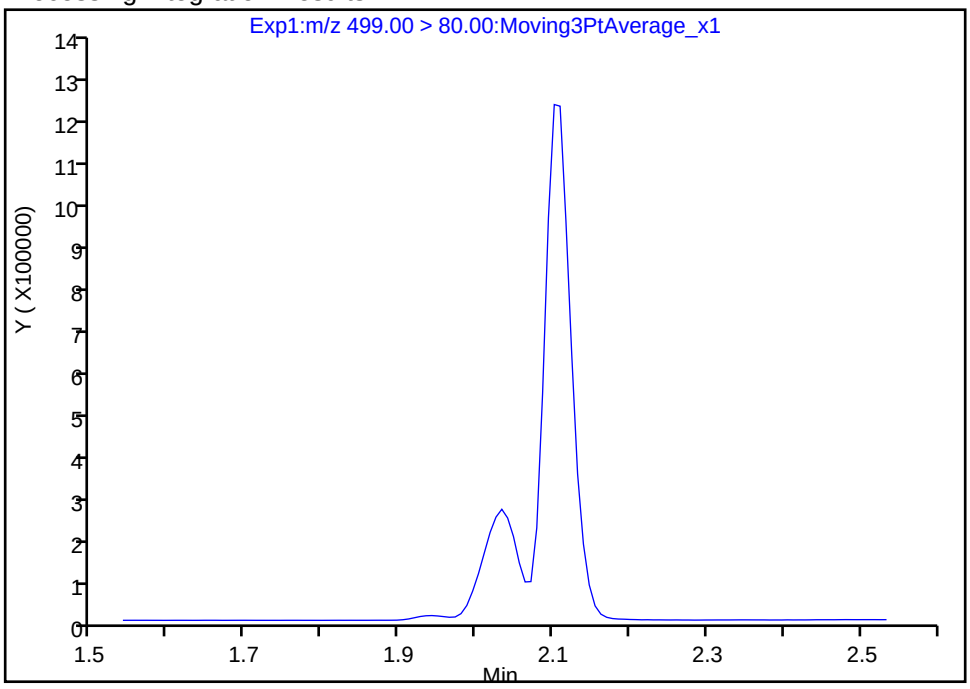
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_007.d
Injection Date: 11-Apr-2018 11:59:48 Instrument ID: A8_N
Lims ID: IC L4
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 4 Worklist Smp#: 6
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: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

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

Signal: 1

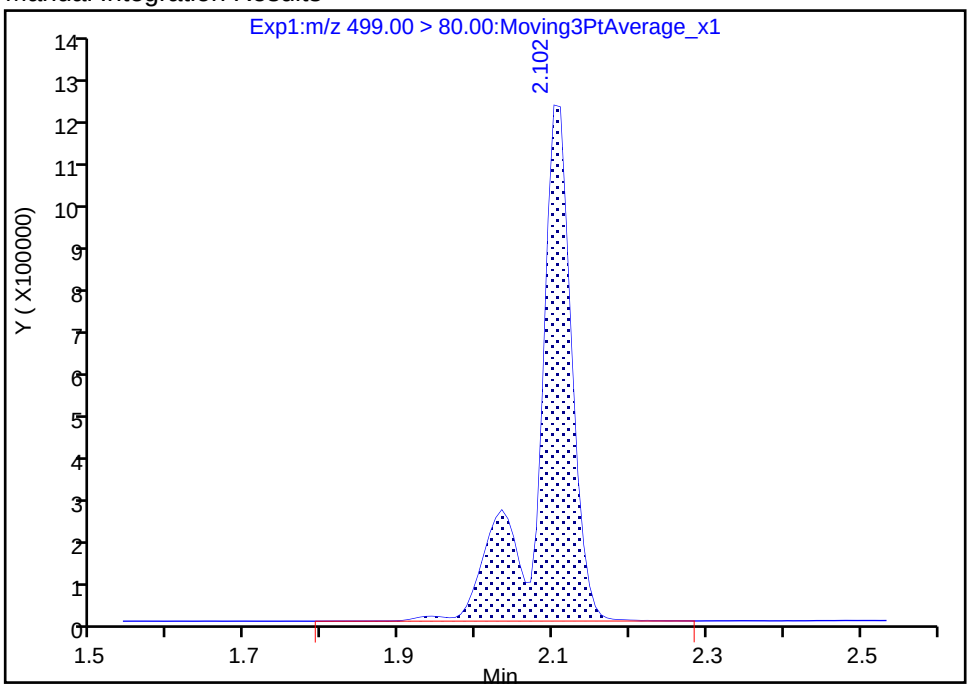
Not Detected
Expected RT: 2.09

Processing Integration Results



Manual Integration Results

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



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

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_008.d
Lims ID: IC L5
Client ID:
Sample Type: IC Calib Level: 5
Inject. Date: 11-Apr-2018 12:04:29 ALS Bottle#: 5 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L5_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub9

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 11-Apr-2018 12:35:32 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK015

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

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

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L5_00026 Amount Added: 1.00 Units: mL

Report Date: 11-Apr-2018 12:35:32 Chrom Revision: 2.2 13-Mar-2018 08:45:20

TestAmerica Sacramento

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

Injection Date: 11-Apr-2018 12:04:29 Instrument ID: A8_N

Lims ID: IC L5

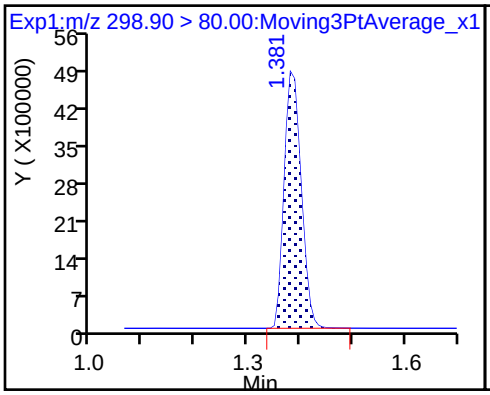
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 7

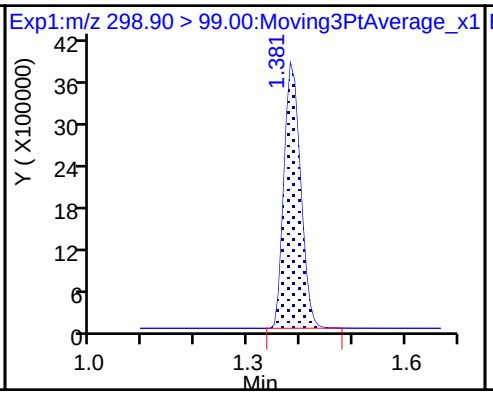
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

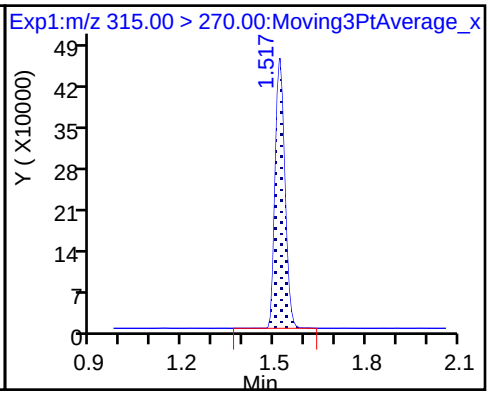
1 Perfluorobutanesulfonic acid



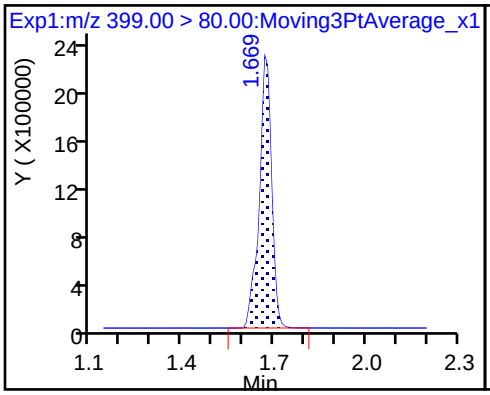
1 Perfluorobutanesulfonic acid



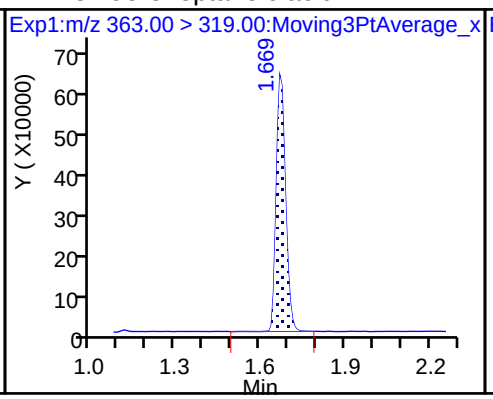
$ 2 13C2 PFHxA



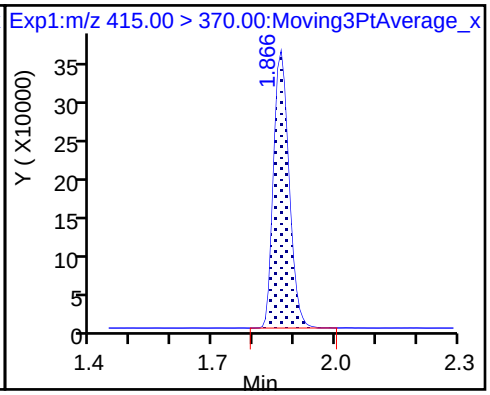
3 Perfluorohexanesulfonic acid



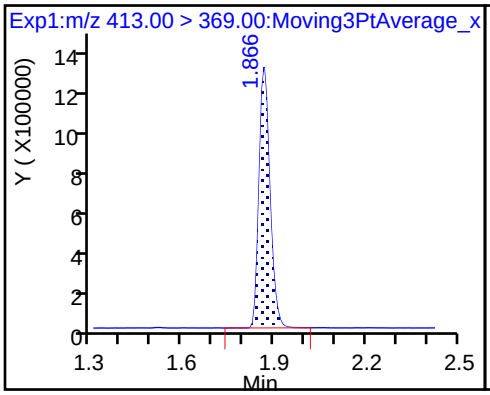
4 Perfluoroheptanoic acid



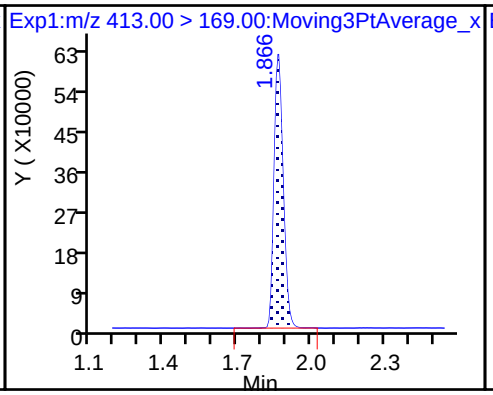
* 6 13C2-PFOA



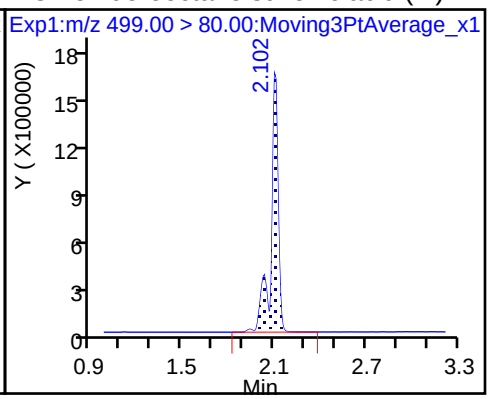
5 Perfluorooctanoic acid



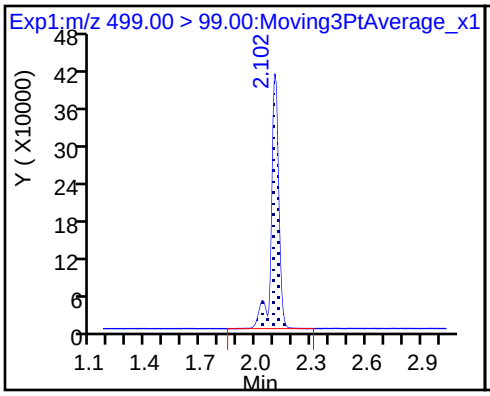
5 Perfluorooctanoic acid



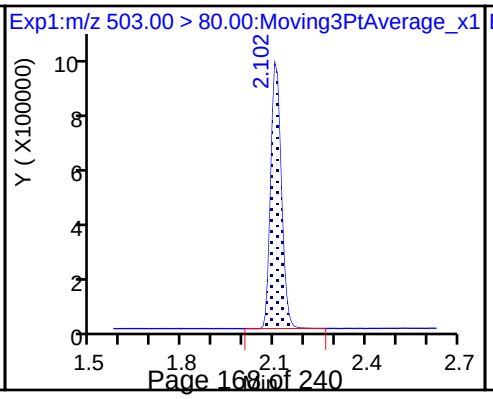
8 Perfluorooctane sulfonic acid (M)



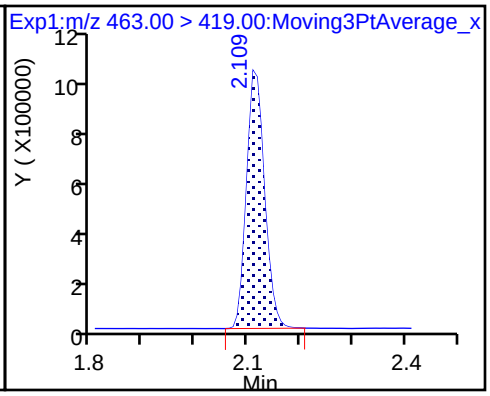
8 Perfluorooctane sulfonic acid



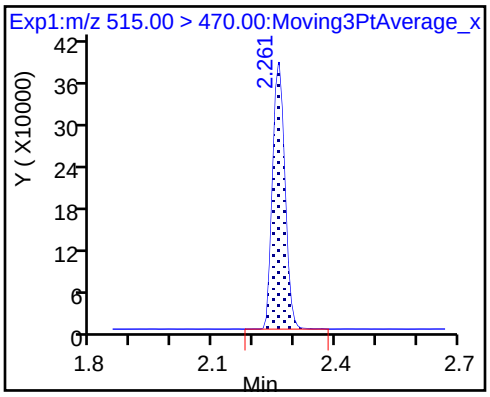
* 7 13C4 PFOS



9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.261
Y (X10000)
42
36
30
24
18
12
6
0
1.8
2.1
2.4
2.7
Min

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

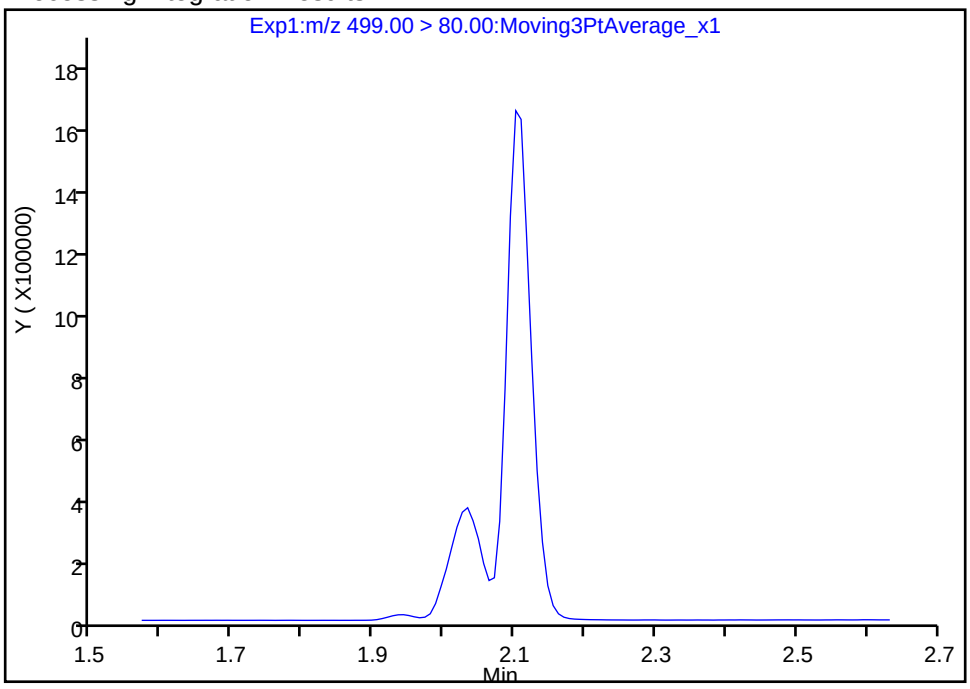
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_008.d
Injection Date: 11-Apr-2018 12:04:29 Instrument ID: A8_N
Lims ID: IC L5
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 7
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: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

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

Signal: 1

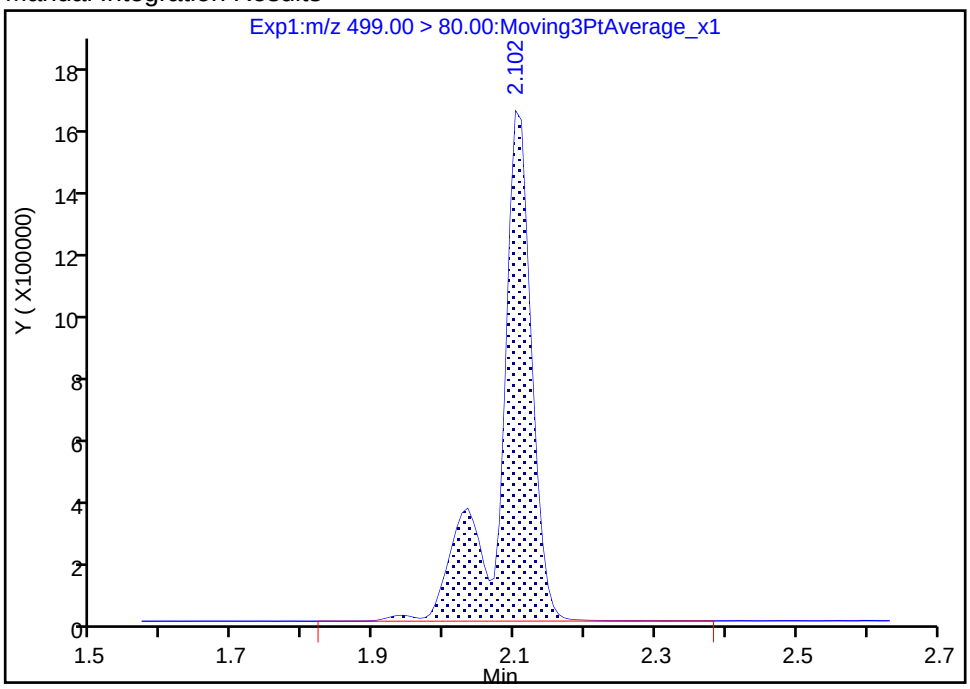
Not Detected
Expected RT: 2.09

Processing Integration Results



Manual Integration Results

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



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

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
Lims ID: IC L6
Client ID:
Sample Type: IC Calib Level: 6
Inject. Date: 11-Apr-2018 12:09:09 ALS Bottle#: 6 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: L6_537
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub9

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 11-Apr-2018 12:35:33 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK015

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

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

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L6_00022 Amount Added: 1.00 Units: mL

Report Date: 11-Apr-2018 12:35:33 Chrom Revision: 2.2 13-Mar-2018 08:45:20

TestAmerica Sacramento

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

Injection Date: 11-Apr-2018 12:09:09 Instrument ID: A8_N

Lims ID: IC L6

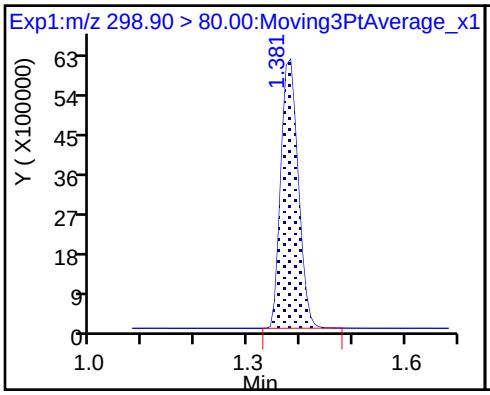
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 6 Worklist Smp#: 8

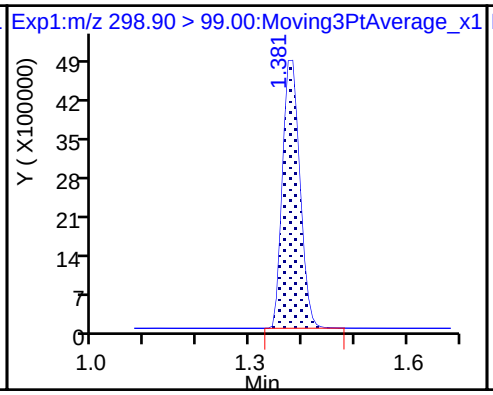
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

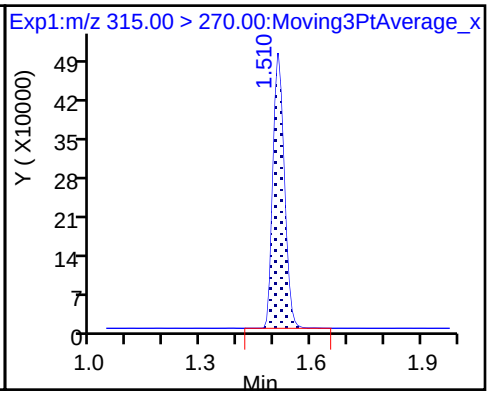
1 Perfluorobutanesulfonic acid



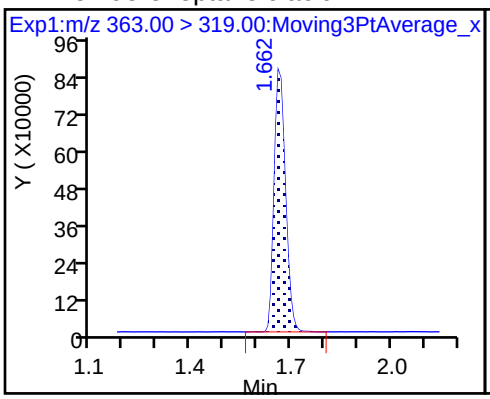
1 Perfluorobutanesulfonic acid



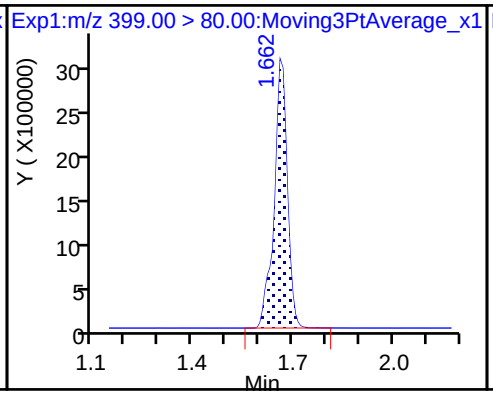
$ 2 13C2 PFHxA



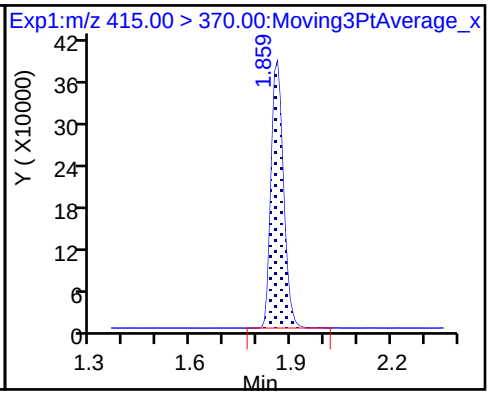
4 Perfluoroheptanoic acid



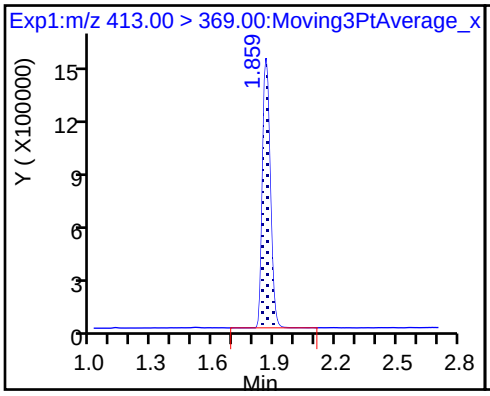
3 Perfluorohexanesulfonic acid



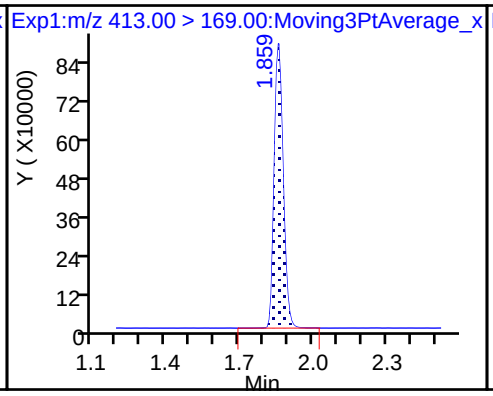
* 6 13C2-PFOA



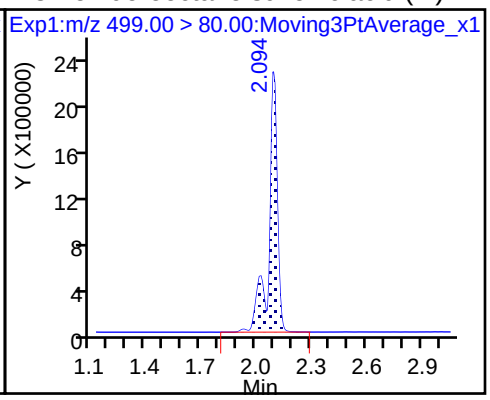
5 Perfluorooctanoic acid



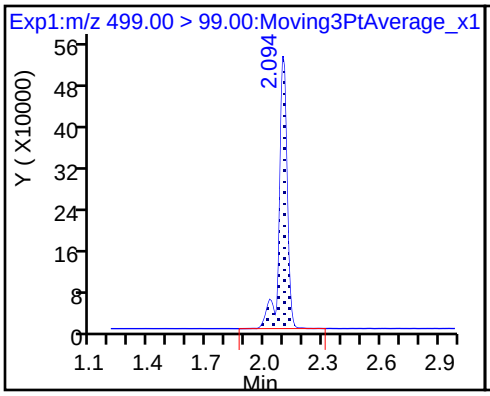
5 Perfluorooctanoic acid



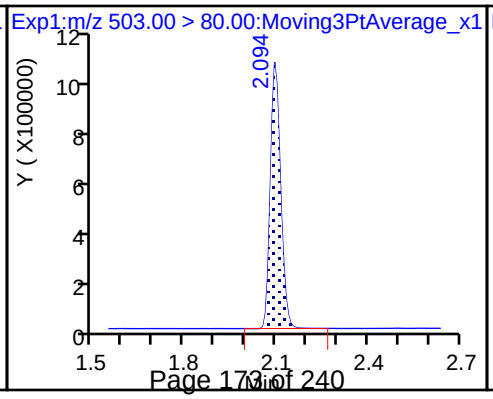
8 Perfluorooctane sulfonic acid (M)



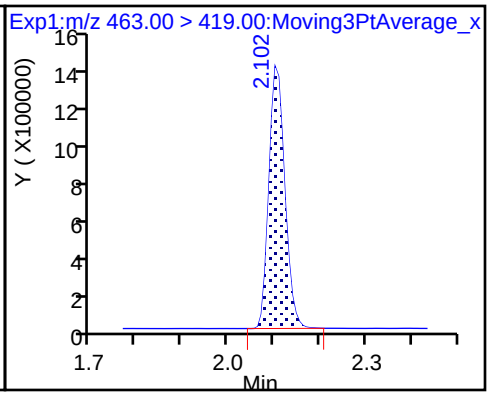
8 Perfluorooctane sulfonic acid



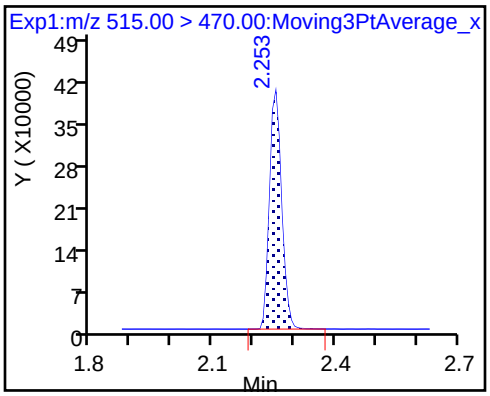
* 7 13C4 PFOS



9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.253
Y (X10000)
49
42
35
28
21
14
7
0
1.8
2.1
2.4
2.7
Min

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

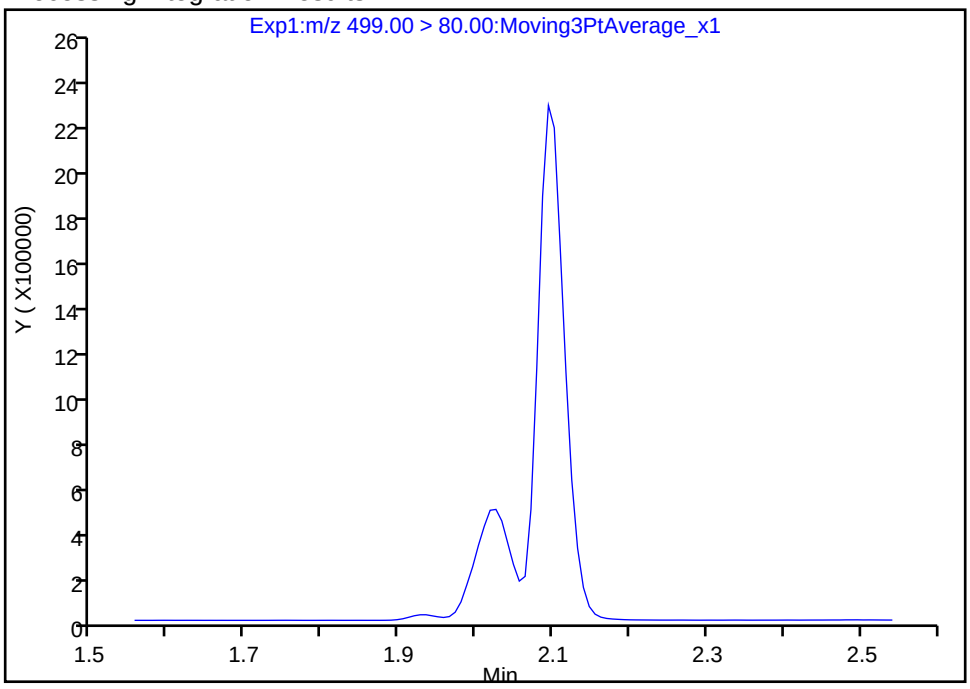
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d
Injection Date: 11-Apr-2018 12:09:09 Instrument ID: A8_N
Lims ID: IC L6
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 6 Worklist Smp#: 8
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: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

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

Signal: 1

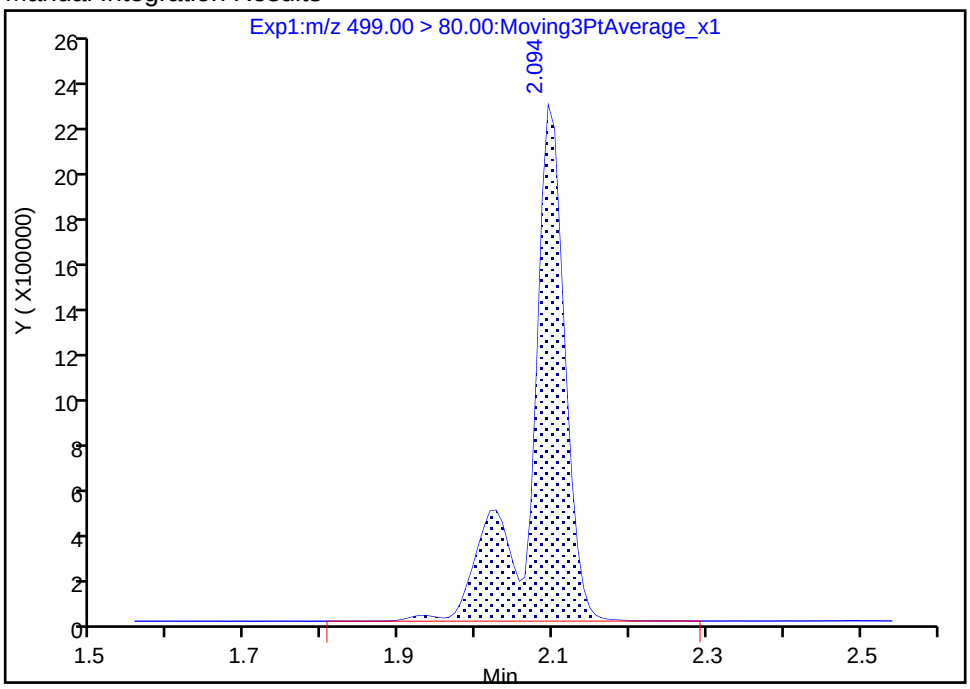
Not Detected
Expected RT: 2.09

Processing Integration Results



Manual Integration Results

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



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

Calibration / Perfluorobutanesulfonic acid

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

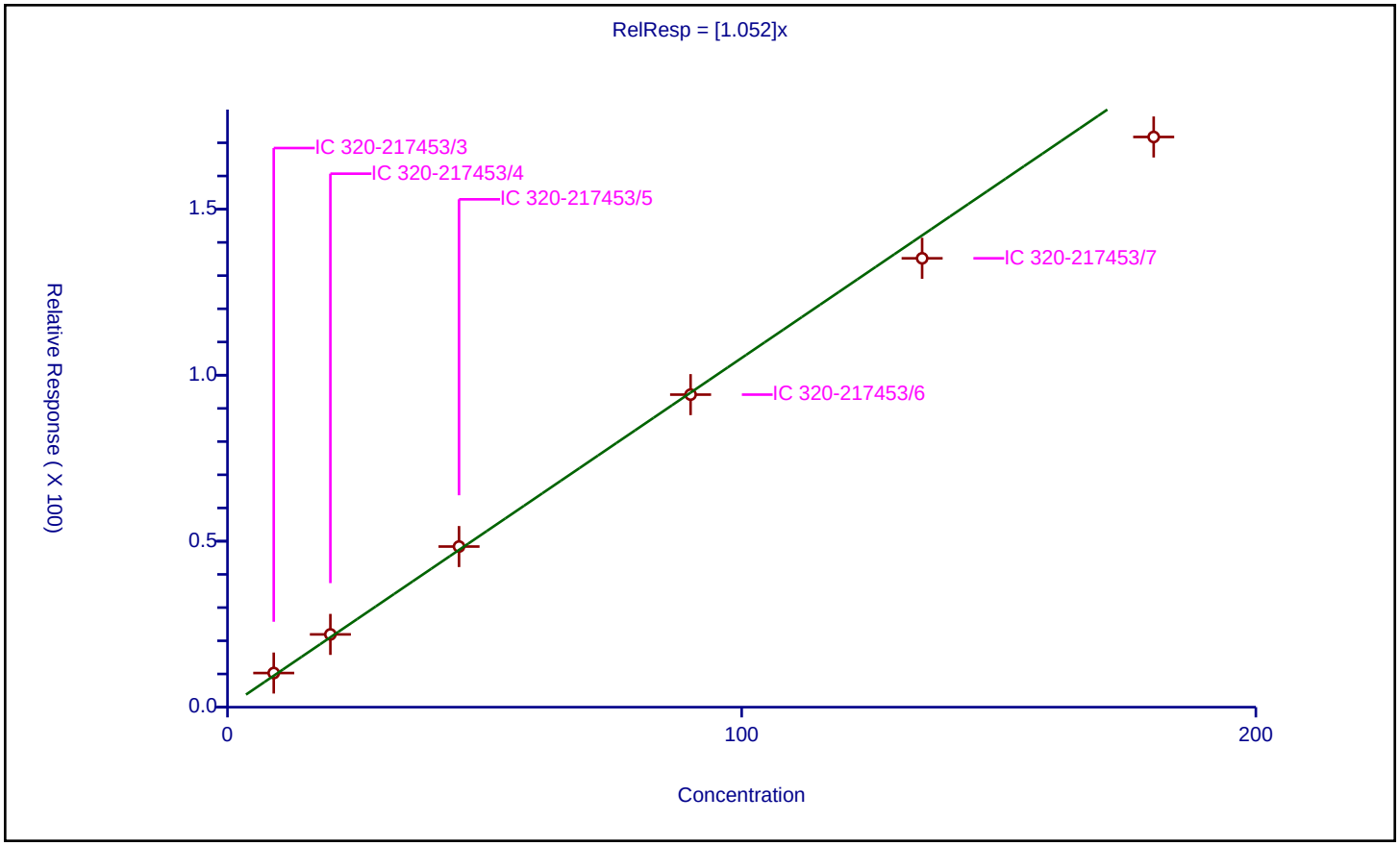
Curve Coefficients

Intercept:	0
Slope:	1.052

Error Coefficients

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

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



Calibration / 13C2 PFHxA

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

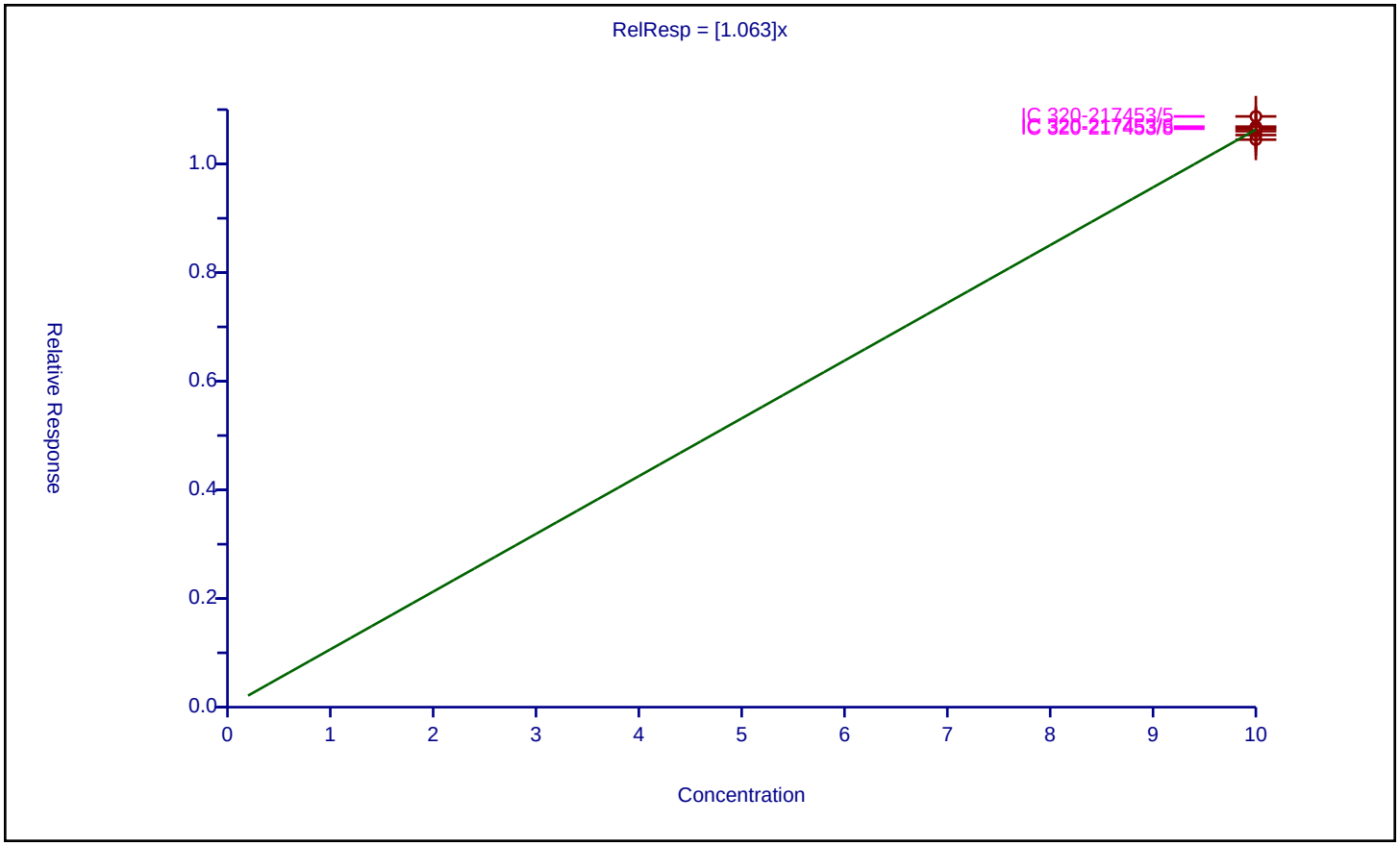
Curve Coefficients

Intercept:	0
Slope:	1.063

Error Coefficients

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

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



Calibration / Perfluorohexanesulfonic acid

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

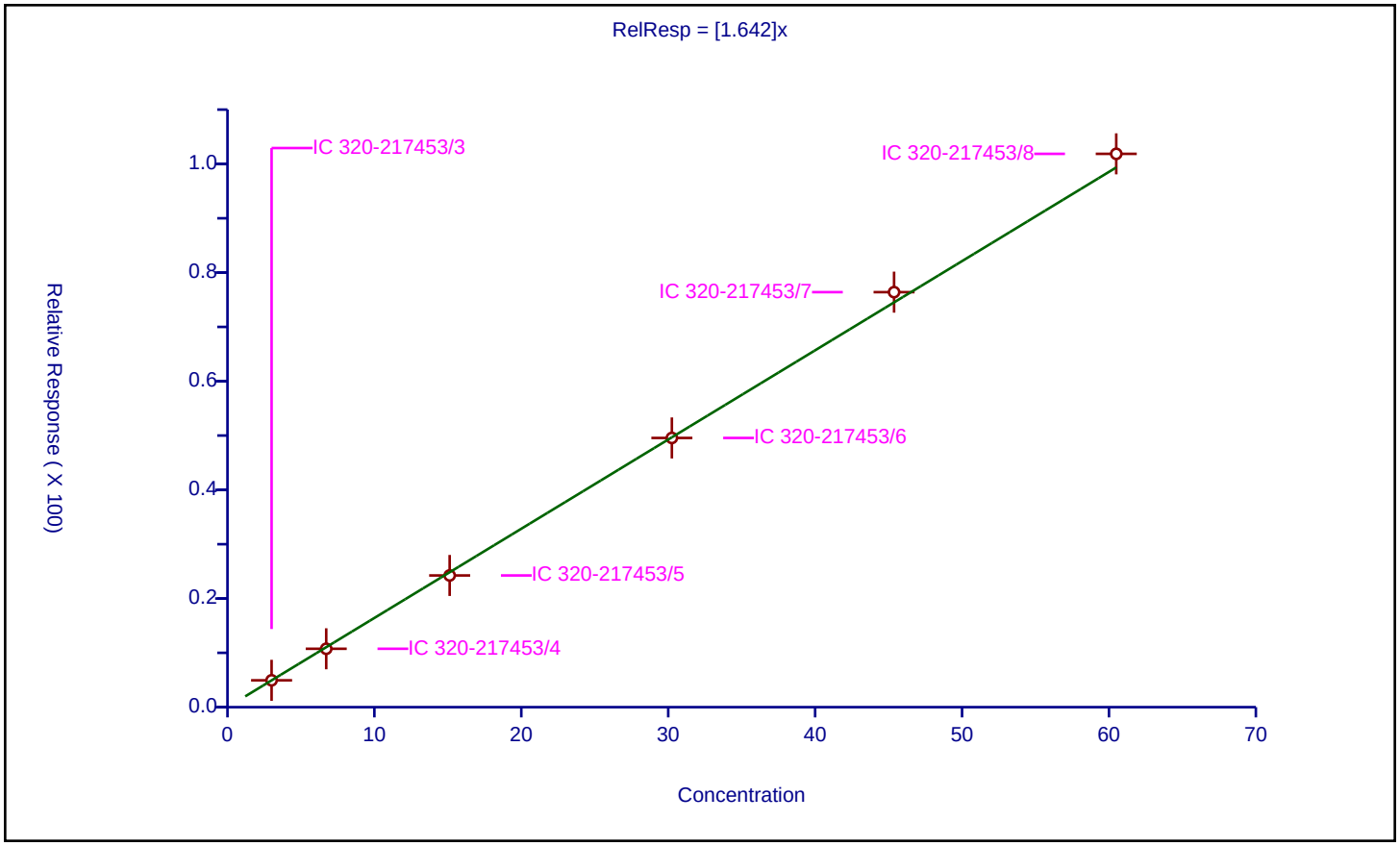
Curve Coefficients

Intercept:	0
Slope:	1.642

Error Coefficients

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

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



Calibration / Perfluoroheptanoic acid

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

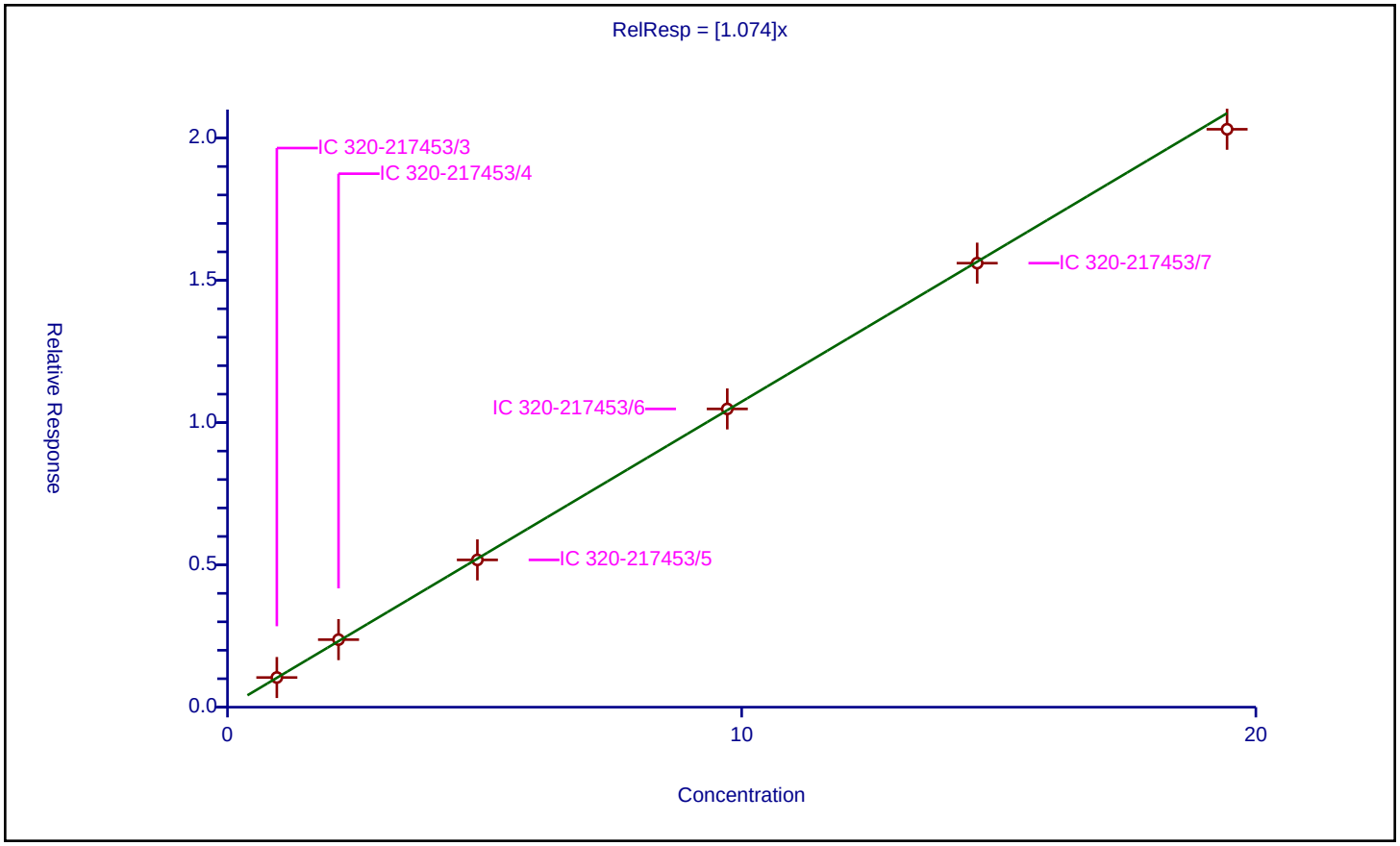
Curve Coefficients

Intercept:	0
Slope:	1.074

Error Coefficients

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

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



Calibration / Perfluorooctanoic acid

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

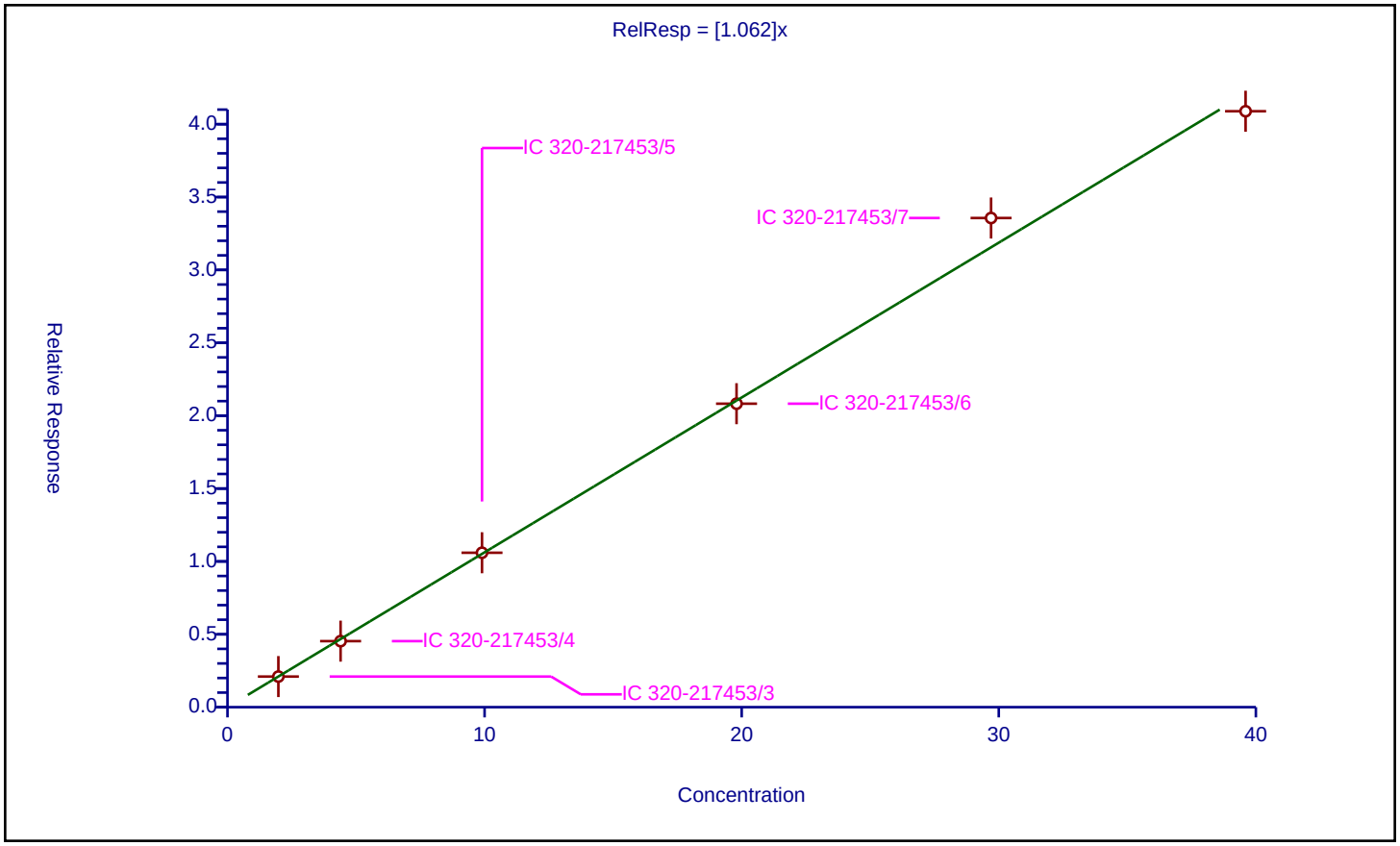
Curve Coefficients

Intercept:	0
Slope:	1.062

Error Coefficients

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

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



Calibration / Perfluorooctane sulfonic acid

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

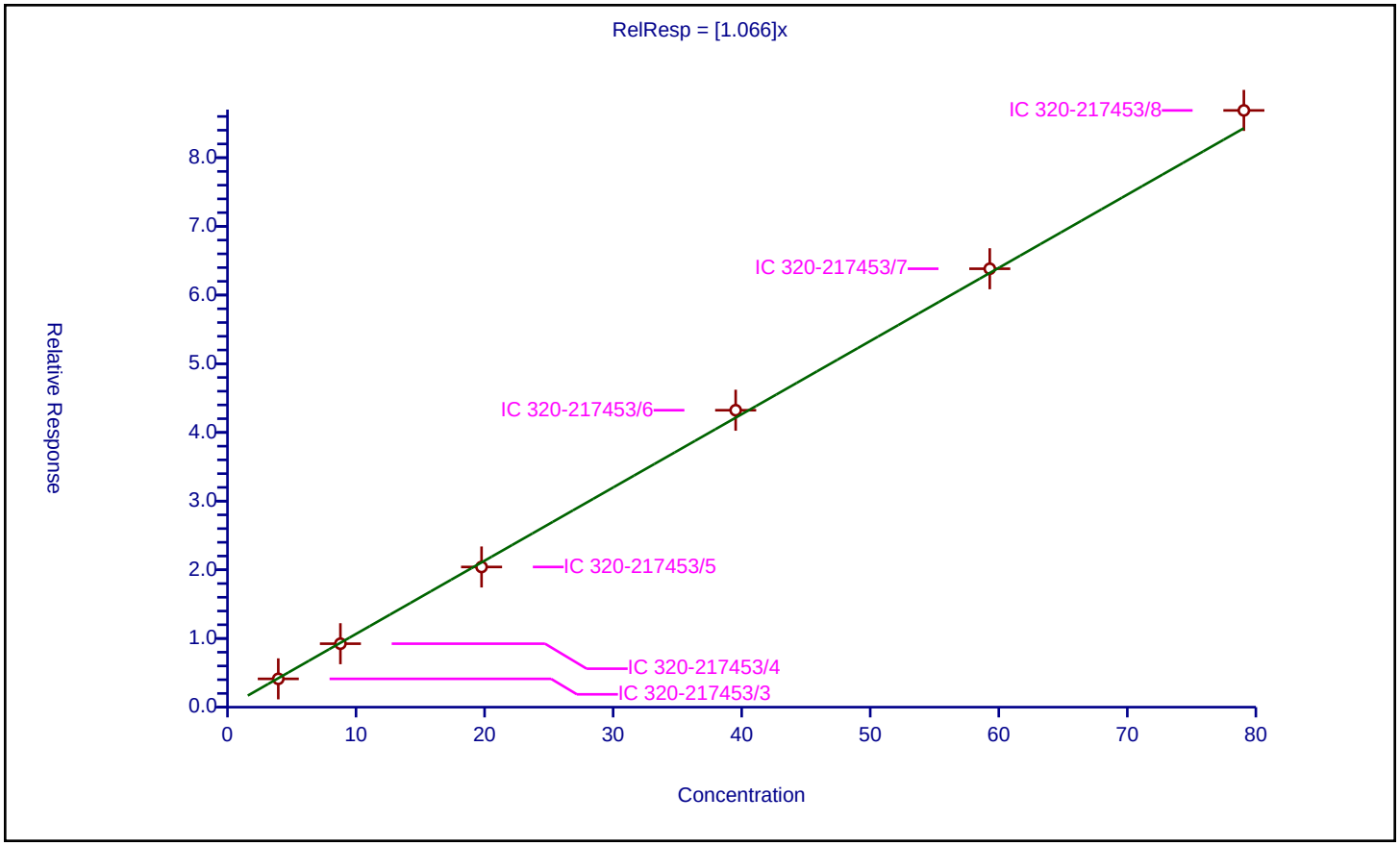
Curve Coefficients

Intercept:	0
Slope:	1.066

Error Coefficients

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

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



Calibration / Perfluorononanoic acid

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

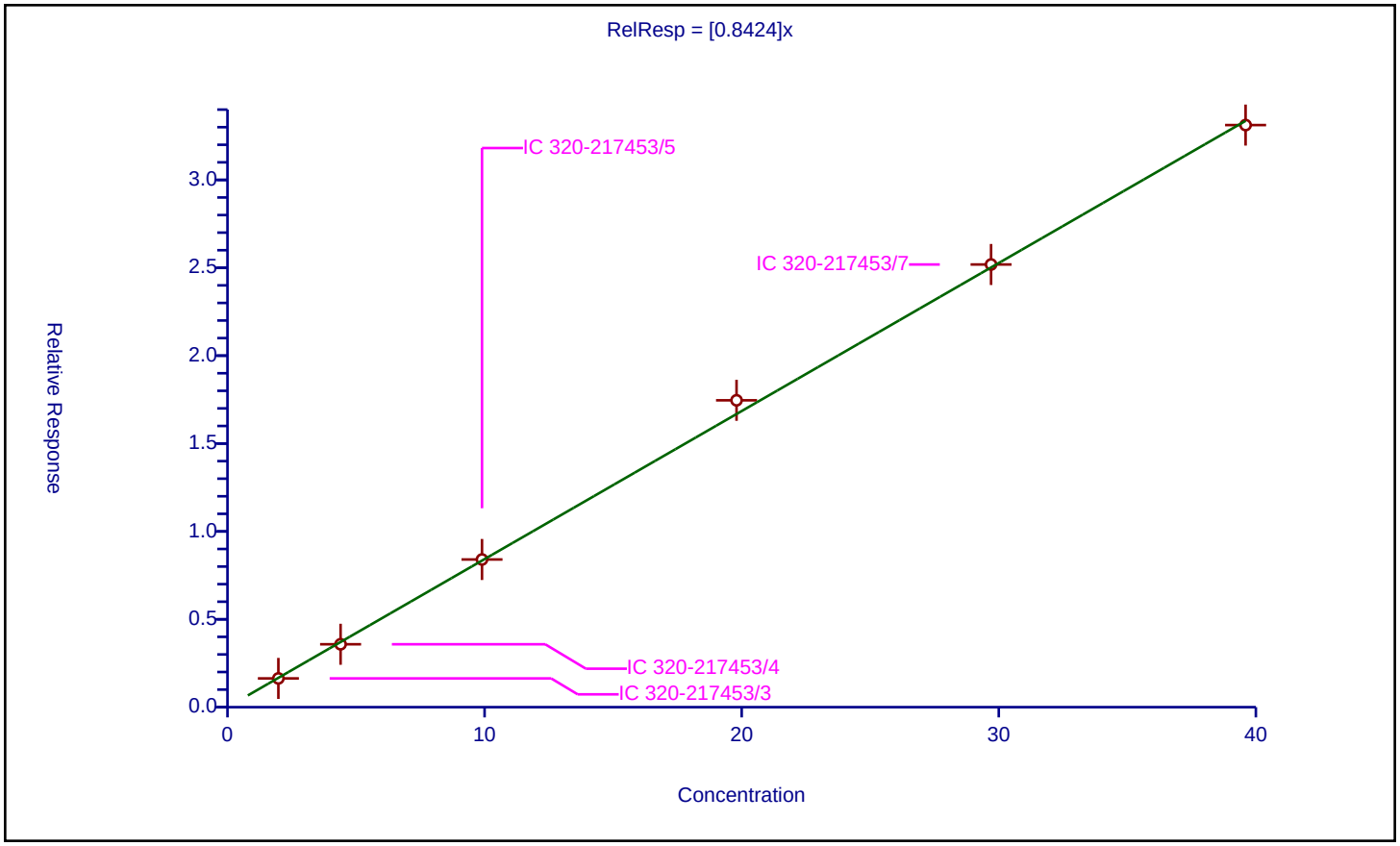
Curve Coefficients

Intercept:	0
Slope:	0.8424

Error Coefficients

Standard Error:	1990000
Relative Standard Error:	2.8
Correlation Coefficient:	0.997
Coefficient of Determination (Adjusted):	0.999

ID	Level	Concentration	Rel. Resp.	IS Amount	IS Response	RRF	Used
1	IC 320-217453/3	1.98	1.635697	10.0	1044020.0	0.826109	Y
2	IC 320-217453/4	4.4	3.578464	10.0	921915.0	0.813287	Y
3	IC 320-217453/5	9.9	8.402645	10.0	945031.0	0.848752	Y
4	IC 320-217453/6	19.8	17.459935	10.0	996809.0	0.881815	Y
5	IC 320-217453/7	29.7	25.186865	10.0	929546.0	0.848043	Y
6	IC 320-217453/8	39.6	33.119218	10.0	982926.0	0.836344	Y



Calibration / 13C2 PFDA

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

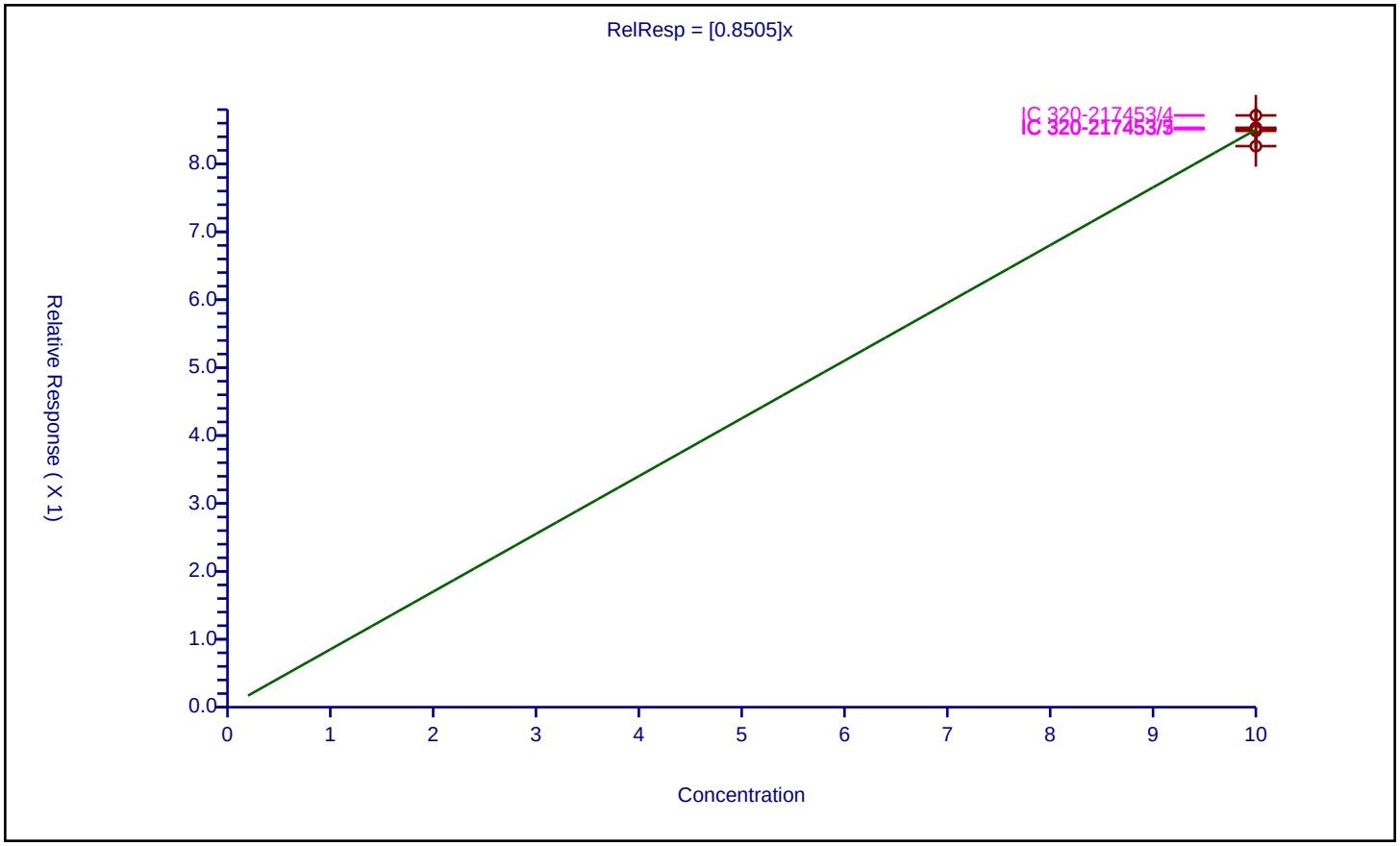
Curve Coefficients

Intercept:	0
Slope:	0.8505

Error Coefficients

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

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



FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Lab Sample ID: CCVL 320-217453/10 Calibration Date: 04/11/2018 12:18

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

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 04/11/2018 12:09

Lab File ID: 2018.04.11_537ICALB_011.d Conc. Units: ng/mL

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

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_011.d
Lims ID: CCVL
Client ID:
Sample Type: CCVL
Inject. Date: 11-Apr-2018 12:18:29 ALS Bottle#: 2 Worklist Smp#: 10
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L2
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub9

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 11-Apr-2018 12:35:34 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK015

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

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

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L2_00022 Amount Added: 1.00 Units: mL

Report Date: 11-Apr-2018 12:35:35 Chrom Revision: 2.2 13-Mar-2018 08:45:20

TestAmerica Sacramento

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

Injection Date: 11-Apr-2018 12:18:29 Instrument ID: A8_N

Lims ID: CCVL

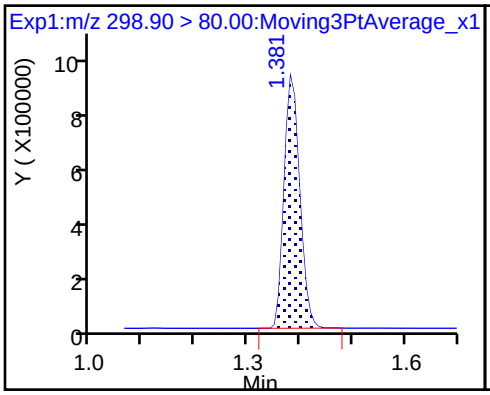
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 10

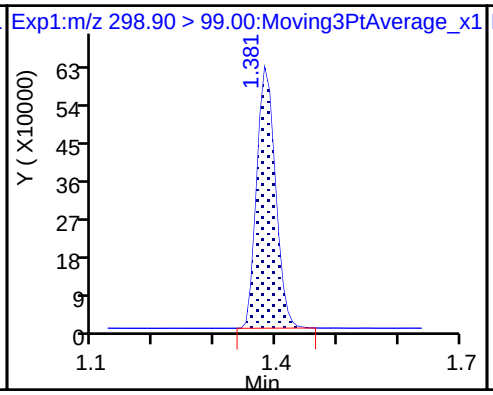
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

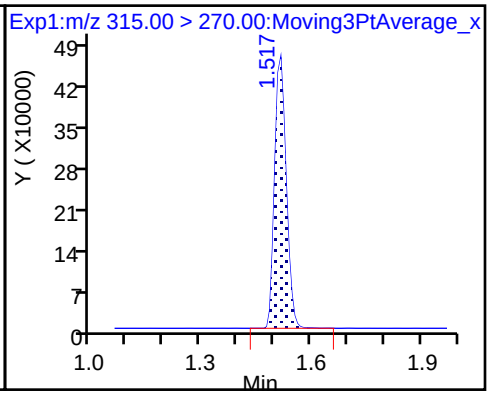
1 Perfluorobutanesulfonic acid



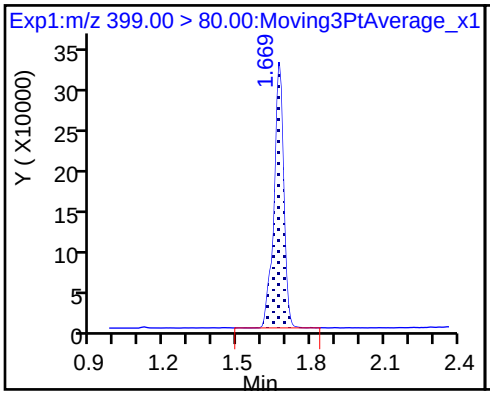
1 Perfluorobutanesulfonic acid



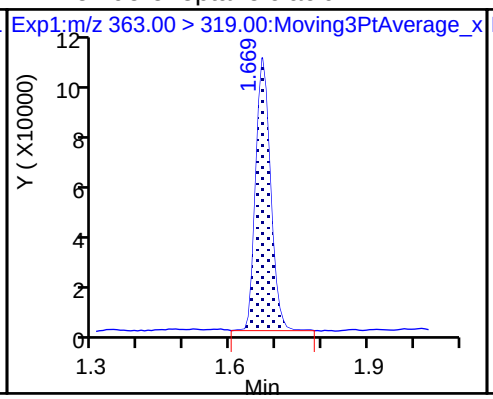
$ 2 13C2 PFHxA



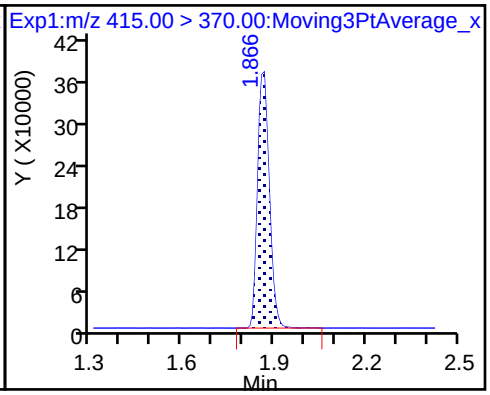
3 Perfluorohexanesulfonic acid



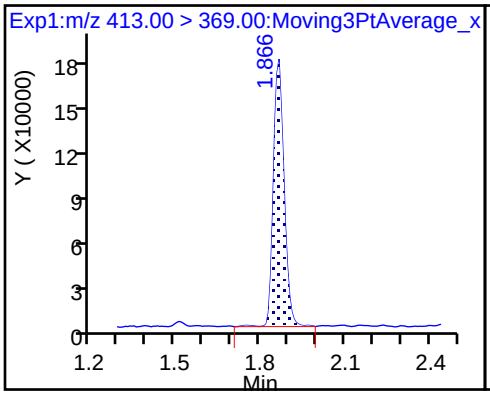
4 Perfluoroheptanoic acid



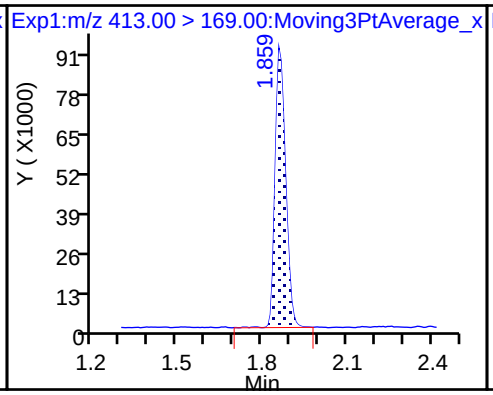
* 6 13C2-PFOA



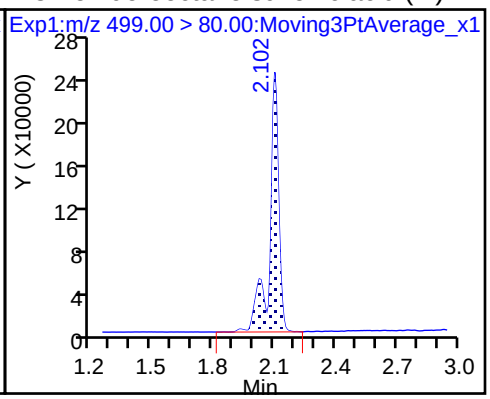
5 Perfluorooctanoic acid



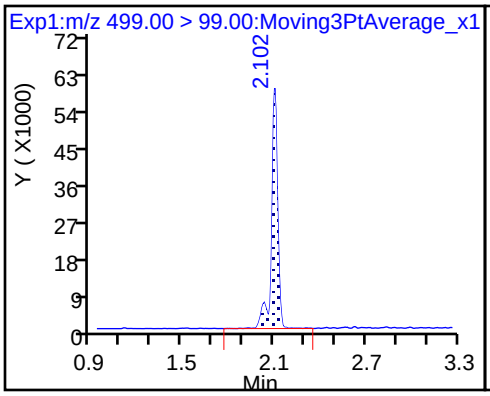
5 Perfluorooctanoic acid



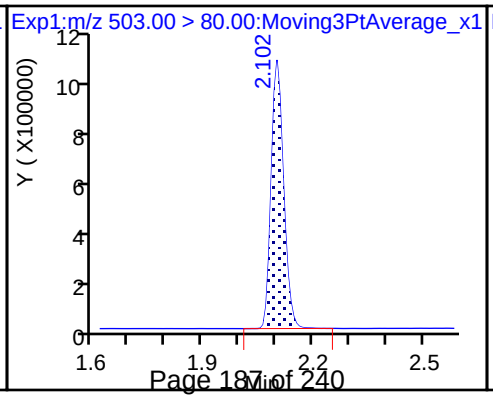
8 Perfluorooctane sulfonic acid (M)



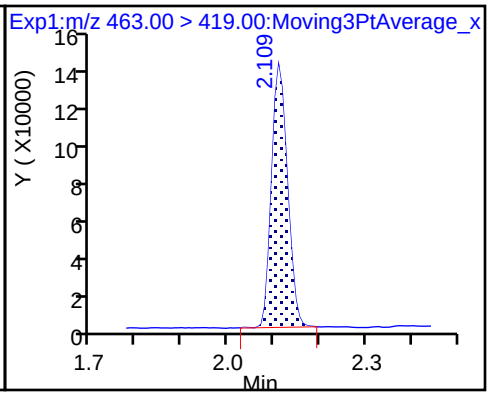
8 Perfluorooctane sulfonic acid



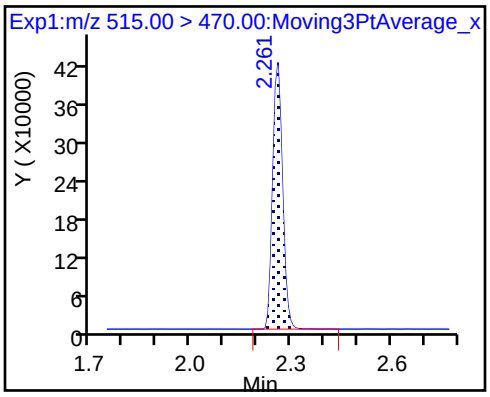
* 7 13C4 PFOS



9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.261
Y (X10000)
42
36
30
24
18
12
6
0
1.7
2.0
2.3
2.6
Min

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

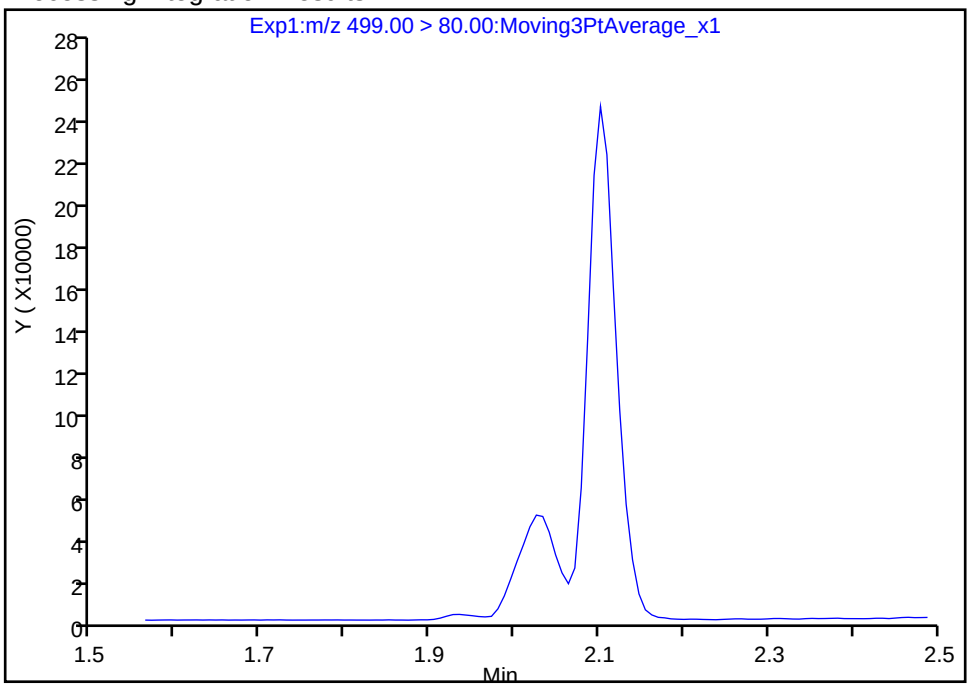
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_011.d
Injection Date: 11-Apr-2018 12:18:29 Instrument ID: A8_N
Lims ID: CCVL
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 10
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: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

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

Signal: 1

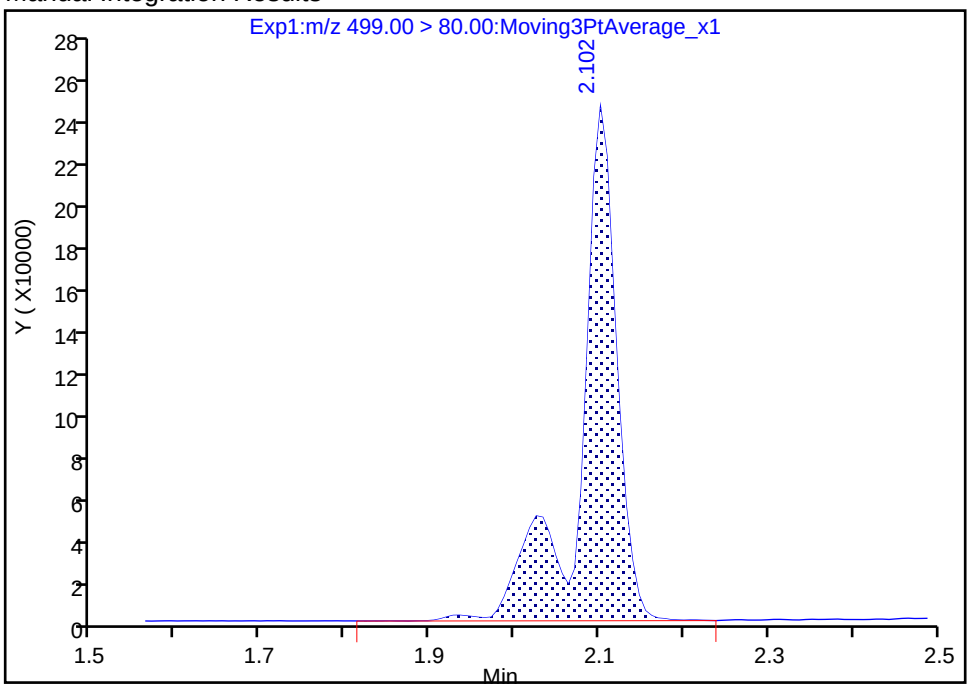
Not Detected
Expected RT: 2.09

Processing Integration Results



Manual Integration Results

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



Reviewer: westendorfc, 11-Apr-2018 12:32:02
Audit Action: Assigned Compound ID Audit Reason: Peak assignment corrected

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Lab Sample ID: ICV 320-217453/12 Calibration Date: 04/11/2018 12:27

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

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 04/11/2018 12:09

Lab File ID: 2018.04.11_537ICALB_013.d Conc. Units: ng/mL

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

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_013.d
Lims ID: ICV
Client ID:
Sample Type: ICV
Inject. Date: 11-Apr-2018 12:27:50 ALS Bottle#: 7 Worklist Smp#: 12
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: ICV
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist:

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 11-Apr-2018 12:35:36 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK015

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

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

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-ICV_00030 Amount Added: 1.00 Units: mL

Report Date: 11-Apr-2018 12:35:37 Chrom Revision: 2.2 13-Mar-2018 08:45:20

TestAmerica Sacramento

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

Injection Date: 11-Apr-2018 12:27:50 Instrument ID: A8_N

Lims ID: ICV

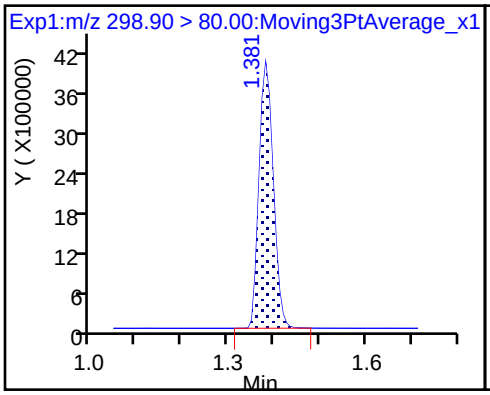
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 7 Worklist Smp#: 12

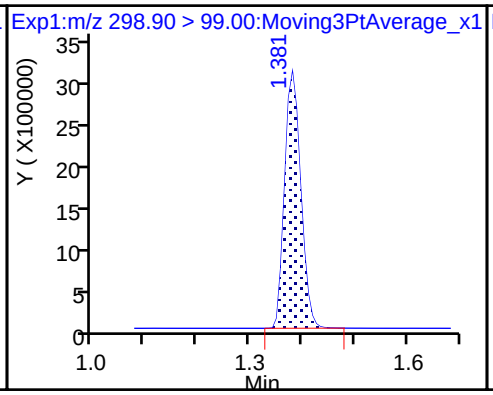
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

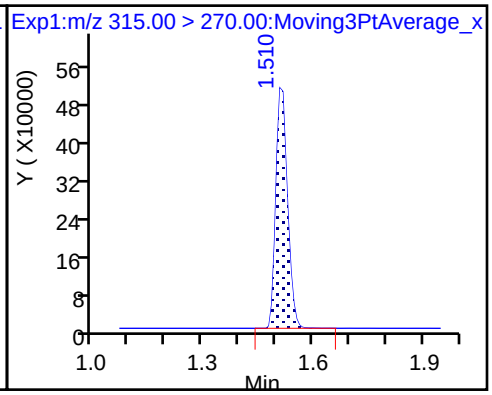
1 Perfluorobutanesulfonic acid



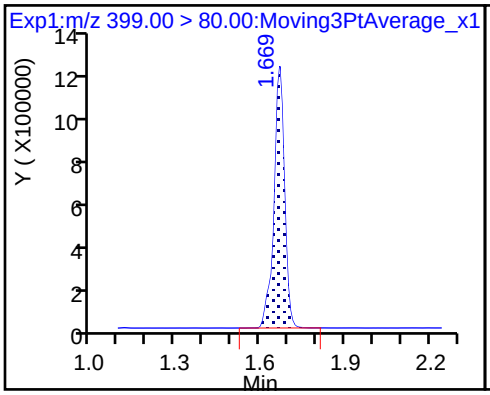
1 Perfluorobutanesulfonic acid



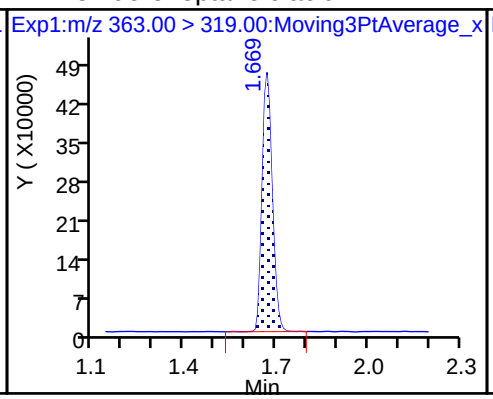
$ 2 13C2 PFHxA



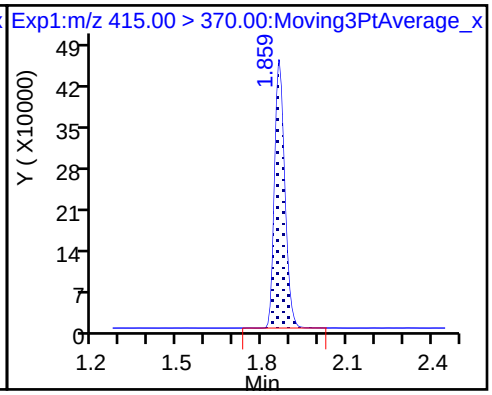
3 Perfluorohexanesulfonic acid



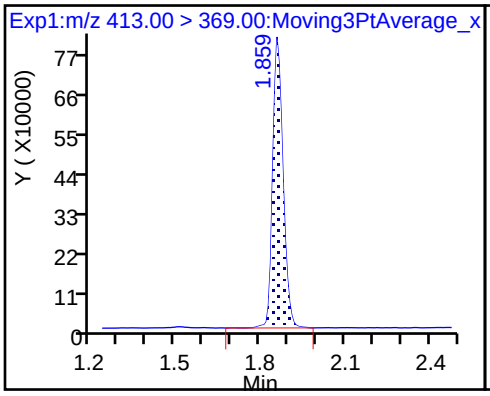
4 Perfluoroheptanoic acid



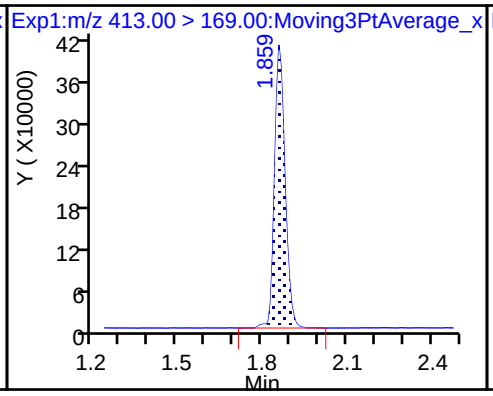
* 6 13C2-PFOA



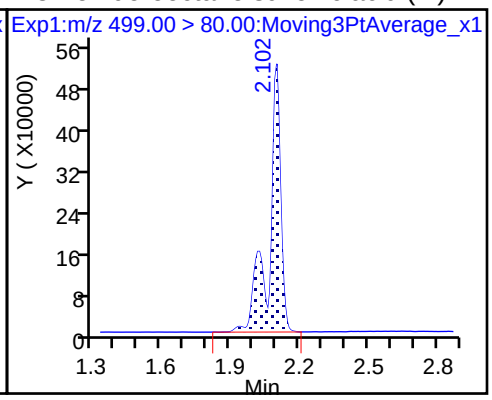
5 Perfluorooctanoic acid



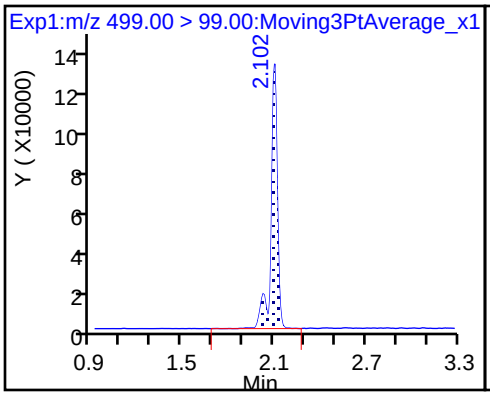
5 Perfluorooctanoic acid



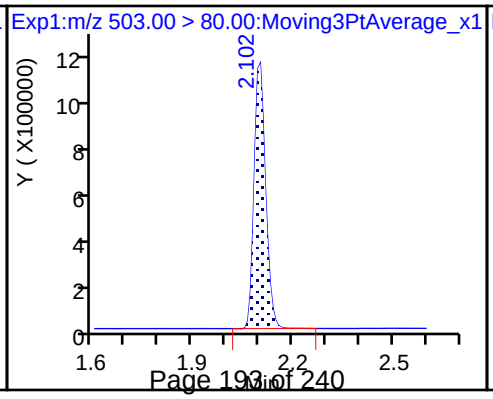
8 Perfluorooctane sulfonic acid (M)



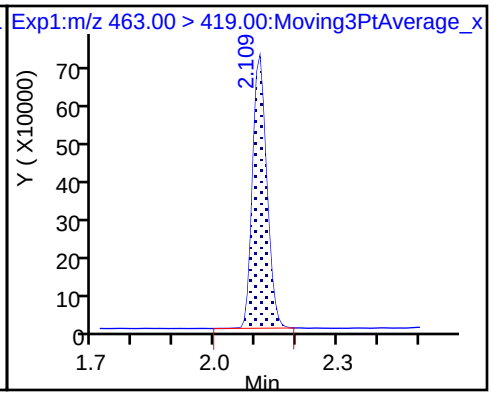
8 Perfluorooctane sulfonic acid



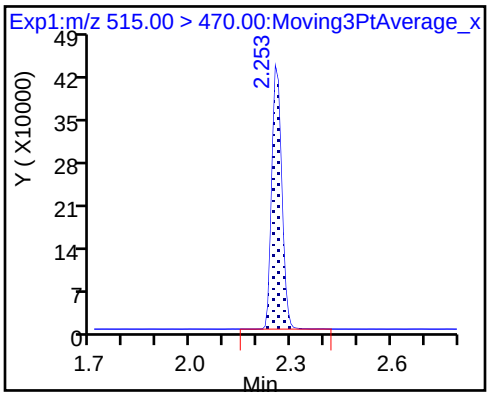
* 7 13C4 PFOS



9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.253
Y (X10000)
49
42
35
28
21
14
7
0
1.7
2.0
2.3
2.6
Min

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

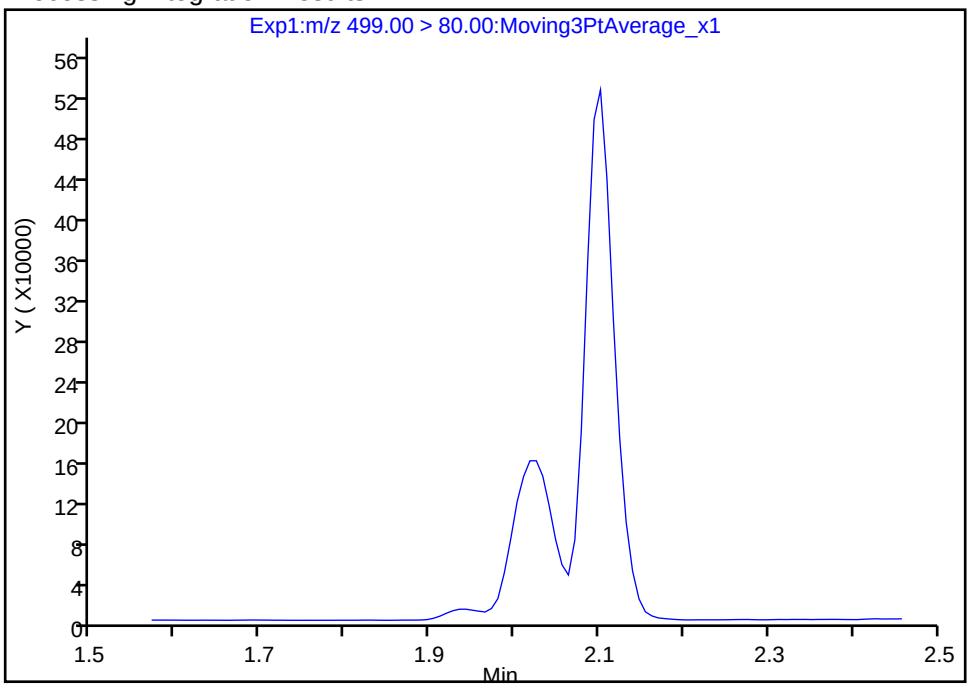
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_013.d
Injection Date: 11-Apr-2018 12:27:50 Instrument ID: A8_N
Lims ID: ICV
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 7 Worklist Smp#: 12
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: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

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

Signal: 1

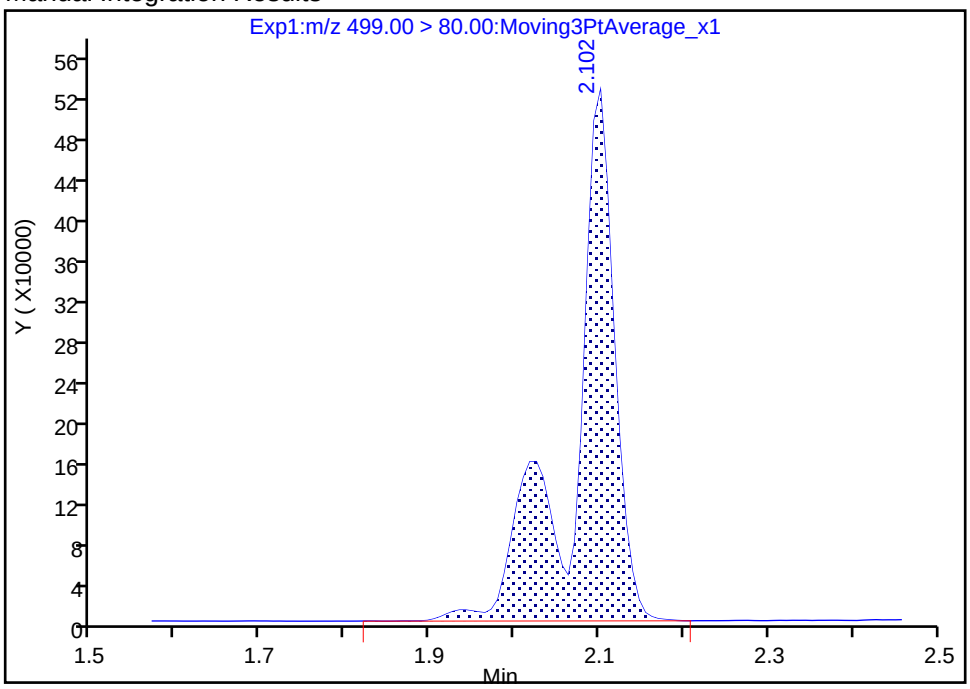
Not Detected
Expected RT: 2.09

Processing Integration Results



Manual Integration Results

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



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

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Lab Sample ID: CCVL 320-220554/1 Calibration Date: 04/29/2018 22:39

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

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 04/11/2018 12:09

Lab File ID: 2018.04.29_537A_004.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.052	1.182		22.5	20.0	12.4	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	1.060		2.13	2.16	-1.2	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.634		6.69	6.72	-0.5	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	1.054		4.37	4.40	-0.8	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	1.041		8.58	8.79	-2.4	50.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.8313		4.34	4.40	-1.3	50.0
13C2 PFHxA	Ave	1.063	1.081		10.2	10.0	1.7	30.0
13C2 PFDA	Ave	0.8505	0.8310		9.77	10.0	-2.3	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57418.b\2018.04.29_537A_004.d
Lims ID: CCVL
Client ID:
Sample Type: CCVL
Inject. Date: 29-Apr-2018 22:39:39 ALS Bottle#: 2 Worklist Smp#: 1
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L2
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub9

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57418.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:15:10 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

First Level Reviewer: barnettj Date: 30-Apr-2018 10:13:40

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.396	1.396	0.0	1.000	1707698	22.5		1461	
298.90 > 99.00	1.396	1.396	0.0	1.000	1271755		1.34(0.00-0.00)	1428	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.525	1.525	0.0	1.000	981985	10.2		6695	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.677	1.677	0.0	1.000	792536	6.69		273	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.677	1.677	0.0	1.000	208039	2.13		21.6	
* 6 13C2-PFOA									
415.00 > 370.00	1.874	1.866	0.008		908315	10.0		5254	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.874	1.866	0.008	1.000	421379	4.37		75.6	
413.00 > 169.00	1.874	1.866	0.008	1.000	226398		1.86(0.00-0.00)	156	
8 Perfluorooctane sulfonic acid									a
499.00 > 80.00	2.124	2.109	0.015	1.000	659842	8.58		208	a
499.00 > 99.00	2.117	2.109	0.008	0.996	143963		4.58(0.00-0.00)	248	
* 7 13C4 PFOS									
503.00 > 80.00	2.124	2.109	0.015		2069824	28.7		1224	
9 Perfluorononanoic acid									
463.00 > 419.00	2.132	2.117	0.015	1.000	332229	4.34		100	
$ 10 13C2 PFDA									
515.00 > 470.00	2.284	2.276	0.008	1.000	754794	9.77		7099	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L2_00022 Amount Added: 1.00 Units: mL

Report Date: 30-Apr-2018 10:15:11 Chrom Revision: 2.2 26-Apr-2018 11:26:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57418.b\2018.04.29_537A_004.d

Injection Date: 29-Apr-2018 22:39:39 Instrument ID: A8_N

Lims ID: CCVL

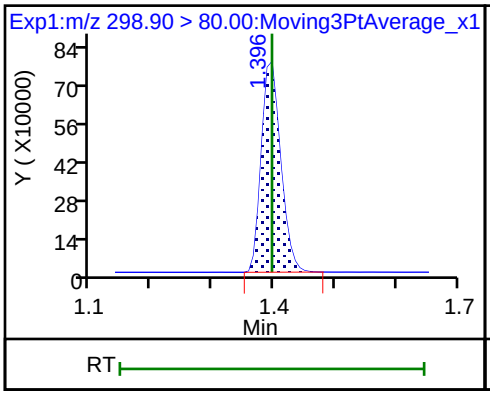
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 1

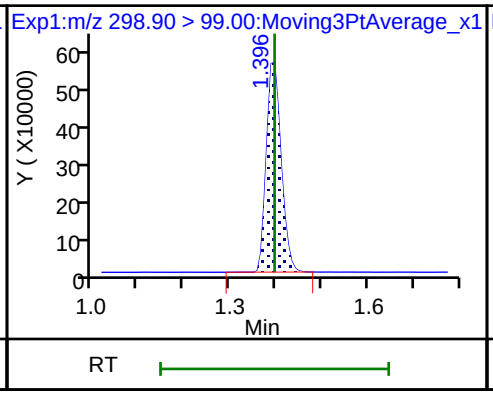
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

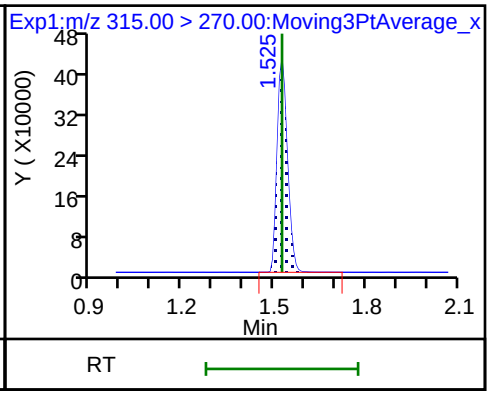
1 Perfluorobutanesulfonic acid



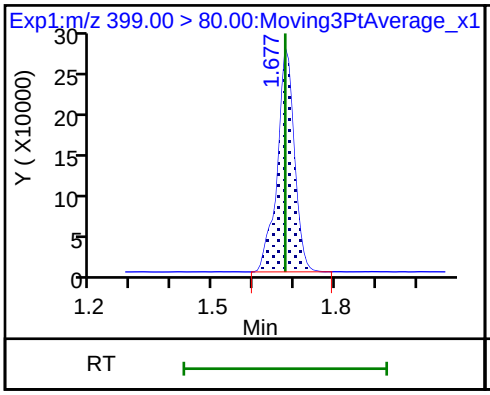
1 Perfluorobutanesulfonic acid



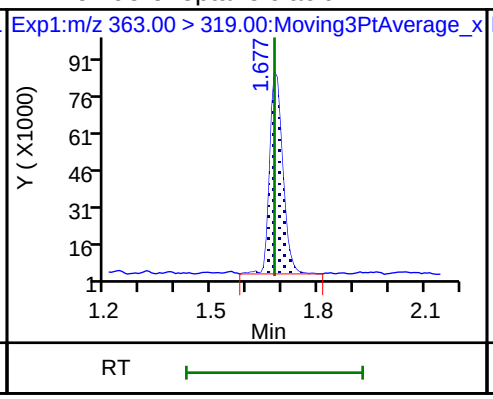
$ 2 13C2 PFHxA



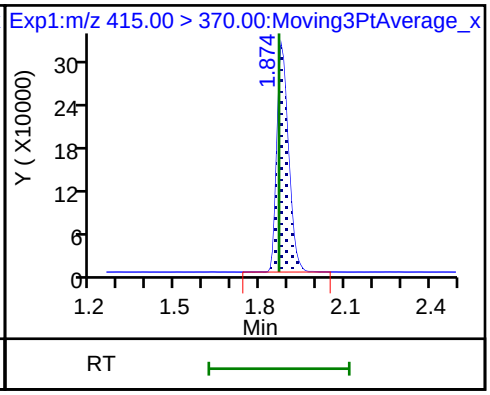
3 Perfluorohexanesulfonic acid



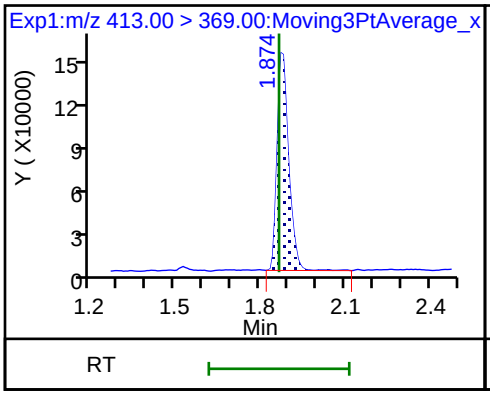
4 Perfluoroheptanoic acid



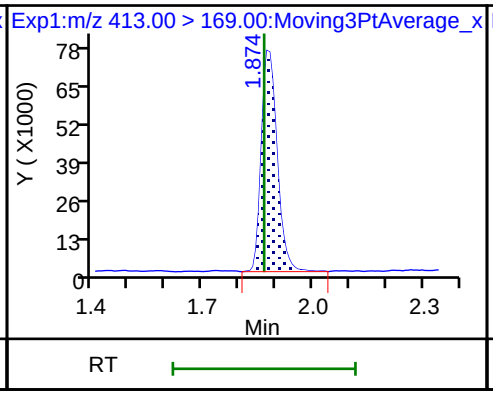
* 6 13C2-PFOA



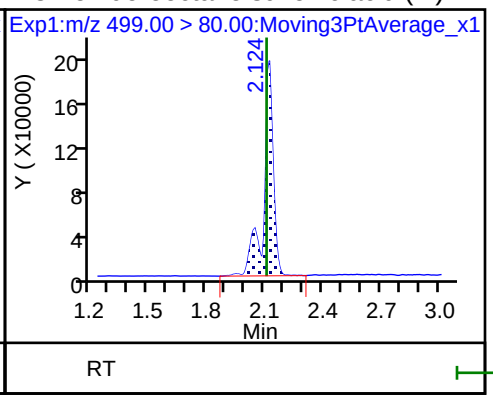
5 Perfluorooctanoic acid



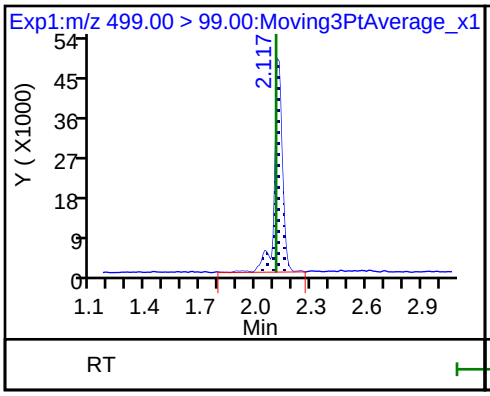
5 Perfluorooctanoic acid



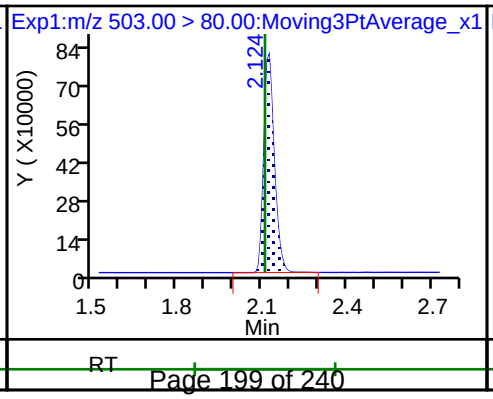
8 Perfluorooctane sulfonic acid (M)



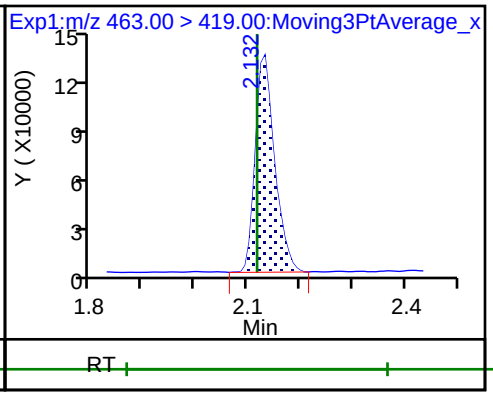
8 Perfluorooctane sulfonic acid



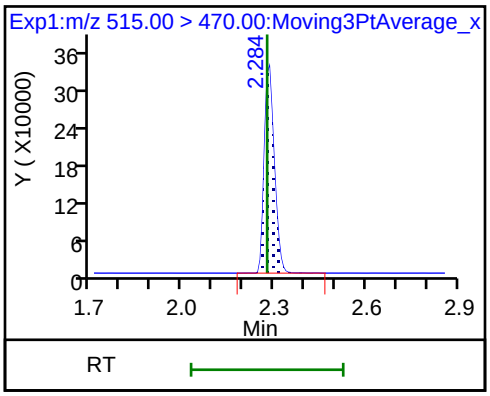
* 7 13C4 PFOS



9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.284
Y (X10000)
36
30
24
18
12
6
0
1.7
2.0
2.3
2.6
2.9
Min
RT

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

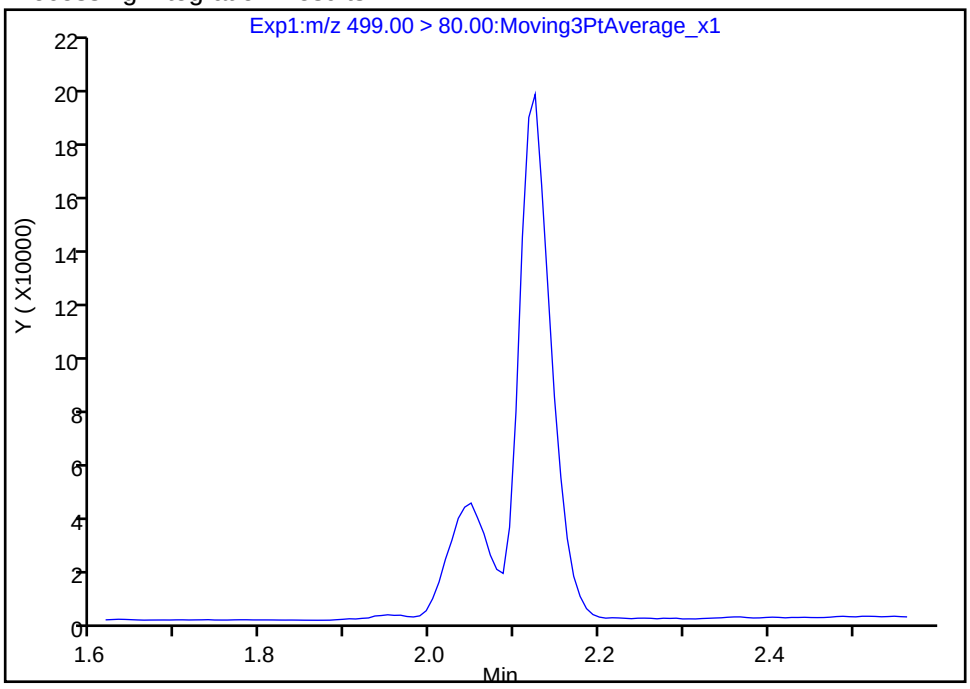
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57418.b\2018.04.29_537A_004.d
Injection Date: 29-Apr-2018 22:39:39 Instrument ID: A8_N
Lims ID: CCVL
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 1
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

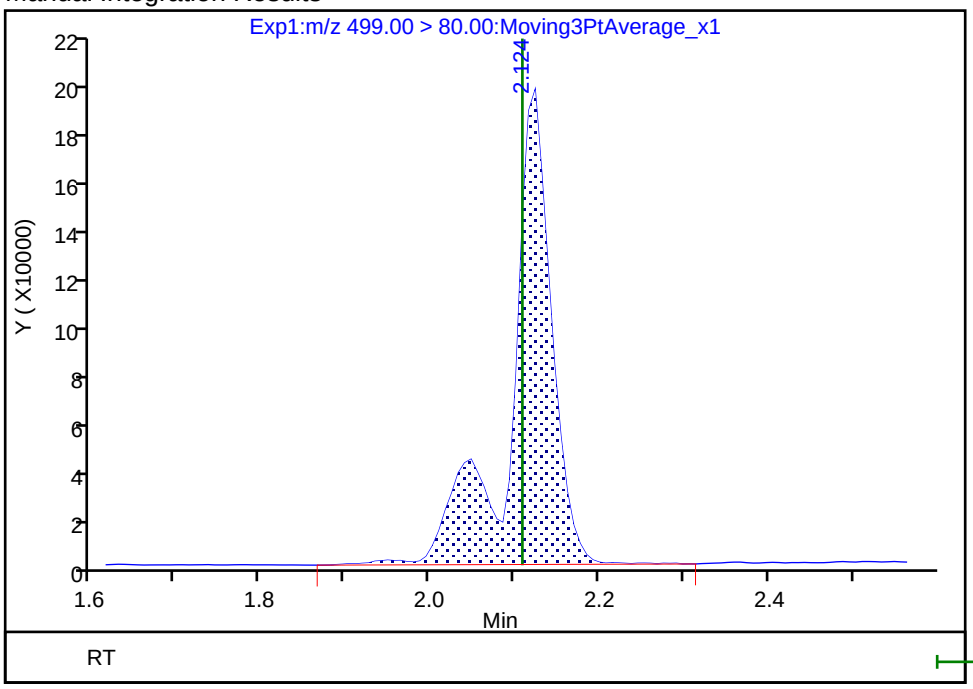
Not Detected
Expected RT: 2.11

Processing Integration Results



Manual Integration Results

RT: 2.12
Area: 659842
Amount: 8.576277
Amount Units: ng/ml



Reviewer: barnettj, 30-Apr-2018 10:13:36
Audit Action: Assigned Compound ID Audit Reason: Peak assignment corrected

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Lab Sample ID: CCV 320-220561/1 Calibration Date: 04/30/2018 01:04

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

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 04/11/2018 12:09

Lab File ID: 2018.04.29_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)	Ave	1.052	1.222		52.3	45.0	16.2	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	1.103		4.99	4.86	2.7	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.713		15.8	15.1	4.3	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	1.080		10.1	9.90	1.6	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	1.077		20.0	19.8	1.0	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.8007		9.41	9.90	-5.0	30.0
13C2 PFHxA	Ave	1.063	1.068		10.0	10.0	0.5	30.0
13C2 PFDA	Ave	0.8505	0.8459		9.95	10.0	-0.5	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_001.d
Lims ID: CCV L3
Client ID:
Sample Type: CCVIS
Inject. Date: 30-Apr-2018 01:04:30 ALS Bottle#: 3 Worklist Smp#: 1
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L3
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub9

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:53:22 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

First Level Reviewer: barnettj Date: 30-Apr-2018 10:50:33

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.396	1.396	0.0	1.000	4207826	52.3		3137	
298.90 > 99.00	1.396	1.396	0.0	1.000	3173390		1.33(0.00-0.00)	3149	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.525	1.525	0.0	1.000	1010821	10.0		8215	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.669	1.669	0.0	1.000	1980320	15.8		638	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.669	1.669	0.0	1.000	507141	4.99		63.9	
* 6 13C2-PFOA									
415.00 > 370.00	1.859	1.859	0.0		946267	10.0		5810	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.859	1.859	0.0	1.000	1011386	10.1		192	
413.00 > 169.00	1.859	1.859	0.0	1.000	528588		1.91(0.00-0.00)	432	
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.102	0.0		2192267	28.7		1165	
8 Perfluorooctane sulfonic acid									a
499.00 > 80.00	2.102	2.102	0.0	1.000	1627610	20.0		452	a
499.00 > 99.00	2.102	2.102	0.0	1.000	359149		4.53(0.00-0.00)	630	
9 Perfluorononanoic acid									
463.00 > 419.00	2.117	2.117	0.0	1.000	750092	9.41		193	
$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.269	0.0	1.000	800432	9.95		7400	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L3_00025 Amount Added: 1.00 Units: mL

Report Date: 30-Apr-2018 10:53:22 Chrom Revision: 2.2 26-Apr-2018 11:26:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_001.d

Injection Date: 30-Apr-2018 01:04:30 Instrument ID: A8_N

Lims ID: CCV L3

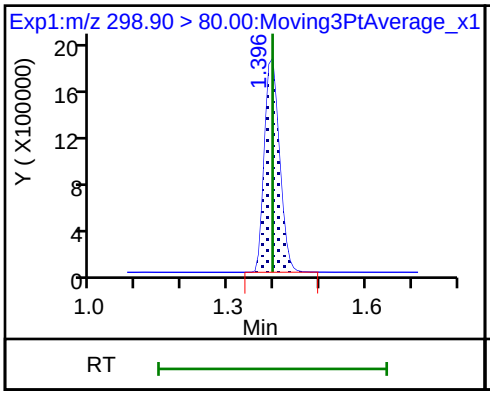
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 1

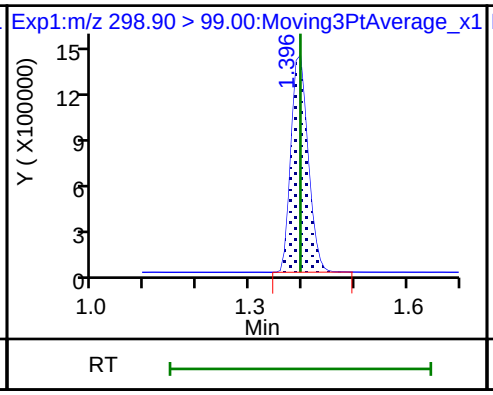
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

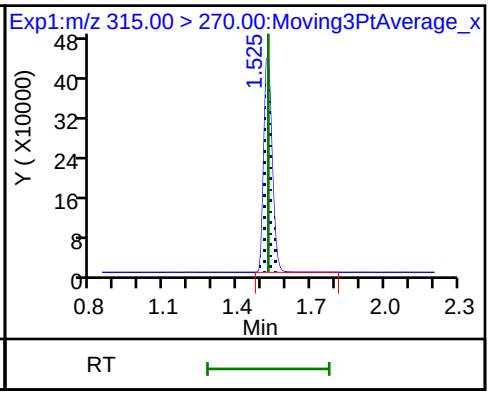
1 Perfluorobutanesulfonic acid



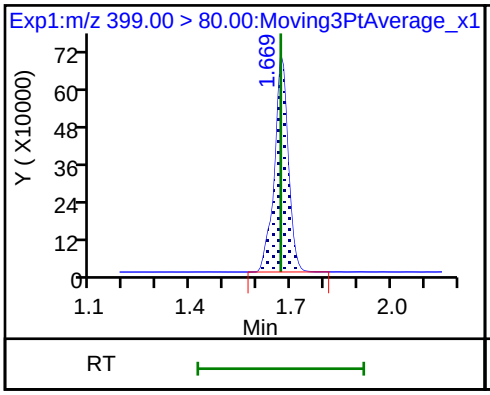
1 Perfluorobutanesulfonic acid



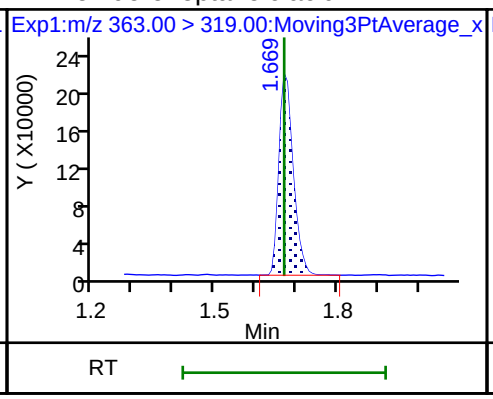
$ 2 13C2 PFHxA



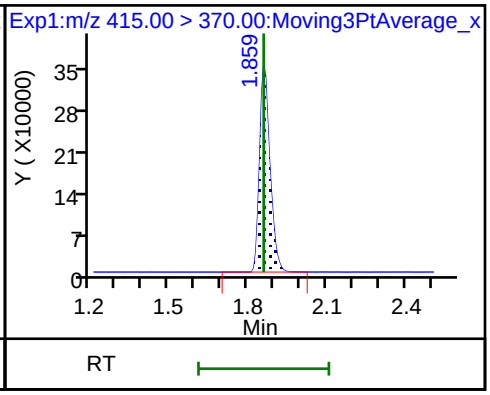
3 Perfluorohexanesulfonic acid



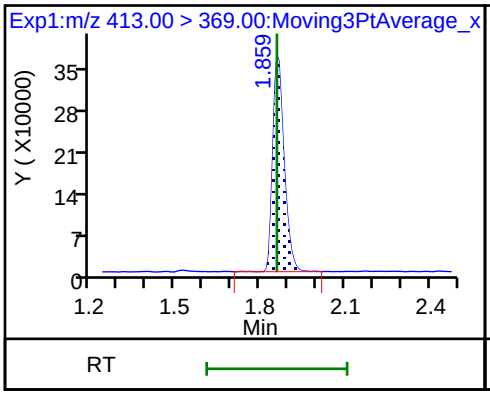
4 Perfluoroheptanoic acid



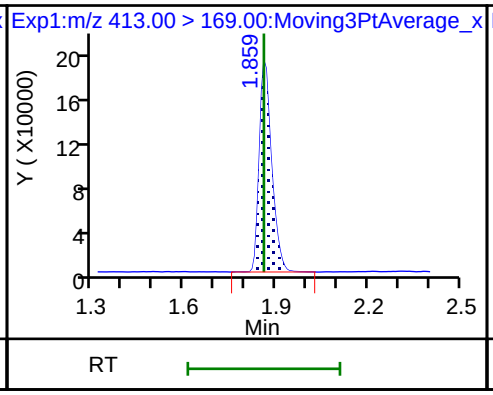
* 6 13C2-PFOA



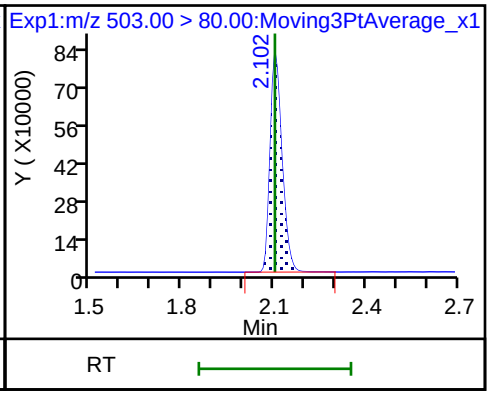
5 Perfluorooctanoic acid



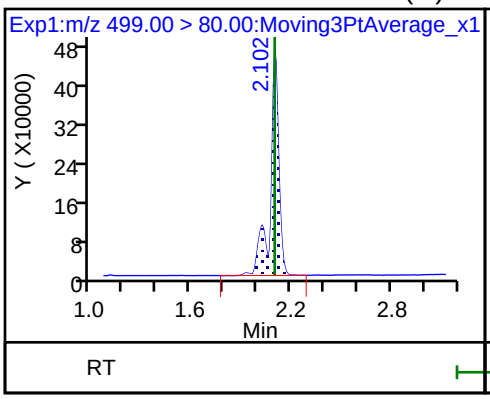
5 Perfluorooctanoic acid



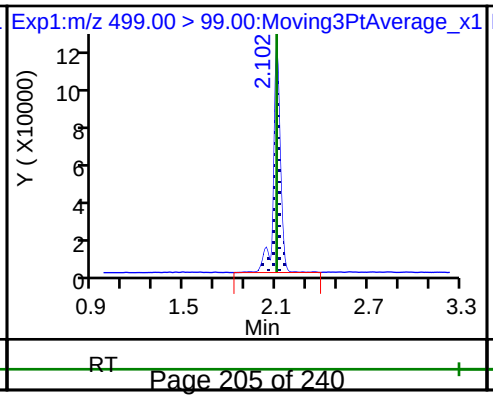
* 7 13C4 PFOS



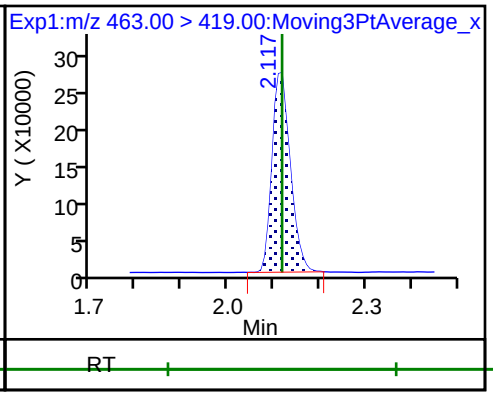
8 Perfluorooctane sulfonic acid (M)



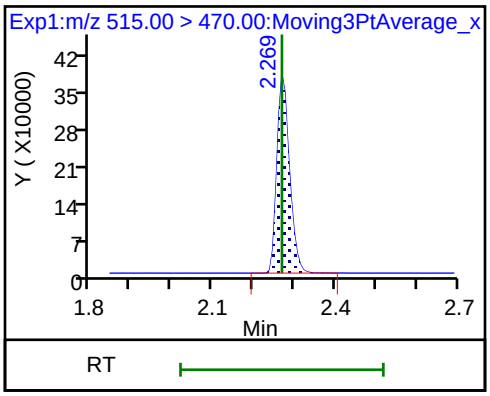
8 Perfluorooctane sulfonic acid



9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.269
Y (X10000)
42
35
28
21
14
7
0
1.8
2.1
2.4
2.7
Min
RT

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

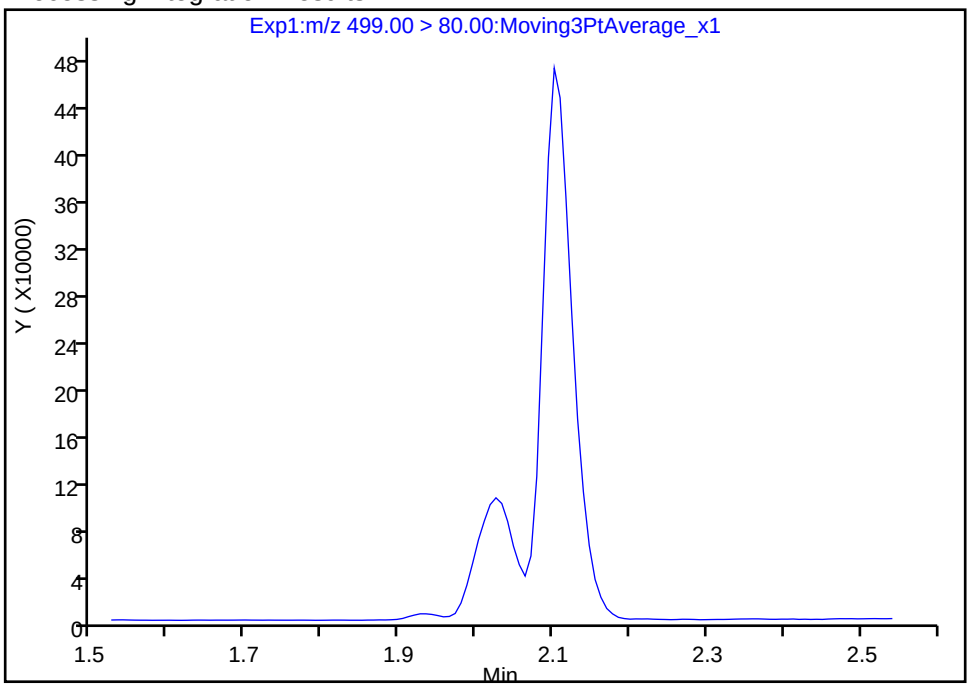
Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_001.d
Injection Date: 30-Apr-2018 01:04:30 Instrument ID: A8_N
Lims ID: CCV L3
Client ID:
Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 1
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Method: 537_A8_N Limit Group: LC 537 ICAL
Column: Detector EXP1

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

Signal: 1

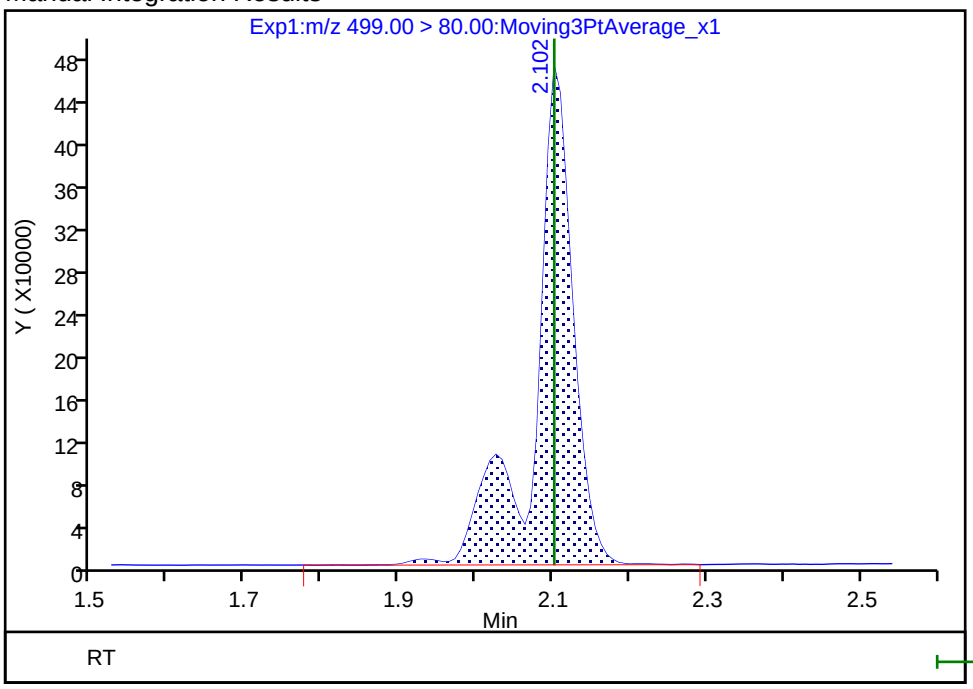
Not Detected
Expected RT: 2.10

Processing Integration Results



Manual Integration Results

RT: 2.10
Area: 1627610
Amount: 19.973269
Amount Units: ng/ml



Reviewer: barnettj, 30-Apr-2018 10:50:28
Audit Action: Assigned Compound ID Audit Reason: Peak assignment corrected

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Lab Sample ID: CCV 320-220561/10 Calibration Date: 04/30/2018 01:46

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

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 04/11/2018 12:09

Lab File ID: 2018.04.29_537B_010.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.052	1.146		147	135	9.0	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	1.075		14.6	14.6	0.2	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.769		48.9	45.4	7.7	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	1.087		30.4	29.7	2.3	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	1.119		62.2	59.3	5.0	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.8260		29.1	29.7	-2.0	30.0
13C2 PFHxA	Ave	1.063	1.127		10.6	10.0	6.0	30.0
13C2 PFDA	Ave	0.8505	0.7863		9.25	10.0	-7.5	30.0

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_010.d
Lims ID: CCV L5
Client ID:
Sample Type: CCVIS
Inject. Date: 30-Apr-2018 01:46:39 ALS Bottle#: 5 Worklist Smp#: 10
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: CCV L5
Misc. Info.: Plate: 1 Rack: 1
Operator ID: SACINSTLCMS01 Instrument ID: A8_N
Sublist: chrom-537_A8_N*sub9

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:53:30 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

First Level Reviewer: roycea Date: 30-Apr-2018 09:03:36

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.388	1.388	0.0	1.000	11355644	147.2		7540	
298.90 > 99.00	1.388	1.388	0.0	1.000	8828191		1.29(0.00-0.00)	8445	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.517	1.517	0.0	1.000	1055303	10.6		8213	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.669	1.669	0.0	1.000	5885269	48.9		1827	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.669	1.669	0.0	1.000	1467490	14.6		187	
* 6 13C2-PFOA									
415.00 > 370.00	1.851	1.851	0.0		935993	10.0		5097	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.859	1.859	0.0	1.000	3022460	30.4		573	
413.00 > 169.00	1.859	1.859	0.0	1.000	1596558		1.89(0.00-0.00)	1346	
* 7 13C4 PFOS									
503.00 > 80.00	2.094	2.094	0.0		2103256	28.7		1105	
8 Perfluorooctane sulfonic acid									a
499.00 > 80.00	2.102	2.102	0.0	1.000	4865644	62.2		1181	a
499.00 > 99.00	2.102	2.102	0.0	1.000	1046723		4.65(0.00-0.00)	1784	
9 Perfluorononanoic acid									
463.00 > 419.00	2.109	2.109	0.0	1.000	2296061	29.1		603	
$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.269	0.0	1.000	735997	9.25		6646	

QC Flag Legend

Review Flags

a - User Assigned ID

Reagents:

LC537-L5_00026 Amount Added: 1.00 Units: mL

Report Date: 30-Apr-2018 10:53:30 Chrom Revision: 2.2 26-Apr-2018 11:26:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_010.d

Injection Date: 30-Apr-2018 01:46:39 Instrument ID: A8_N

Lims ID: CCV L5

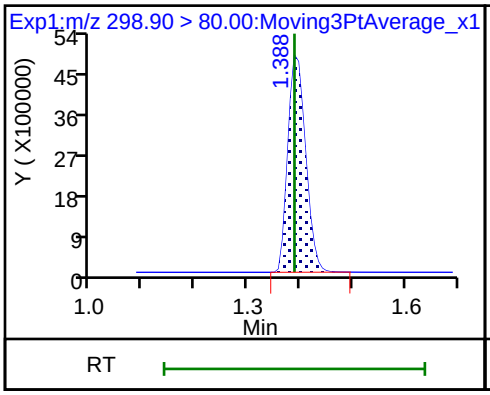
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 5 Worklist Smp#: 10

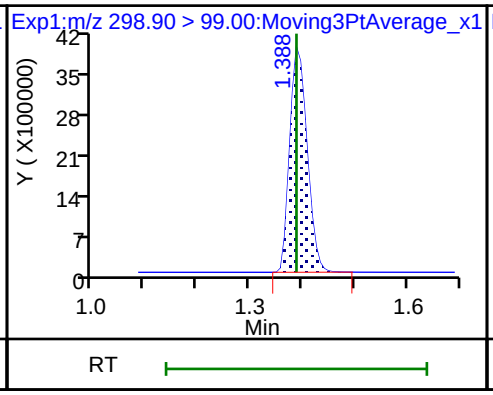
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

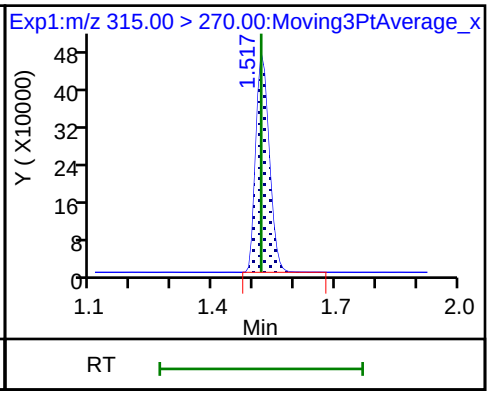
1 Perfluorobutanesulfonic acid



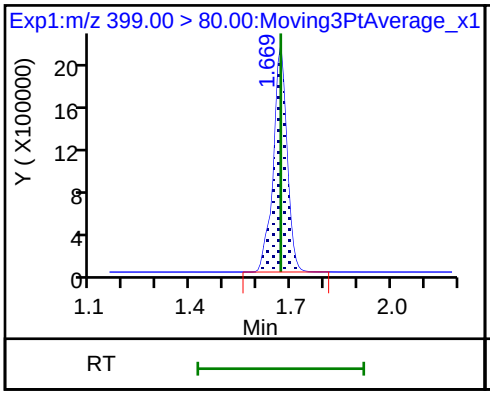
1 Perfluorobutanesulfonic acid



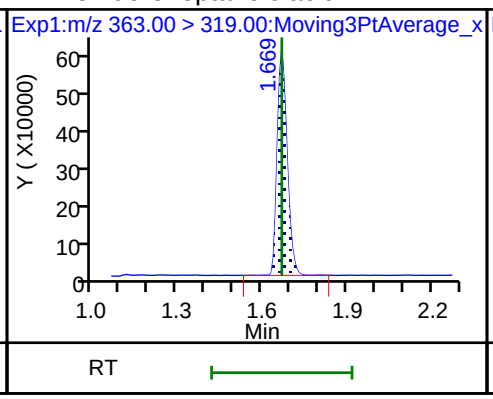
$ 2 13C2 PFHxA



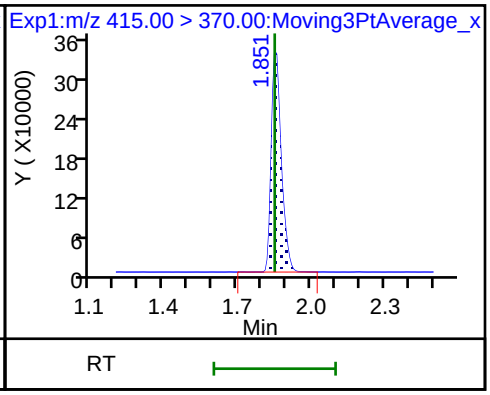
3 Perfluorohexanesulfonic acid



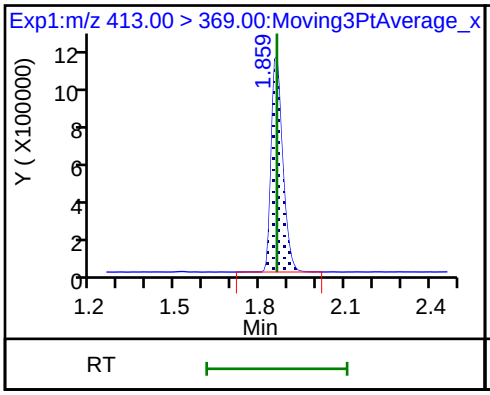
4 Perfluoroheptanoic acid



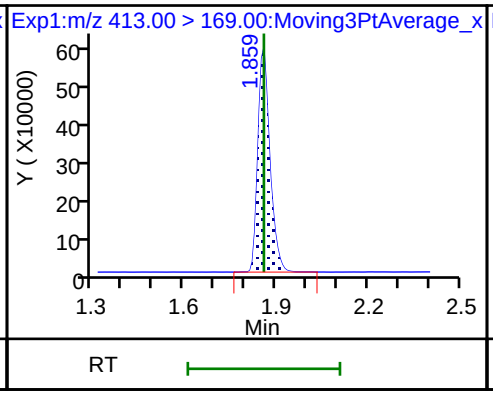
* 6 13C2-PFOA



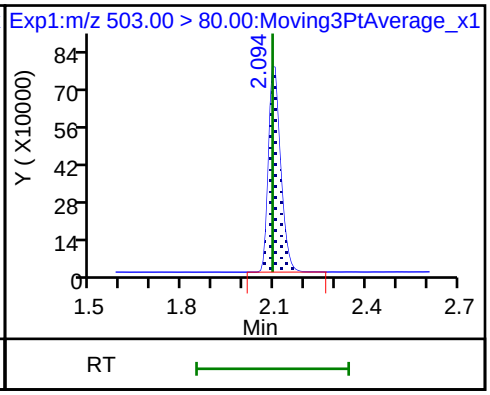
5 Perfluorooctanoic acid



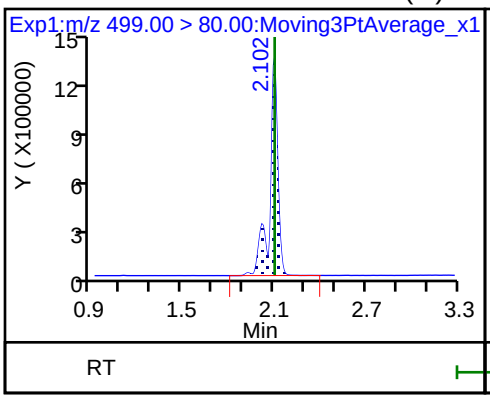
5 Perfluorooctanoic acid



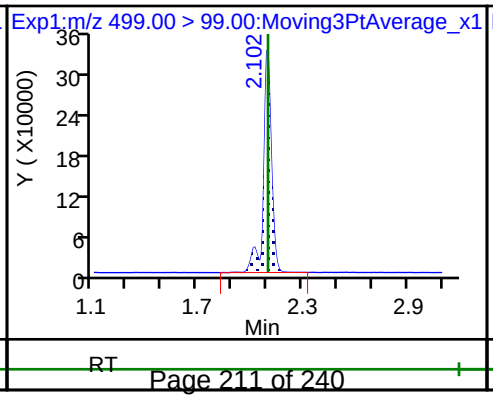
* 7 13C4 PFOS



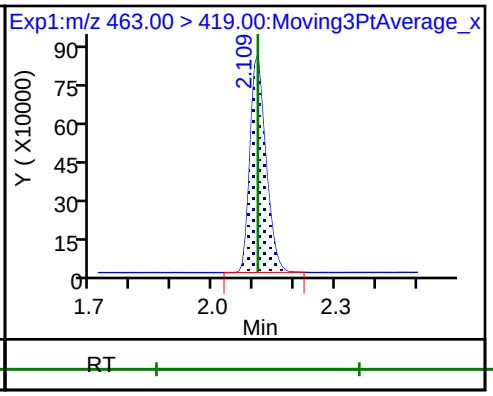
8 Perfluorooctane sulfonic acid (M)



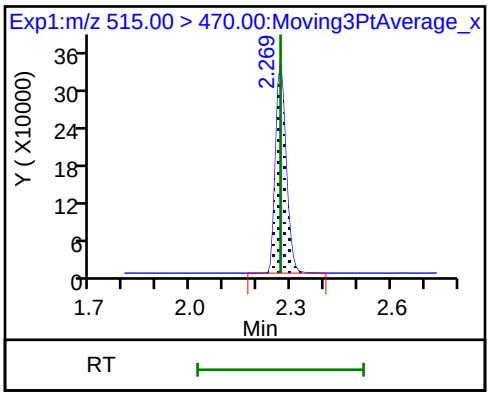
8 Perfluorooctane sulfonic acid



9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.269
Y (X10000)
36
30
24
18
12
6
0
1.7
2.0
2.3
2.6
Min
RT

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

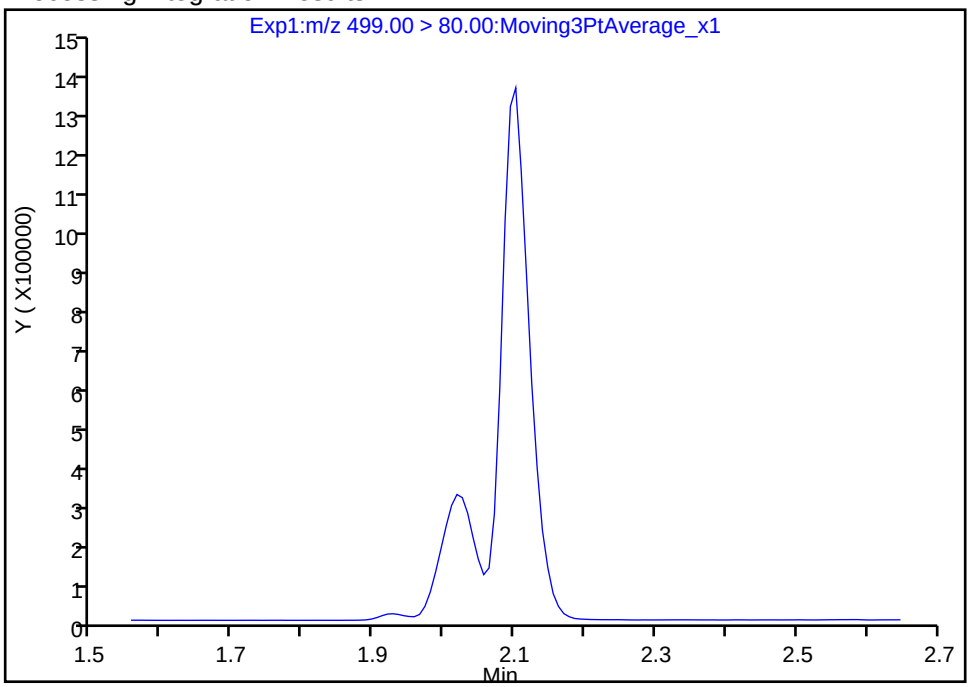
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_010.d				
Injection Date:	30-Apr-2018 01:46:39	Instrument ID:	A8_N		
Lims ID:	CCV L5				
Client ID:					
Operator ID:	SACINSTLCMS01	ALS Bottle#:	5	Worklist Smp#:	10
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	537_A8_N	Limit Group:	LC 537 ICAL		
Column:		Detector	EXP1		

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

Signal: 1

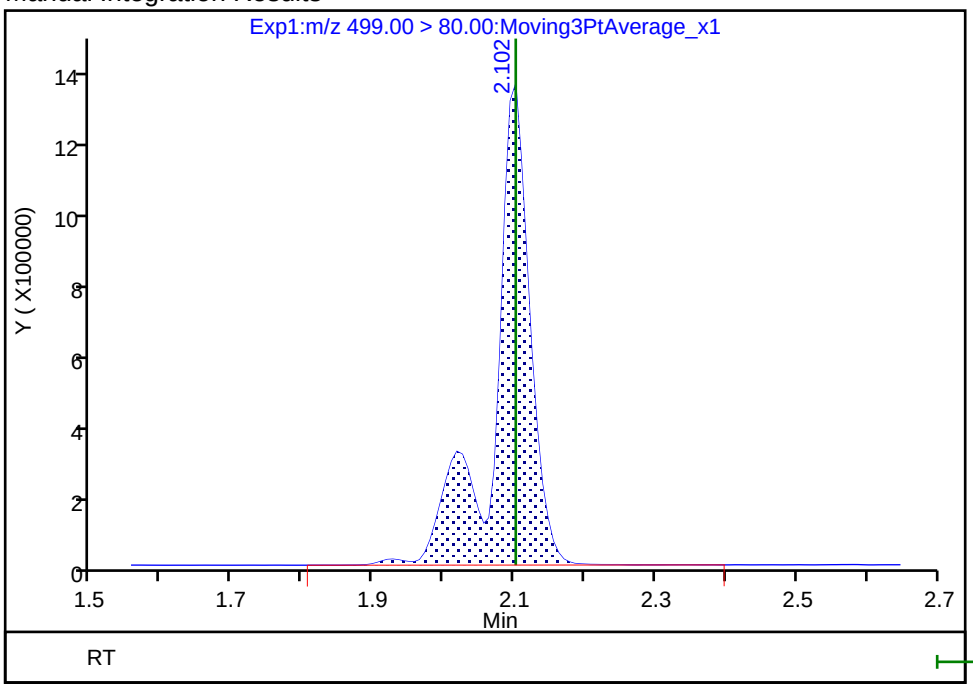
Not Detected
Expected RT: 2.10

Processing Integration Results



Manual Integration Results

RT: 2.10
Area: 4865644
Amount: 62.235824
Amount Units: ng/ml



Reviewer: roycea, 30-Apr-2018 09:03:28
Audit Action: Assigned Compound ID Audit Reason: Peak assignment corrected

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: | Lab Sample ID: MB 320-219207/1-A

Matrix: Water | Lab File ID: 2018.04.29_537B_003.d

Analysis Method: 537 | Date Collected:

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 250(mL) | Date Analyzed: 04/30/2018 01:13

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.: 220561 | 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	96		70-130
STL00996	13C2 PFDA	88		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_003.d
Lims ID: MB 320-219207/1-A
Client ID:
Sample Type: MB
Inject. Date: 30-Apr-2018 01:13:50 ALS Bottle#: 1 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-219207/1-a
Misc. Info.: Plate: 1 Rack: 6
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:53:22 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
$ 2 13C2 PFHxA									
315.00 > 270.00	1.525	1.525	0.0	1.000	1024570	9.61		8173	
* 6 13C2-PFOA									
415.00 > 370.00	1.866	1.859	0.007		1002403	10.0		6075	
* 7 13C4 PFOS									
503.00 > 80.00	2.109	2.102	0.007		2434296	28.7		1307	
$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.269	0.0	1.000	751266	8.81		7275	

Report Date: 30-Apr-2018 10:53:24 Chrom Revision: 2.2 26-Apr-2018 11:26:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_003.d

Injection Date: 30-Apr-2018 01:13:50 Instrument ID: A8_N

Lims ID: MB 320-219207/1-A

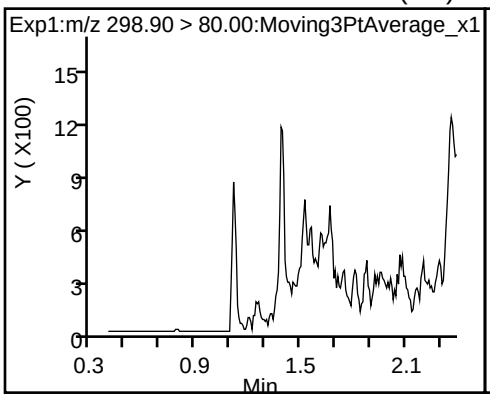
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 1 Worklist Smp#: 3

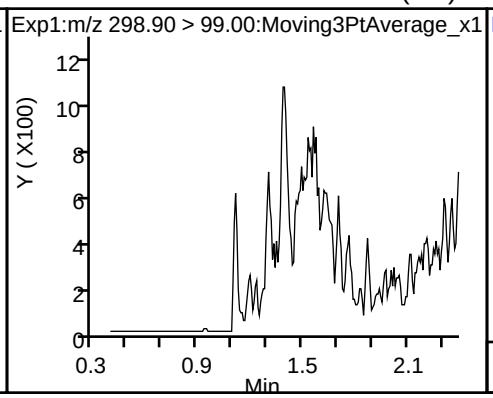
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

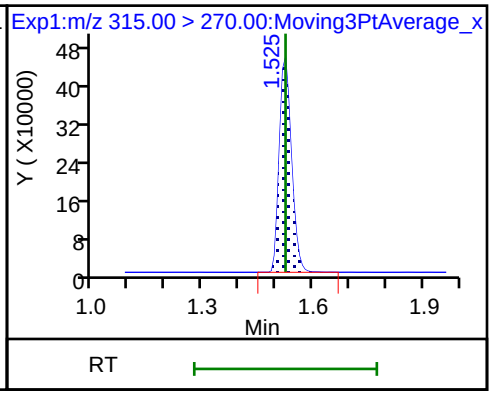
1 Perfluorobutanesulfonic acid (ND)



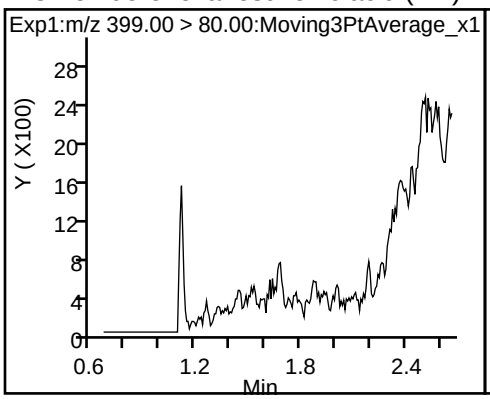
1 Perfluorobutanesulfonic acid (ND)



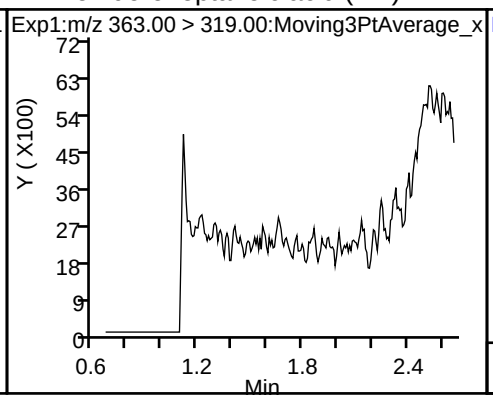
$ 2 13C2 PFHxA



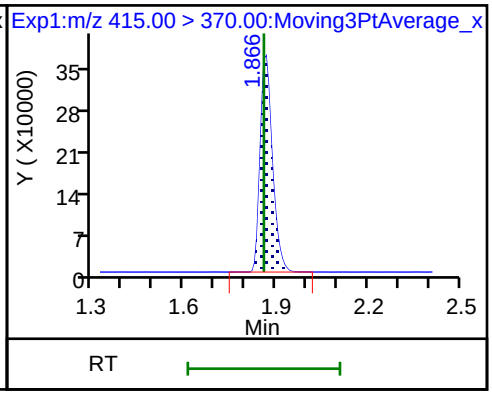
3 Perfluorohexanesulfonic acid (ND)



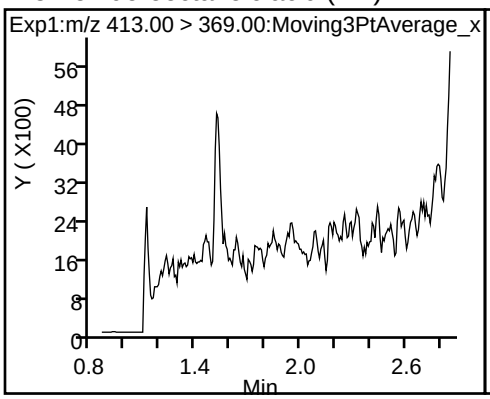
4 Perfluoroheptanoic acid (ND)



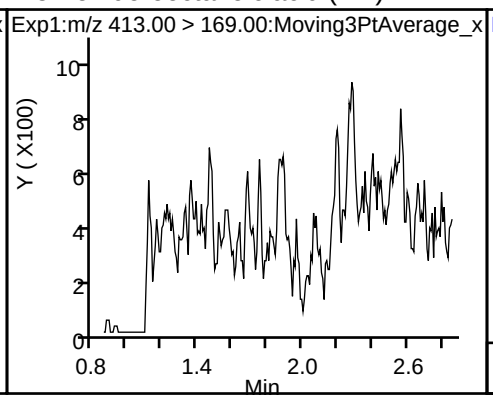
* 6 13C2-PFOA



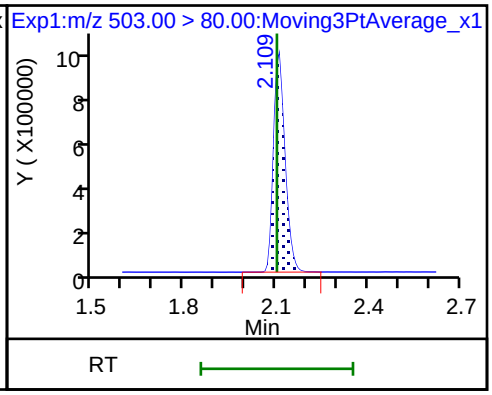
5 Perfluorooctanoic acid (ND)



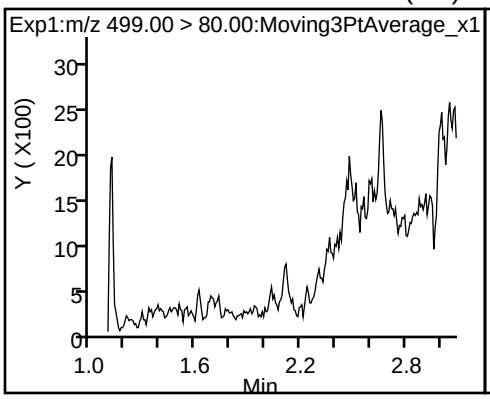
5 Perfluorooctanoic acid (ND)



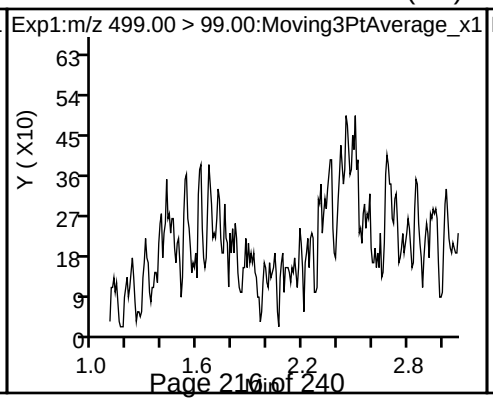
* 7 13C4 PFOS



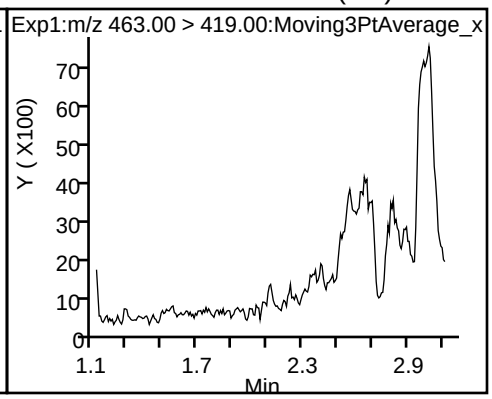
8 Perfluorooctane sulfonic acid (ND)



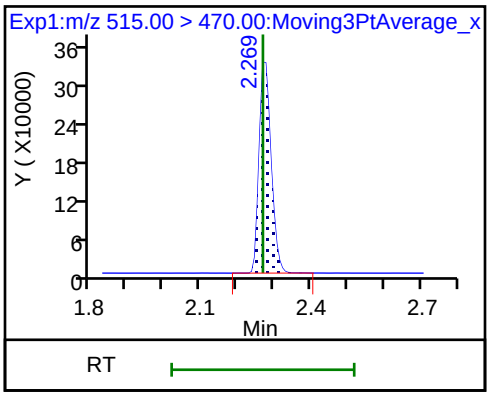
8 Perfluorooctane sulfonic acid (ND)



9 Perfluorononanoic acid (ND)



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.269
Y (X10000)
36
30
24
18
12
6
0
1.8
2.1
2.4
2.7
Min
RT

TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_003.d
Lims ID: MB 320-219207/1-A
Client ID:
Sample Type: MB
Inject. Date: 30-Apr-2018 01:13:50 ALS Bottle#: 1 Worklist Smp#: 3
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: mb 320-219207/1-a
Misc. Info.: Plate: 1 Rack: 6
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:53:22 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

Compound	Amount Added	Amount Recovered	% Rec.
$ 2 13C2 PFHxA	10.0	9.61	96.14
$ 10 13C2 PFDA	10.0	8.81	88.12

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCS 320-219207/2-A

Matrix: Water | Lab File ID: 2018.04.29_537B_004.d

Analysis Method: 537 | Date Collected:

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 250(mL) | Date Analyzed: 04/30/2018 01:18

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 220561 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	121	M	40	16	6.8
335-67-1	Perfluorooctanoic acid (PFOA)	61.9		20	8.0	2.8
375-95-1	Perfluorononanoic acid (PFNA)	57.7		24	20	8.0
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	98.6		30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	29.6		10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	280		90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	91		70-130
STL00996	13C2 PFDA	85		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_004.d
Lims ID: LCS 320-219207/2-A
Client ID:
Sample Type: LCS
Inject. Date: 30-Apr-2018 01:18:32 ALS Bottle#: 2 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-219207
Misc. Info.: Plate: 1 Rack: 6
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:53:22 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

First Level Reviewer: roycea Date: 30-Apr-2018 09:02:05

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.396	1.396	0.0	1.000	6061702	70.1		4358	
298.90 > 99.00	1.396	1.396	0.0	1.000	4543125		1.33(0.00-0.00)	4141	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.525	1.525	0.0	1.000	981194	9.10		8094	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.677	1.669	0.008	1.000	3329907	24.7		1045	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.677	1.669	0.008	1.000	805522	7.40		103	
* 6 13C2-PFOA									
415.00 > 370.00	1.866	1.859	0.007		1013642	10.0		6436	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.866	1.859	0.007	1.000	1666805	15.5		310	
413.00 > 169.00	1.866	1.859	0.007	1.000	913493		1.82(0.00-0.00)	785	
* 7 13C4 PFOS									
503.00 > 80.00	2.102	2.102	0.0		2358409	28.7		1217	
8 Perfluorooctane sulfonic acid									a
499.00 > 80.00	2.109	2.102	0.007	1.000	2645101	30.2		677	a
499.00 > 99.00	2.109	2.102	0.007	1.000	567294		4.66(0.00-0.00)	879	
9 Perfluorononanoic acid									
463.00 > 419.00	2.117	2.117	0.0	1.000	1232189	14.4		280	
$ 10 13C2 PFDA									
515.00 > 470.00	2.269	2.269	0.0	1.000	736090	8.54		7608	

QC Flag Legend

Review Flags

a - User Assigned ID

Report Date: 30-Apr-2018 10:53:24 Chrom Revision: 2.2 26-Apr-2018 11:26:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_004.d

Injection Date: 30-Apr-2018 01:18:32 Instrument ID: A8_N

Lims ID: LCS 320-219207/2-A

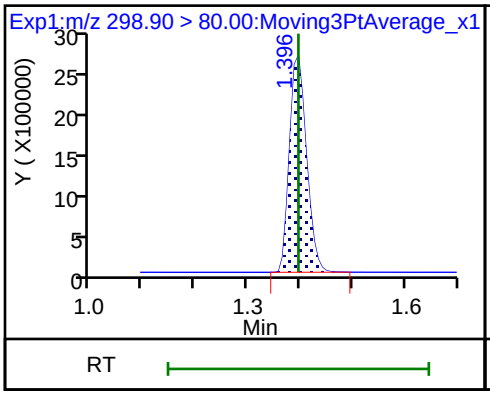
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 2 Worklist Smp#: 4

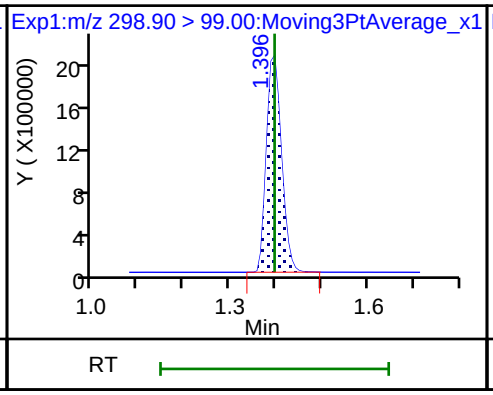
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

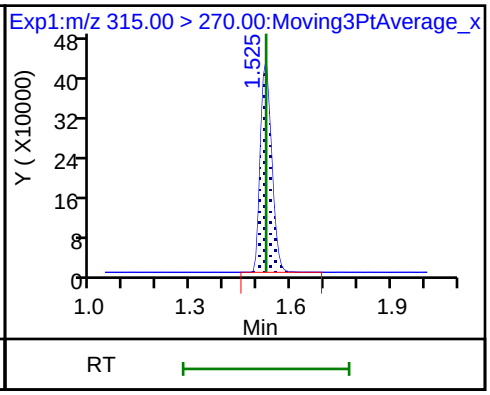
1 Perfluorobutanesulfonic acid



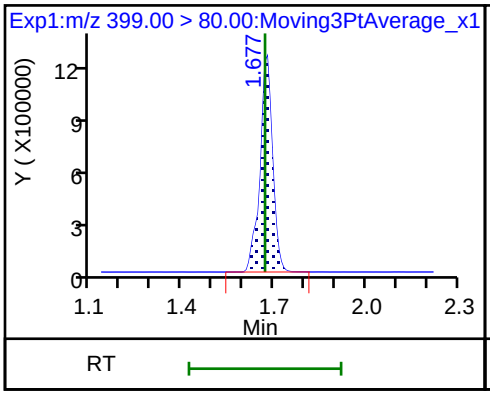
1 Perfluorobutanesulfonic acid



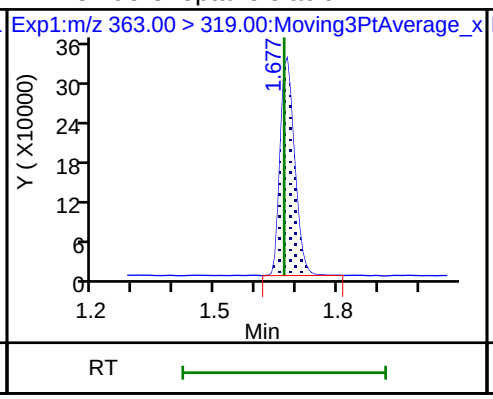
$ 2 13C2 PFHxA



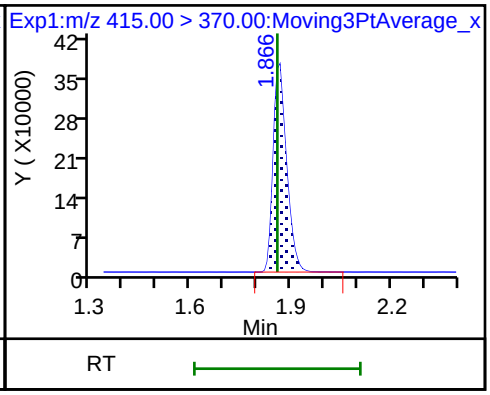
3 Perfluorohexanesulfonic acid



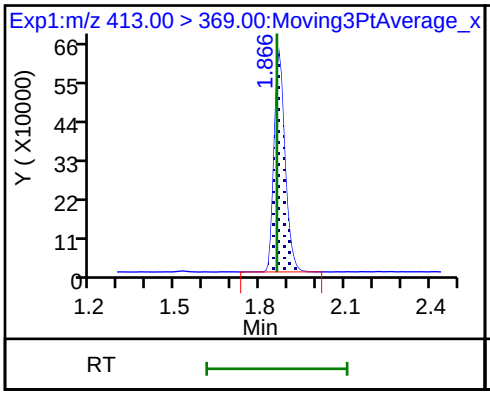
4 Perfluoroheptanoic acid



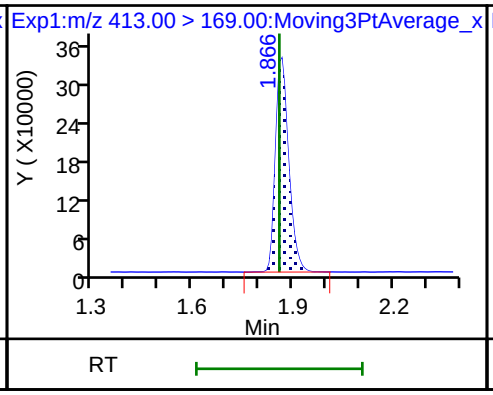
* 6 13C2-PFOA



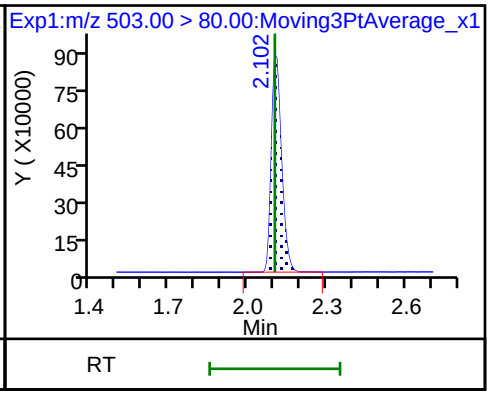
5 Perfluorooctanoic acid



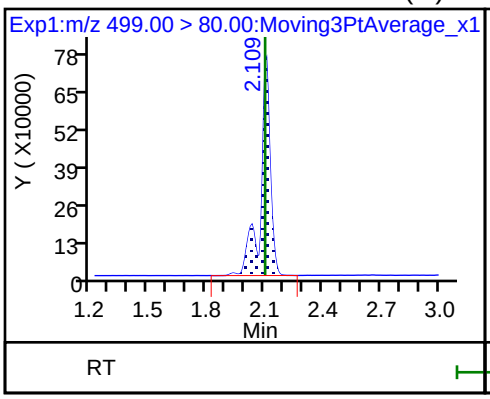
5 Perfluorooctanoic acid



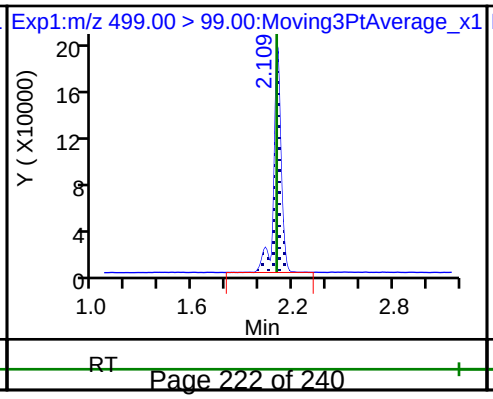
* 7 13C4 PFOS



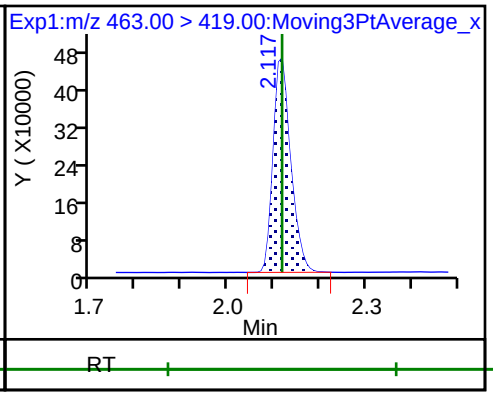
8 Perfluorooctane sulfonic acid (M)



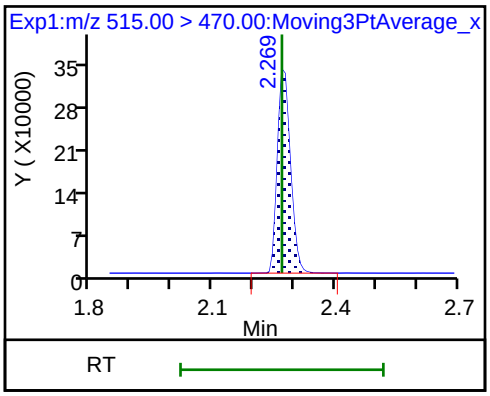
8 Perfluorooctane sulfonic acid



9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.269
Y (X10000)
35
28
21
14
7
0
1.8
2.1
2.4
2.7
Min
RT

TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_004.d
Lims ID: LCS 320-219207/2-A
Client ID:
Sample Type: LCS
Inject. Date: 30-Apr-2018 01:18:32 ALS Bottle#: 2 Worklist Smp#: 4
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcs 320-219207
Misc. Info.: Plate: 1 Rack: 6
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:53:22 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

First Level Reviewer: roycea Date: 30-Apr-2018 09:02:05

Compound	Amount Added	Amount Recovered	% Rec.
$ 2 13C2 PFHxA	10.0	9.10	91.05
$ 10 13C2 PFDA	10.0	8.54	85.39

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

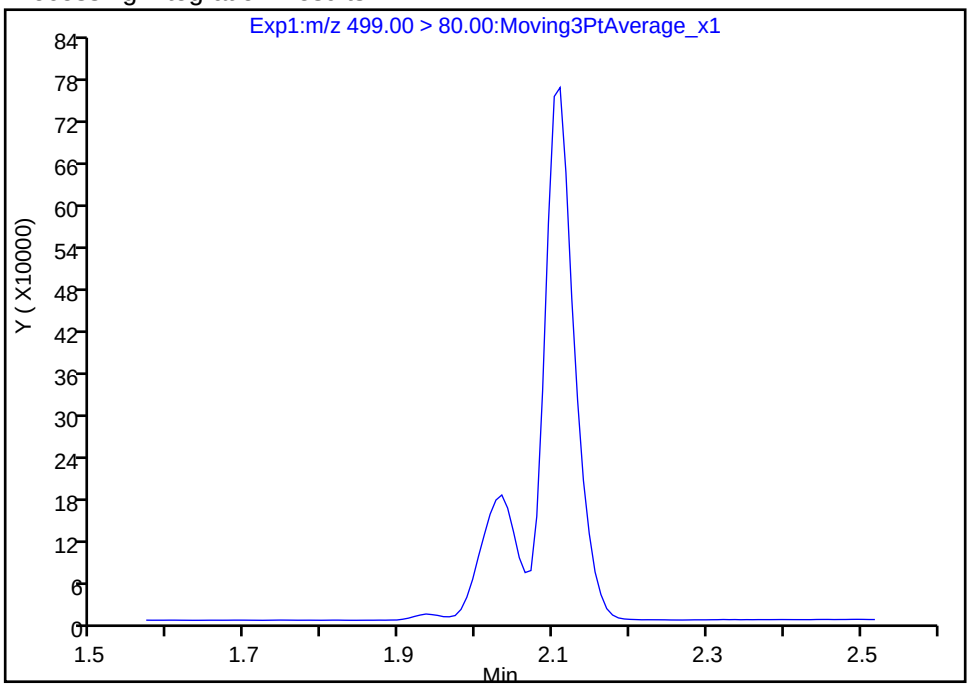
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_004.d				
Injection Date:	30-Apr-2018 01:18:32	Instrument ID:	A8_N		
Lims ID:	LCS 320-219207/2-A				
Client ID:					
Operator ID:	SACINSTLCMS01	ALS Bottle#:	2	Worklist Smp#:	4
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	537_A8_N	Limit Group:	LC 537 ICAL		
Column:		Detector	EXP1		

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

Signal: 1

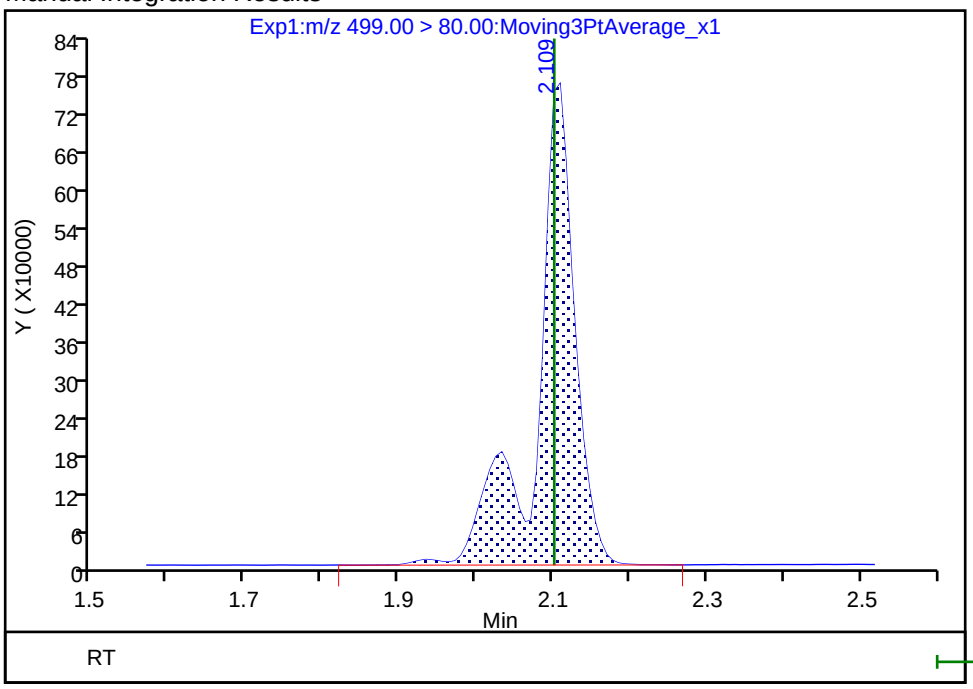
Not Detected
Expected RT: 2.10

Processing Integration Results



Manual Integration Results

RT: 2.11
Area: 2645101
Amount: 30.172784
Amount Units: ng/ml



Reviewer: roycea, 30-Apr-2018 09:01:49
Audit Action: Assigned Compound ID Audit Reason: Peak assignment corrected

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: | Lab Sample ID: LCSD 320-219207/3-A

Matrix: Water | Lab File ID: 2018.04.29_537B_005.d

Analysis Method: 537 | Date Collected:

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 250(mL) | Date Analyzed: 04/30/2018 01:23

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.: 220561 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	121	M	40	16	6.8
335-67-1	Perfluorooctanoic acid (PFOA)	61.7		20	8.0	2.8
375-95-1	Perfluorononanoic acid (PFNA)	57.7		24	20	8.0
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	101		30	12	5.5
375-85-9	Perfluoroheptanoic acid (PFHpA)	29.9		10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	286		90	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	94		70-130
STL00996	13C2 PFDA	88		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_005.d
Lims ID: LCSD 320-219207/3-A
Client ID:
Sample Type: LCSD
Inject. Date: 30-Apr-2018 01:23:13 ALS Bottle#: 3 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcsd 320-219207/3-a
Misc. Info.: Plate: 1 Rack: 6
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:53:22 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

First Level Reviewer: roycea Date: 30-Apr-2018 09:02:45

Signal	RT	EXP RT	DLT RT	REL RT	Response	Amount ng/ml	Ratio(Limits)	S/N	Flags
1 Perfluorobutanesulfonic acid									
298.90 > 80.00	1.396	1.396	0.0	1.000	5666478	71.6		4055	
298.90 > 99.00	1.396	1.396	0.0	1.000	4266169		1.33(0.00-0.00)	3722	
$ 2 13C2 PFHxA									
315.00 > 270.00	1.525	1.525	0.0	1.000	905147	9.40		6962	
3 Perfluorohexanesulfonic acid									
399.00 > 80.00	1.677	1.669	0.008	1.000	3122935	25.3		1007	
4 Perfluoroheptanoic acid									
363.00 > 319.00	1.677	1.669	0.008	1.000	727058	7.48		98.2	
* 6 13C2-PFOA									
415.00 > 370.00	1.866	1.859	0.007		905314	10.0		5325	
5 Perfluorooctanoic acid									
413.00 > 369.00	1.866	1.859	0.007	1.000	1483076	15.4		249	
413.00 > 169.00	1.866	1.859	0.007	1.000	817028		1.82(0.00-0.00)	674	
* 7 13C4 PFOS									
503.00 > 80.00	2.109	2.102	0.007		2157796	28.7		1138	
8 Perfluorooctane sulfonic acid									a
499.00 > 80.00	2.109	2.102	0.007	1.000	2429305	30.3		633	a
499.00 > 99.00	2.109	2.102	0.007	1.000	538425		4.51(0.00-0.00)	978	
9 Perfluorononanoic acid									
463.00 > 419.00	2.117	2.117	0.0	1.000	1100694	14.4		243	
$ 10 13C2 PFDA									
515.00 > 470.00	2.276	2.269	0.008	1.000	677664	8.80		6634	

QC Flag Legend

Review Flags

a - User Assigned ID

Report Date: 30-Apr-2018 10:53:25 Chrom Revision: 2.2 26-Apr-2018 11:26:08

TestAmerica Sacramento

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_005.d

Injection Date: 30-Apr-2018 01:23:13 Instrument ID: A8_N

Lims ID: LCSD 320-219207/3-A

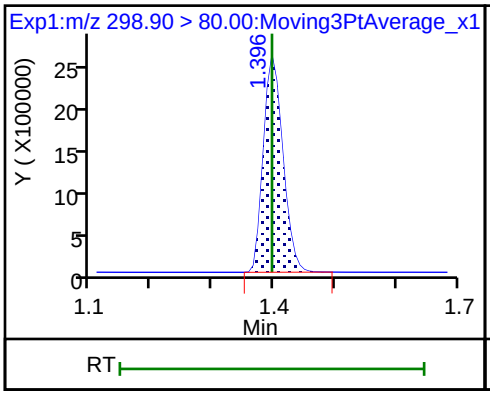
Client ID:

Operator ID: SACINSTLCMS01 ALS Bottle#: 3 Worklist Smp#: 5

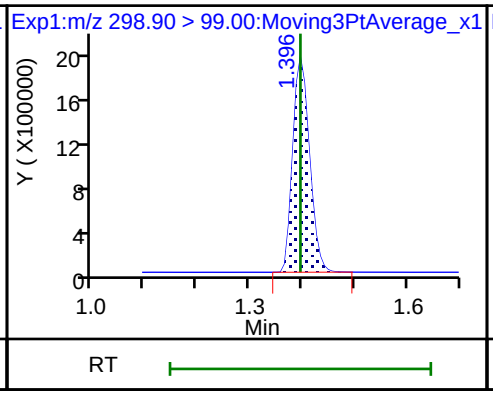
Injection Vol: 2.0 ul Dil. Factor: 1.0000

Method: 537_A8_N Limit Group: LC 537 ICAL

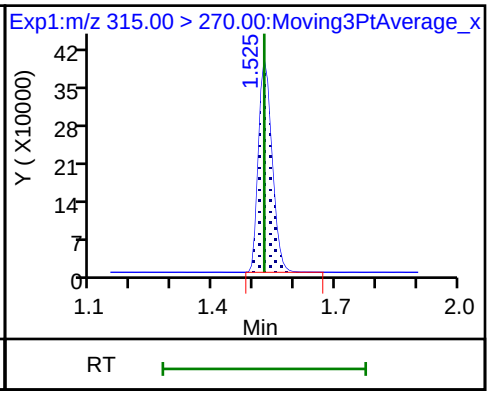
1 Perfluorobutanesulfonic acid



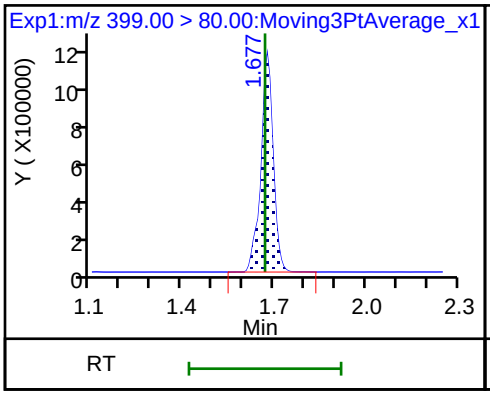
1 Perfluorobutanesulfonic acid



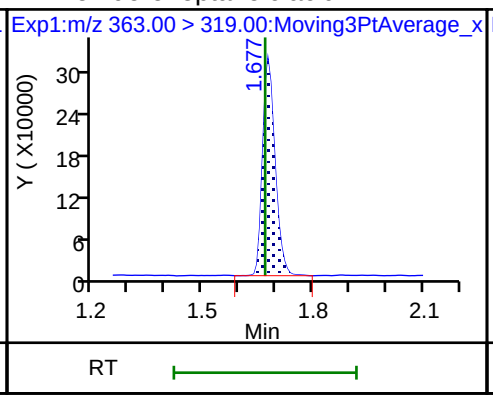
$ 2 13C2 PFHxA



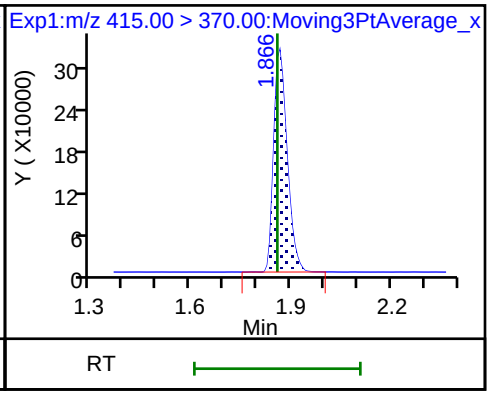
3 Perfluorohexanesulfonic acid



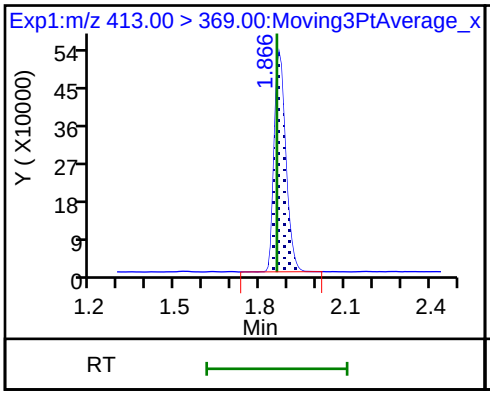
4 Perfluoroheptanoic acid



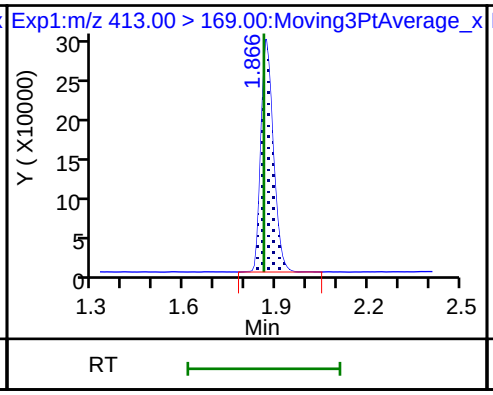
* 6 13C2-PFOA



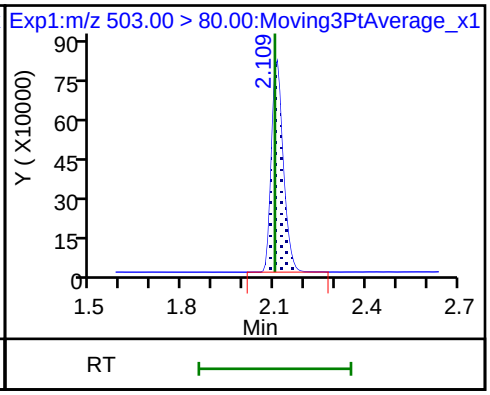
5 Perfluorooctanoic acid



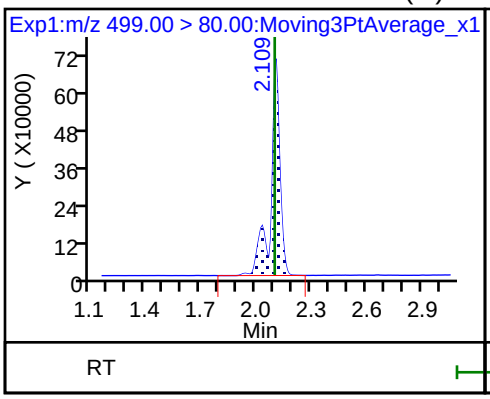
5 Perfluorooctanoic acid



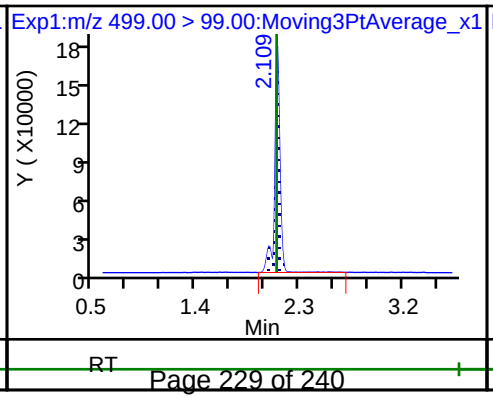
* 7 13C4 PFOS



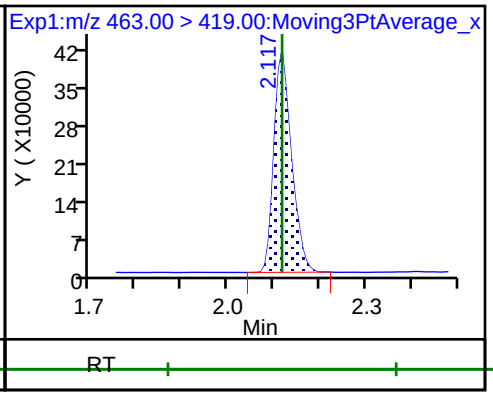
8 Perfluorooctane sulfonic acid (M)



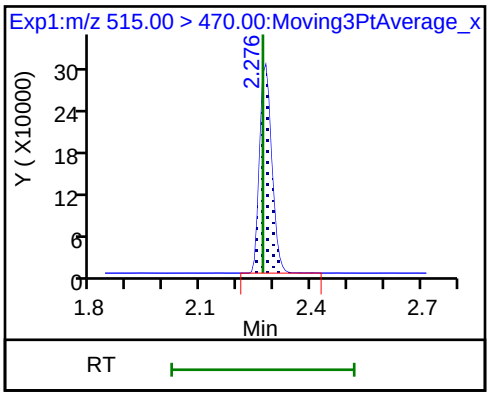
8 Perfluorooctane sulfonic acid



9 Perfluorononanoic acid



$ 10 13C2 PFDA


Exp1:m/z 515.00 > 470.00:Moving3PtAverage_x
2.276
Y (X10000)
30
24
18
12
6
0
1.8
2.1
2.4
2.7
Min
RT

TestAmerica Sacramento
Recovery Report

Data File: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_005.d
Lims ID: LCSD 320-219207/3-A
Client ID:
Sample Type: LCSD
Inject. Date: 30-Apr-2018 01:23:13 ALS Bottle#: 3 Worklist Smp#: 5
Injection Vol: 2.0 ul Dil. Factor: 1.0000
Sample Info: lcsd 320-219207/3-a
Misc. Info.: Plate: 1 Rack: 6
Operator ID: SACINSTLCMS01 Instrument ID: A8_N

Method: \\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\537_A8_N.m
Limit Group: LC 537 ICAL
Last Update: 30-Apr-2018 10:53:22 Calib Date: 11-Apr-2018 12:09:09
Integrator: Picker
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\ChromNA\Sacramento\ChromData\A8_N\20180411-56557.b\2018.04.11_537ICALB_009.d

Column 1 : Det: EXP1
Process Host: XAWRK006

First Level Reviewer: roycea Date: 30-Apr-2018 09:02:45

Compound	Amount Added	Amount Recovered	% Rec.
$ 2 13C2 PFHxA	10.0	9.40	94.04
$ 10 13C2 PFDA	10.0	8.80	88.01

Manual Integration/User Assign Peak Report

TestAmerica Sacramento

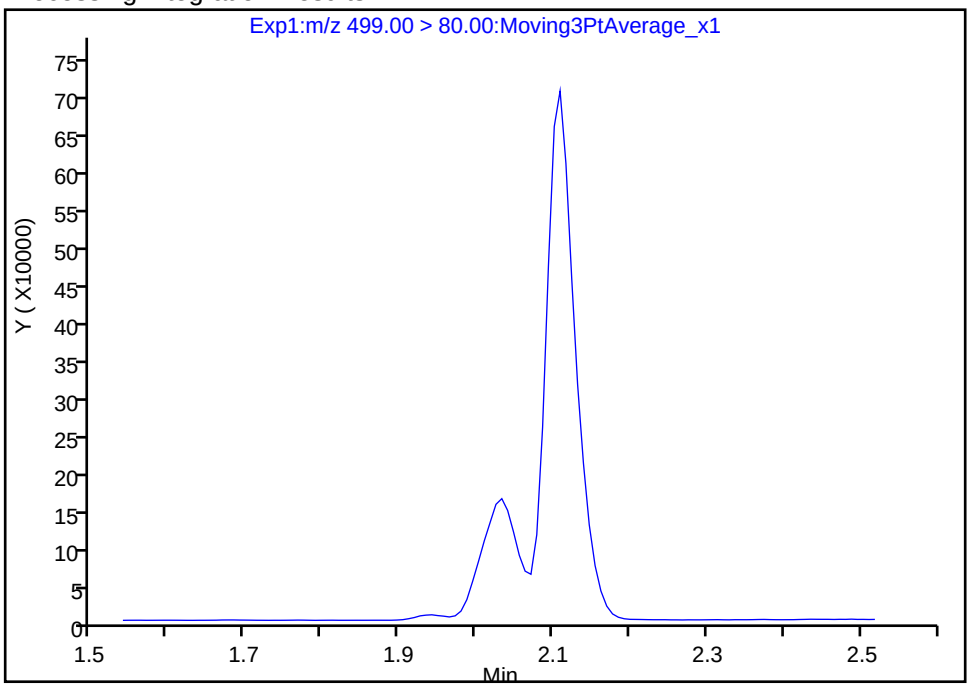
Data File:	\\ChromNa\Sacramento\ChromData\A8_N\20180430-57419.b\2018.04.29_537B_005.d				
Injection Date:	30-Apr-2018 01:23:13	Instrument ID:	A8_N		
Lims ID:	LCSD 320-219207/3-A				
Client ID:					
Operator ID:	SACINSTLCMS01	ALS Bottle#:	3	Worklist Smp#:	5
Injection Vol:	2.0 ul	Dil. Factor:	1.0000		
Method:	537_A8_N	Limit Group:	LC 537 ICAL		
Column:		Detector	EXP1		

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

Signal: 1

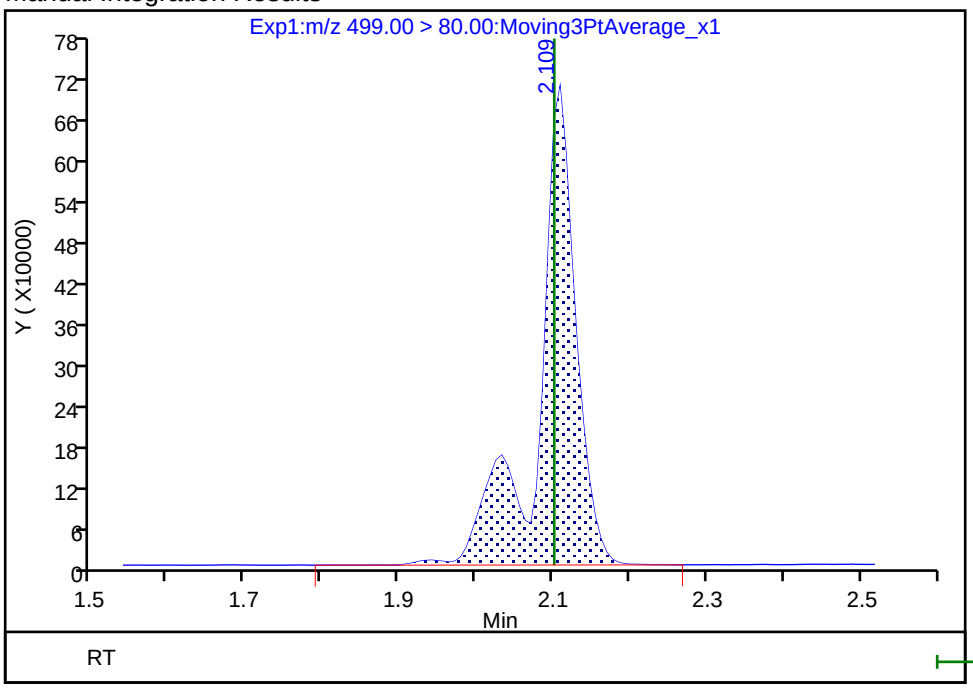
Not Detected
Expected RT: 2.10

Processing Integration Results



Manual Integration Results

RT: 2.11
Area: 2429305
Amount: 30.287534
Amount Units: ng/ml



Reviewer: roycea, 30-Apr-2018 09:02:32
Audit Action: Assigned Compound ID Audit Reason: Peak assignment corrected

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

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

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

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

537

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Instrument ID: A8_N Start Date: 04/29/2018 22:39

Analysis Batch Number: 220554 End Date: 04/29/2018 22:39

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-220554/1		04/29/2018 22:39	1	2018.04.29_537A_004.d	GeminiC18 3x100 3(mm)

537

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Instrument ID: A8_N Start Date: 04/30/2018 01:04

Analysis Batch Number: 220561 End Date: 04/30/2018 01:46

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-220561/1 CCVIS		04/30/2018 01:04	1	2018.04.29_537B 001.d	GeminiC18 3x100 3(mm)
MB 320-219207/1-A		04/30/2018 01:13	1	2018.04.29_537B 003.d	GeminiC18 3x100 3(mm)
LCS 320-219207/2-A		04/30/2018 01:18	1	2018.04.29_537B 004.d	GeminiC18 3x100 3(mm)
LCSD 320-219207/3-A		04/30/2018 01:23	1	2018.04.29_537B 005.d	GeminiC18 3x100 3(mm)
320-38340-1		04/30/2018 01:27	1	2018.04.29_537B 006.d	GeminiC18 3x100 3(mm)
320-38340-2		04/30/2018 01:32	1	2018.04.29_537B 007.d	GeminiC18 3x100 3(mm)
320-38340-3		04/30/2018 01:37	1	2018.04.29_537B 008.d	GeminiC18 3x100 3(mm)
320-38340-4		04/30/2018 01:41	1	2018.04.29_537B 009.d	GeminiC18 3x100 3(mm)
CCV 320-220561/10 CCVIS		04/30/2018 01:46	1	2018.04.29_537B 010.d	GeminiC18 3x100 3(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Batch Number: 219207 Batch Start Date: 04/23/18 07:33 Batch Analyst: Kouchari, Shamiran

Batch Method: 537 Batch End Date: 04/26/18 12:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-IS 00067
MB 320-219207/1		537, 537				250 mL	1.00 mL	7 SU	100 uL
LCS 320-219207/2		537, 537				250 mL	1.00 mL	7 SU	100 uL
LCSD 320-219207/3		537, 537				250 mL	1.00 mL	7 SU	100 uL
320-38340-A-1	NAWC-041818-RW-260	537, 537	T	284.13 g	28.41 g	255.7 mL	1.00 mL	7 SU	100 uL
320-38340-A-2	NAWC-041818-FRB-260	537, 537	T	280.64 g	27.99 g	252.7 mL	1.00 mL	7 SU	100 uL
320-38340-A-3	NAWC-041818-RW-228	537, 537	T	272.64 g	29.17 g	243.5 mL	1.00 mL	7 SU	100 uL
320-38340-A-4	NAWC-041818-FRB-228	537, 537	T	275.49 g	27.97 g	247.5 mL	1.00 mL	7 SU	100 uL

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-MSP 00033	LC537-SU 00066	AnalysisComment			
MB 320-219207/1		537, 537			100 uL	Chlorine, ND			
LCS 320-219207/2		537, 537		100 uL	100 uL	Chlorine, ND			
LCSD 320-219207/3		537, 537		100 uL	100 uL	Chlorine, ND			
320-38340-A-1	NAWC-041818-RW-260	537, 537	T		100 uL	Chlorine, ND			
320-38340-A-2	NAWC-041818-FRB-260	537, 537	T		100 uL	Chlorine, ND			
320-38340-A-3	NAWC-041818-RW-228	537, 537	T		100 uL	Chlorine, ND			
320-38340-A-4	NAWC-041818-FRB-228	537, 537	T		100 uL	Chlorine, ND			

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

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Batch Number: 219207 Batch Start Date: 04/23/18 07:33 Batch Analyst: Kouchari, Shamiran

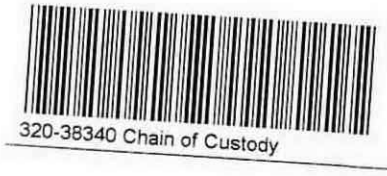
Batch Method: 537 Batch End Date: 04/26/18 12:00

Batch Notes	
Analyst ID - Aliquot Step	VPM
Batch Comment	Client labels match TA label, 04/23/18 SKD
Analyst ID - Concentration	SKD/KMK
Analyst ID - Final Volume Step	TWL
Internal Standard ID#	1208799
Manifold ID	3
Methanol ID	1217927
pH Indicator ID	3817
Pipette ID	R40536G
Analyst ID - IS Reagent Drop	VPM
Analyst ID - IS Reagent Drop Witness	TWL
Analyst ID - SU Reagent Drop	SKD
Analyst ID - SU Reagent Drop Witness	HJA
Analyst ID - TA Reagent Drop	SKD
Analyst ID - TA Reagent Drop Witness	HJA
SPE Cartridge Lot ID	6390138-03
Trizma ID	SLBR5241V
Reagent Water ID	04/21/18

Basis	Basis Description
T	Total/NA

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

Shipping and Receiving Documents



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

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

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

Client Contact	Project Manager: Andy Frebowitz	Site Contact: Mary Kay Bond	Date: 4/18/2018	COC No:
TetraTech	Tel/Fax: 610.382.1170	Lab Contact: Dave Alltucker	Carrier: FedEx	1 of 1 COCs
234 Mall Boulevard Suite 260	Analysis Turnaround Time			Sampler: Mary Kay Bond
King of Prussia, PA 19406	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
610-382-1174	TAT if different from Below 21			Walk-in Client:
610-491-9688	☐ 2 weeks			Lab Sampling:
Project Name: WE04	☐ 1 week			
Site: WE04	☐ 2 days			Job / SDG No.:
P O # 1132358 (through EarthToxics)	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	EPA 537 UCMR3	Sample Specific Notes:
NAWC-041818-RW-260	4/18/2018	12:10	G	DW	2	N	N	Y	
NAWC-041818-FRB-260	4/18/2018	12:05	G	DW	2	N	N	Y	Field Reagent Blank
NAWC-041818-RW-228	4/18/2018	13:10	G	DW	2	N	N	Y	
NAWC-041818-FRB-228	4/18/2018	13:05	G	DW	2	N	N	Y	Field Reagent Blank
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other: Trizma								6	

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the

☑Non-Hazard ☐Flammable ☐Skin Irritant ☐Poison B ☐Unknown

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

☐Return to Client ☑Disposal by Lab ☐Archive for_____ Months

Fed Ex Tracking: **7720 3085 2456**

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: 5.4 Corr'd:_____ | Therm ID No.: AC5

Relinquished by: Mary Kay Bond.	Company: Tetra Tech	Date/Time: 4/18/2018 16:00	Received by: DL	Company: TAL SAC	Date/Time: 840 4/19/18
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

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 320-38340-1

Login Number: 38340
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	094863, 094864
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 <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

"NAWC-041818-RW-260","537","RES","320-38340-1","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","19","ng/L","J M","6.6","DL","","TRG","","","39","LOQ","YES","-99","","255.7","1.00","16",""
"NAWC-041818-RW-260","537","RES","320-38340-1","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","18","ng/L","J","2.7","DL","","TRG","","","20","LOQ","YES","-99","","255.7","1.00","7.8",""
"NAWC-041818-RW-260","537","RES","320-38340-1","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","8.8","ng/L","J","5.4","DL","","TRG","","","29","LOQ","YES","-99","","255.7","1.00","12",""
"NAWC-041818-RW-260","537","RES","320-38340-1","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","16","ng/L","J","16","DL","","TRG","","","88","LOQ","YES","-99","","255.7","1.00","35",""
"NAWC-041818-RW-260","537","RES","320-38340-1","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","5.5","ng/L","J","1.9","DL","","TRG","","","9.8","LOQ","YES","-99","","255.7","1.00","3.9",""
"NAWC-041818-RW-260","537","RES","320-38340-1","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","20","ng/L","U M","7.8","DL","","TRG","","","23","LOQ","YES","-99","","255.7","1.00","20",""
"NAWC-041818-RW-260","537","RES","320-38340-1","TALSAC","STL00993","13C2 PFHxA","38","ng/L","","-99","DL","","SURR","97","","-99","LOQ","YES","39.1","","255.7","1.00","0",""
"NAWC-041818-RW-260","537","RES","320-38340-1","TALSAC","STL00996","13C2 PFDA","33","ng/L","","-99","DL","","SURR","85","","-99","LOQ","YES","39.1","","255.7","1.00","0",""
"NAWC-041818-FRB-260","537","RES","320-38340-2","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","16","ng/L","U","6.7","DL","","TRG","","","40","LOQ","YES","-99","","252.7","1.00","16",""
"NAWC-041818-FRB-260","537","RES","320-38340-2","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","7.9","ng/L","U","2.8","DL","","TRG","","","20","LOQ","YES","-99","","252.7","1.00","7.9",""
"NAWC-041818-FRB-260","537","RES","320-38340-2","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","12","ng/L","U","5.4","DL","","TRG","","","30","LOQ","YES","-99","","252.7","1.00","12",""
"NAWC-041818-FRB-260","537","RES","320-38340-2","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","36","ng/L","U","16","DL","","TRG","","","89","LOQ","YES","-99","","252.7","1.00","36",""
"NAWC-041818-FRB-260","537","RES","320-38340-2","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","4.0","ng/L","U","1.9","DL","","TRG","","","9.9","LOQ","YES","-99","","252.7","1.00","4.0",""
"NAWC-041818-FRB-260","537","RES","320-38340-2","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","20","ng/L","U","7.9","DL","","TRG","","","24","LOQ","YES","-99","","252.7","1.00","20",""
"NAWC-041818-FRB-260","537","RES","320-38340-2","TALSAC","STL00993","13C2 PFHxA","39","ng/L","","-99","DL","","SURR","98","","-99","LOQ","YES","39.6","","252.7","1.00","0",""
"NAWC-041818-FRB-260","537","RES","320-38340-2","TALSAC","STL00996","13C2 PFDA","34","ng/L","","-99","DL","","SURR","85","","-99","LOQ","YES","39.6","","252.7","1.00","0",""
"NAWC-041818-RW-228","537","RES","320-38340-3","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","15","ng/L","J M","7.0","DL","","TRG","","","41","LOQ","YES","-99","","243.5","1.00","16",""
"NAWC-041818-RW-228","537","RES","320-38340-3","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","21","ng/L","","2.9","DL","","TRG","","","21","LOQ","YES","-99","","243.5","1.00","8.2",""
"NAWC-041818-RW-228","537","RES","320-38340-3","TALSAC","355-46-4","Perfluorohexanesulfonic acid (PFHxS)","12","ng/L","U","5.6","DL","","TRG","","","31","LOQ","YES","-99","","243.5","1.00","12",""
"NAWC-041818-RW-228","537","RES","320-38340-3","TALSAC","375-73-5","Perfluorobutanesulfonic acid (PFBS)","38","ng/L","J","17","DL","","TRG","","","92","LOQ","YES","-99","","243.5","1.00","37",""
"NAWC-041818-RW-228","537","RES","320-38340-3","TALSAC","375-85-9","Perfluoroheptanoic acid (PFHpA)","7.9","ng/L","J","2.0","DL","","TRG","","","10","LOQ","YES","-99","","243.5","1.00","4.1",""
"NAWC-041818-RW-228","537","RES","320-38340-3","TALSAC","375-95-1","Perfluorononanoic acid (PFNA)","21","ng/L","U M","8.2","DL","","TRG","","","25","LOQ","YES","-99","","243.5","1.00","21",""
"NAWC-041818-RW-228","537","RES","320-38340-3","TALSAC","STL00993","13C2 PFHxA","39","ng/L","","-99","DL","","SURR","96","","-99","LOQ","YES","41.1","","243.5","1.00","0",""
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"NAWC-041818-FRB-228","537","RES","320-38340-4","TALSAC","1763-23-1","Perfluorooctanesulfonic acid (PFOS)","16","ng/L","U","6.9","DL","","TRG","","","40","LOQ","YES","-99","","247.5","1.00","16",""
"NAWC-041818-FRB-228","537","RES","320-38340-4","TALSAC","335-67-1","Perfluorooctanoic acid (PFOA)","8.1","ng/L","U","2.8","DL","","TRG","","","20","LOQ","YES","-99","","247.5","1.00","8.1",""
"NAWC-041818-FRB-228","537","RES","320-38340-4","TALSAC","355-46-4","Perfluorohexanesulfonic acid

(PFHxS)","12","ng/L","U","5.6","DL","","TRG","","","30","LOQ","YES","-99","","247.5","1.00","12",""
"NAWC-041818-FRB-228","537","RES","320-38340-4","TALSAC","375-73-5","Perfluorobutanesulfonic acid
(PFBS)","36","ng/L","U","16","DL","","TRG","","","91","LOQ","YES","-99","","247.5","1.00","36",""
"NAWC-041818-FRB-228","537","RES","320-38340-4","TALSAC","375-85-9","Perfluoroheptanoic acid
(PFHpA)","4.0","ng/L","U","1.9","DL","","TRG","","","10","LOQ","YES","-99","","247.5","1.00","4.0",""
"NAWC-041818-FRB-228","537","RES","320-38340-4","TALSAC","375-95-1","Perfluorononanoic acid
(PFNA)","20","ng/L","U","8.1","DL","","TRG","","","24","LOQ","YES","-99","","247.5","1.00","20",""
"NAWC-041818-FRB-228","537","RES","320-38340-4","TALSAC","STL00993","13C2
PFHxA","38","ng/L","","-99","DL","","SURR","95","","-99","LOQ","YES","40.4","","247.5","1.00","0",""
"NAWC-041818-FRB-228","537","RES","320-38340-4","TALSAC","STL00996","13C2
PFDA","37","ng/L","","-99","DL","","SURR","91","","-99","LOQ","YES","40.4","","247.5","1.00","0",""
"LCS 320-219207/2-A","537","RES","LCS 320-219207/2-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid
(PFOS)","121","ng/L","M","6.8","DL","","SPK","92","","40","LOQ","YES","132","","250","1.00","16",""
"LCS 320-219207/2-A","537","RES","LCS 320-219207/2-A","TALSAC","335-67-1","Perfluorooctanoic acid
(PFOA)","61.9","ng/L","","2.8","DL","","SPK","94","","20","LOQ","YES","66.0","","250","1.00","8.0",""
"LCS 320-219207/2-A","537","RES","LCS 320-219207/2-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid
(PFHxS)","98.6","ng/L","","5.5","DL","","SPK","99","","30","LOQ","YES","100","","250","1.00","12",""
"LCS 320-219207/2-A","537","RES","LCS 320-219207/2-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid
(PFBS)","280","ng/L","","16","DL","","SPK","93","","90","LOQ","YES","300","","250","1.00","36",""
"LCS 320-219207/2-A","537","RES","LCS 320-219207/2-A","TALSAC","375-85-9","Perfluoroheptanoic acid
(PFHpA)","29.6","ng/L","","1.9","DL","","SPK","93","","10","LOQ","YES","32.0","","250","1.00","4.0",""
"LCS 320-219207/2-A","537","RES","LCS 320-219207/2-A","TALSAC","375-95-1","Perfluorononanoic acid
(PFNA)","57.7","ng/L","","8.0","DL","","SPK","87","","24","LOQ","YES","66.0","","250","1.00","20",""
"LCS 320-219207/2-A","537","RES","LCS 320-219207/2-A","TALSAC","STL00993","13C2
PFHxA","36.4","ng/L","","-99","DL","","SURR","91","","-99","LOQ","YES","40.0","","250","1.00","0",""
"LCS 320-219207/2-A","537","RES","LCS 320-219207/2-A","TALSAC","STL00996","13C2
PFDA","34.2","ng/L","","-99","DL","","SURR","85","","-99","LOQ","YES","40.0","","250","1.00","0",""
"LCSD 320-219207/3-A","537","RES","LCSD 320-219207/3-A","TALSAC","1763-23-1","Perfluorooctanesulfonic
acid (PFOS)","121","ng/L","M","6.8","DL","","SPK","92","0","40","LOQ","YES","132","LCS 320-219207/2-
A","250","1.00","16",""
"LCSD 320-219207/3-A","537","RES","LCSD 320-219207/3-A","TALSAC","335-67-1","Perfluorooctanoic acid
(PFOA)","61.7","ng/L","","2.8","DL","","SPK","93","0","20","LOQ","YES","66.0","LCS 320-219207/2-
A","250","1.00","8.0",""
"LCSD 320-219207/3-A","537","RES","LCSD 320-219207/3-A","TALSAC","355-46-4","Perfluorohexanesulfonic
acid (PFHxS)","101","ng/L","","5.5","DL","","SPK","101","2","30","LOQ","YES","100","LCS 320-219207/2-
A","250","1.00","12",""
"LCSD 320-219207/3-A","537","RES","LCSD 320-219207/3-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid
(PFBS)","286","ng/L","","16","DL","","SPK","95","2","90","LOQ","YES","300","LCS 320-219207/2-
A","250","1.00","36",""
"LCSD 320-219207/3-A","537","RES","LCSD 320-219207/3-A","TALSAC","375-85-9","Perfluoroheptanoic acid
(PFHpA)","29.9","ng/L","","1.9","DL","","SPK","93","1","10","LOQ","YES","32.0","LCS 320-219207/2-
A","250","1.00","4.0",""
"LCSD 320-219207/3-A","537","RES","LCSD 320-219207/3-A","TALSAC","375-95-1","Perfluorononanoic acid
(PFNA)","57.7","ng/L","","8.0","DL","","SPK","87","0","24","LOQ","YES","66.0","LCS 320-219207/2-
A","250","1.00","20",""
"LCSD 320-219207/3-A","537","RES","LCSD 320-219207/3-A","TALSAC","STL00993","13C2
PFHxA","37.6","ng/L","","-99","DL","","SURR","94","","-99","LOQ","YES","40.0","LCS 320-219207/2-
A","250","1.00","0",""
"LCSD 320-219207/3-A","537","RES","LCSD 320-219207/3-A","TALSAC","STL00996","13C2
PFDA","35.2","ng/L","","-99","DL","","SURR","88","","-99","LOQ","YES","40.0","LCS 320-219207/2-
A","250","1.00","0",""
"MB 320-219207/1-A","537","RES","MB 320-219207/1-A","TALSAC","1763-23-1","Perfluorooctanesulfonic acid
(PFOS)","16","ng/L","U","6.8","DL","","TRG","","","40","LOQ","YES","-99","","250","1.00","16",""
"MB 320-219207/1-A","537","RES","MB 320-219207/1-A","TALSAC","335-67-1","Perfluorooctanoic acid

(PFOA)","8.0","ng/L","U","2.8","DL","","TRG","","","20","LOQ","YES","-99","","250","1.00","8.0",""
"MB 320-219207/1-A","537","RES","MB 320-219207/1-A","TALSAC","355-46-4","Perfluorohexanesulfonic acid
(PFHxS)","12","ng/L","U","5.5","DL","","TRG","","","30","LOQ","YES","-99","","250","1.00","12",""
"MB 320-219207/1-A","537","RES","MB 320-219207/1-A","TALSAC","375-73-5","Perfluorobutanesulfonic acid
(PFBS)","36","ng/L","U","16","DL","","TRG","","","90","LOQ","YES","-99","","250","1.00","36",""
"MB 320-219207/1-A","537","RES","MB 320-219207/1-A","TALSAC","375-85-9","Perfluoroheptanoic acid
(PFHpA)","4.0","ng/L","U","1.9","DL","","TRG","","","10","LOQ","YES","-99","","250","1.00","4.0",""
"MB 320-219207/1-A","537","RES","MB 320-219207/1-A","TALSAC","375-95-1","Perfluorononanoic acid
(PFNA)","20","ng/L","U","8.0","DL","","TRG","","","24","LOQ","YES","-99","","250","1.00","20",""
"MB 320-219207/1-A","537","RES","MB 320-219207/1-A","TALSAC","STL00993","13C2
PFHxA","38.5","ng/L","","-99","DL","","SURR","96","","-99","LOQ","YES","40.0","","250","1.00","0",""
"MB 320-219207/1-A","537","RES","MB 320-219207/1-A","TALSAC","STL00996","13C2
PFDA","35.2","ng/L","","-99","DL","","SURR","88","","-99","LOQ","YES","40.0","","250","1.00","0",""
"Unknown","Unknown","NAWC-041818-RW-260","04/18/2018 12:10","AQ","320-38340-
1","NM","","5.9","537","METHOD","RES","04/23/2018 07:33","04/30/2018
01:27","TALSAC","COA","WET","NA","1","NA","NA","","100","320-219207","320-219207","NA","320-
220561","320-38340-1","04/19/2018 08:40","04/20/2018 08:10",""
"Unknown","Unknown","NAWC-041818-FRB-260","04/18/2018 12:05","AQ","320-38340-
2","NM","","5.9","537","METHOD","RES","04/23/2018 07:33","04/30/2018
01:32","TALSAC","COA","WET","NA","1","NA","NA","","100","320-219207","320-219207","NA","320-
220561","320-38340-1","04/19/2018 08:40","04/20/2018 08:10",""
"Unknown","Unknown","NAWC-041818-RW-228","04/18/2018 13:10","AQ","320-38340-
3","NM","","5.9","537","METHOD","RES","04/23/2018 07:33","04/30/2018
01:37","TALSAC","COA","WET","NA","1","NA","NA","","100","320-219207","320-219207","NA","320-
220561","320-38340-1","04/19/2018 08:40","04/20/2018 08:10",""
"Unknown","Unknown","NAWC-041818-FRB-228","04/18/2018 13:05","AQ","320-38340-
4","NM","","5.9","537","METHOD","RES","04/23/2018 07:33","04/30/2018
01:41","TALSAC","COA","WET","NA","1","NA","NA","","100","320-219207","320-219207","NA","320-
220561","320-38340-1","04/19/2018 08:40","04/20/2018 08:10",""
"Unknown","Unknown","LCS 320-219207/2-A","","AQ","LCS 320-219207/2-
A","LCS","","-99","537","METHOD","RES","04/23/2018 07:33","04/30/2018
01:18","TALSAC","COA","WET","NA","1","NA","NA","","100","320-219207","320-219207","NA","320-
220561","320-38340-1","04/23/2018 07:33","04/20/2018 08:10",""
"Unknown","Unknown","LCSD 320-219207/3-A","","AQ","LCSD 320-219207/3-
A","LCSD","","-99","537","METHOD","RES","04/23/2018 07:33","04/30/2018
01:23","TALSAC","COA","WET","NA","1","NA","NA","","100","320-219207","320-219207","NA","320-
220561","320-38340-1","04/23/2018 07:33","04/20/2018 08:10",""
"Unknown","Unknown","MB 320-219207/1-A","","AQ","MB 320-219207/1-
A","MB","","-99","537","METHOD","RES","04/23/2018 07:33","04/30/2018
01:13","TALSAC","COA","WET","NA","1","NA","NA","","100","320-219207","320-219207","NA","320-
220561","320-38340-1","04/23/2018 07:33","04/20/2018 08:10",""

TETRA TECH

INTERNAL CORRESPONDENCE

TO: **A. FREBOWITZ** **DATE:** **MAY 25, 2018**

FROM: **TERRI L. SOLOMON** **COPIES:** **DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION –POLYFLUOROALKYL SUBSTANCES (PFAS)**
NAS JRB WILLOW GROVE
SAMPLE DELIVERY GROUP (SDG) 320-38340-1

SAMPLES: 2/Field Reagent Blank (FRB)
NAWC-041818-FRB-228 NAWC-041818-FRB-260

2/Drinking Water
NAWC-041818-RW-228 NAWC-041818-RW-260

Overview

The sample set for NAS JRB Willow Grove, SDG 320-38340-1, consisted of two (2) drinking water samples and two (2) FRB samples. All samples were analyzed for select perfluorinated alkyl acids including pentadecafluorooctanoic acid (PFOA), perfluorobutane sulfonic acid (PFBS), perfluoroheptanoic acid (PFHpA), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA) and perfluorooctane sulfonic acid (PFOS). No field duplicate pairs were included in this SDG.

The samples were collected by Tetra Tech on April 18, 2018 and analyzed by Test America-Sacramento. All sample analyses were conducted in accordance with EPA Method 537 version 1.1 analytical and reporting protocols.

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

Major

None.

Minor

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 FRBs.

Sample	Associated FRB
NAWC-041818-RW-150	NAWC-041818-FRB-150
NAWC-041818-RW-179	NAWC-041818-FRB-179

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

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

Executive Summary

Laboratory Performance: None.

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

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

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

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

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

Data Qualifier Definitions

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

U	The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted 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 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate
Z4 = Sample activity is less than the at uncertainty at 3 standard deviations and greater than the MDC
Z5 = Sample activity is less than the at uncertainty at 3 standard deviations and less than the MDC

PROJ_NO: 08005-WE04	NSAMPLE	NAWC-041818-FRB-228			NAWC-041818-FRB-260			NAWC-041818-RW-228			NAWC-041818-RW-260		
SDG: 320-38340-1	LAB_ID	320-38340-4			320-38340-2			320-38340-3			320-38340-1		
FRACTION: PFAS	SAMP_DATE	4/18/2018			4/18/2018			4/18/2018			4/18/2018		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	NG/L			NG/L			NG/L			NG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
PENTADECAFLUOROOCTANOIC ACID (PFOA)		8.1	U		7.9	U		21			18	J	P
PERFLUOROBUTANESULFONIC ACID (PFBS)		36	U		36	U		38	J	P	16	J	P
PERFLUOROHEPTANOIC ACID (PFHPA)		4	U		4	U		7.9	J	P	5.5	J	P
PERFLUOROHEXANESULFONIC ACID (PFHXS)		12	U		12	U		12	U		8.8	J	P
PERFLUORONONANOIC ACID (PFNA)		20	U		20	U		21	U		20	U	
PERFLUOROOCTANESULFONIC ACID (PFOS)		16	U		16	U		15	J	P	19	J	P

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: NAWC-041818-RW-260 | Lab Sample ID: 320-38340-1

Matrix: Water | Lab File ID: 2018.04.29_537B_006.d

Analysis Method: 537 | Date Collected: 04/18/2018 12:10

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 255.7(mL) | Date Analyzed: 04/30/2018 01:27

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.: 220561 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	19	J ~~M~~	39	16	6.6
335-67-1	Perfluorooctanoic acid (PFOA)	18	J	20	7.8	2.7
375-95-1	Perfluorononanoic acid (PFNA)	20	U ~~M~~	23	20	7.8
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	8.8	J	29	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	5.5	J	9.8	3.9	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	16	J	88	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	97		70-130
STL00996	13C2 PFDA	85		70-130

05/25/2018

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: NAWC-041818-FRB-260 | Lab Sample ID: 320-38340-2

Matrix: Water | Lab File ID: 2018.04.29_537B_007.d

Analysis Method: 537 | Date Collected: 04/18/2018 12:05

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 252.7(mL) | Date Analyzed: 04/30/2018 01:32

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.: 220561 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	16	U	40	16	6.7
335-67-1	Perfluorooctanoic acid (PFOA)	7.9	U	20	7.9	2.8
375-95-1	Perfluorononanoic acid (PFNA)	20	U	24	20	7.9
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	30	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.0	U	9.9	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36	U	89	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	98		70-130
STL00996	13C2 PFDA	85		70-130

Toni L Salomon
05/25/2018

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: NAWC-041818-RW-228 | Lab Sample ID: 320-38340-3

Matrix: Water | Lab File ID: 2018.04.29_537B_008.d

Analysis Method: 537 | Date Collected: 04/18/2018 13:10

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 243.5(mL) | Date Analyzed: 04/30/2018 01:37

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 220561 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	J ~~M~~	41	16	7.0
335-67-1	Perfluorooctanoic acid (PFOA)	21		21	8.2	2.9
375-95-1	Perfluorononanoic acid (PFNA)	21	U ~~M~~	25	21	8.2
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	31	12	5.6
375-85-9	Perfluoroheptanoic acid (PFHpA)	7.9	J	10	4.1	2.0
375-73-5	Perfluorobutanesulfonic acid (PFBS)	38	J	92	37	17

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	96		70-130
STL00996	13C2 PFDA	84		70-130

Toni L Salomon
05/25/2018

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: NAWC-041818-FRB-228 | Lab Sample ID: 320-38340-4

Matrix: Water | Lab File ID: 2018.04.29_537B_009.d

Analysis Method: 537 | Date Collected: 04/18/2018 13:05

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 247.5(mL) | Date Analyzed: 04/30/2018 01:41

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.: 220561 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	16	U	40	16	6.9
335-67-1	Perfluorooctanoic acid (PFOA)	8.1	U	20	8.1	2.8
375-95-1	Perfluorononanoic acid (PFNA)	20	U	24	20	8.1
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	30	12	5.6
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.0	U	10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36	U	91	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	95		70-130
STL00996	13C2 PFDA	91		70-130

05/25/2018

Appendix B

Results as Reported by the Laboratory

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: NAWC-041818-RW-260 | Lab Sample ID: 320-38340-1

Matrix: Water | Lab File ID: 2018.04.29_537B_006.d

Analysis Method: 537 | Date Collected: 04/18/2018 12:10

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 255.7(mL) | Date Analyzed: 04/30/2018 01:27

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.: 220561 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	19	J M	39	16	6.6
335-67-1	Perfluorooctanoic acid (PFOA)	18	J	20	7.8	2.7
375-95-1	Perfluorononanoic acid (PFNA)	20	U M	23	20	7.8
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	8.8	J	29	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	5.5	J	9.8	3.9	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	16	J	88	35	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	97		70-130
STL00996	13C2 PFDA	85		70-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: NAWC-041818-FRB-260 | Lab Sample ID: 320-38340-2

Matrix: Water | Lab File ID: 2018.04.29_537B_007.d

Analysis Method: 537 | Date Collected: 04/18/2018 12:05

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 252.7(mL) | Date Analyzed: 04/30/2018 01:32

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.: 220561 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	16	U	40	16	6.7
335-67-1	Perfluorooctanoic acid (PFOA)	7.9	U	20	7.9	2.8
375-95-1	Perfluorononanoic acid (PFNA)	20	U	24	20	7.9
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	30	12	5.4
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.0	U	9.9	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36	U	89	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	98		70-130
STL00996	13C2 PFDA	85		70-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: NAWC-041818-RW-228 | Lab Sample ID: 320-38340-3

Matrix: Water | Lab File ID: 2018.04.29_537B_008.d

Analysis Method: 537 | Date Collected: 04/18/2018 13:10

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 243.5(mL) | Date Analyzed: 04/30/2018 01:37

Con. Extract Vol.: 1.00(mL) | Dilution Factor: 1

Injection Volume: 2(uL) | GC Column: GeminiC18 3x100 ID: 3(mm)

% Moisture: | GPC Cleanup:(Y/N) N

Analysis Batch No.: 220561 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	15	J M	41	16	7.0
335-67-1	Perfluorooctanoic acid (PFOA)	21		21	8.2	2.9
375-95-1	Perfluorononanoic acid (PFNA)	21	U M	25	21	8.2
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	31	12	5.6
375-85-9	Perfluoroheptanoic acid (PFHpA)	7.9	J	10	4.1	2.0
375-73-5	Perfluorobutanesulfonic acid (PFBS)	38	J	92	37	17

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	96		70-130
STL00996	13C2 PFDA	84		70-130

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: NAWC-041818-FRB-228 | Lab Sample ID: 320-38340-4

Matrix: Water | Lab File ID: 2018.04.29_537B_009.d

Analysis Method: 537 | Date Collected: 04/18/2018 13:05

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 247.5(mL) | Date Analyzed: 04/30/2018 01:41

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.: 220561 | Units: ng/L

CAS NO.	COMPOUND NAME	RESULT	Q	LOQ	LOD	DL
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	16	U	40	16	6.9
335-67-1	Perfluorooctanoic acid (PFOA)	8.1	U	20	8.1	2.8
375-95-1	Perfluorononanoic acid (PFNA)	20	U	24	20	8.1
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	12	U	30	12	5.6
375-85-9	Perfluoroheptanoic acid (PFHpA)	4.0	U	10	4.0	1.9
375-73-5	Perfluorobutanesulfonic acid (PFBS)	36	U	91	36	16

CAS NO.	SURROGATE	%REC	Q	LIMITS
STL00993	13C2 PFHxA	95		70-130
STL00996	13C2 PFDA	91		70-130

Appendix C

Support Documentation

320-38340 Chain of Custody

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

Chain of Custody Record

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: 4/18/2018	COC No:
TetraTech	Tel/Fax: 610.382.1170	Lab Contact: Dave Alltucker	Carrier: FedEx	1 of 1 COCs
234 Mall Boulevard Suite 260	Analysis Turnaround Time			Sampler: Mary Kay Bond
King of Prussia, PA 19406	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
610-382-1174	TAT if different from Below 21			Walk-in Client:
610-491-9688	☐ 2 weeks			Lab Sampling:
Project Name: WE04	☐ 1 week			
Site: WE04	☐ 2 days			Job / SDG No.:
P O # 1132358 (through EarthToxics)	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	EPA 537 UCMR3	Sample Specific Notes:
NAWC-041818-RW-260	4/18/2018	12:10	G	DW	2	N	N	Y	
NAWC-041818-FRB-260	4/18/2018	12:05	G	DW	2	N	N	Y	Field Reagent Blank
NAWC-041818-RW-228	4/18/2018	13:10	G	DW	2	N	N	Y	
NAWC-041818-FRB-228	4/18/2018	13:05	G	DW	2	N	N	Y	Field Reagent Blank
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other: Trizma								6	

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the

☑Non-Hazard ☐Flammable ☐Skin Irritant ☐Poison B ☐Unknown

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

☐Return to Client ☑Disposal by Lab ☐Archive for_____ Months

Fed Ex Tracking: **7720 3085 2456**

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: 5.4 Corr'd:_____	Therm ID No.: AC5
Relinquished by: Mary Kay Bond.	Company: Tetra Tech	Date/Time: 4/18/2018 16:00	Received by: RL	Company: TAL-SAC	Date/Time: 840 4/19/18
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

Receipt
The samples were received on 4/19/2018 8:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice at 5.9 degrees 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 320-219207.

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. TestAmerica Job ID: 320-38340-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

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

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

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

Sample Summary

Client: Tetra Tech, Inc.
TestAmerica Job ID: 320-38340-1
Project/Site: Warminster: PFAS, NAS JRB Willow Grove

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-38340-1	NAWC-041818-RW-260	Water	04/18/18 12:10	04/19/18 08:40
320-38340-2	NAWC-041818-FRB-260	Water	04/18/18 12:05	04/19/18 08:40
320-38340-3	NAWC-041818-RW-228	Water	04/18/18 13:10	04/19/18 08:40
320-38340-4	NAWC-041818-FRB-228	Water	04/18/18 13:05	04/19/18 08:40

FORM II
LCMS SURROGATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Matrix: Water Level: Low

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

Client Sample ID	Lab Sample ID	PFHxA #	PFDA #
NAWC-041818-RW-260	320-38340-1	97	85
NAWC-041818-FRB-260	320-38340-2	98	85
NAWC-041818-RW-228	320-38340-3	96	84
NAWC-041818-FRB-228	320-38340-4	95	91
	MB 320-219207/1-A	96	88
	LCS 320-219207/2-A	91	85
	LCSD 320-219207/3-A	94	88

	QC LIMITS
PFHxA = 13C2 PFHxA	70-130
PFDA = 13C2 PFDA	70-130

Column to be used to flag recovery values

FORM II 537

FORM III
LCMS LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 2018.04.29_537B_004.d

Lab ID: LCS 320-219207/2-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCS CONCENTRATION (ng/L)	LCS % REC	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	132	121	92	70-130	M
Perfluorooctanoic acid (PFOA)	66.0	61.9	94	70-130	
Perfluorononanoic acid (PFNA)	66.0	57.7	87	70-130	
Perfluorohexanesulfonic acid (PFHxS)	100	98.6	99	70-130	
Perfluoroheptanoic acid (PFHpA)	32.0	29.6	93	70-130	
Perfluorobutanesulfonic acid (PFBS)	300	280	93	70-130	

Column to be used to flag recovery and RPD values

FORM III 537

FORM III
LCMS LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Matrix: Water Level: Low Lab File ID: 2018.04.29_537B_005.d

Lab ID: LCSD 320-219207/3-A Client ID:

COMPOUND	SPIKE ADDED (ng/L)	LCSD CONCENTRATION (ng/L)	LCSD % REC	% RPD	QC LIMITS RPD	QC LIMITS REC	#
Perfluorooctanesulfonic acid (PFOS)	132	121	92	0	30	70-130	M
Perfluorooctanoic acid (PFOA)	66.0	61.7	93	0	30	70-130	
Perfluorononanoic acid (PFNA)	66.0	57.7	87	0	30	70-130	
Perfluorohexanesulfonic acid (PFHxS)	100	101	101	2	30	70-130	
Perfluoroheptanoic acid (PFHpA)	32.0	29.9	93	1	30	70-130	
Perfluorobutanesulfonic acid (PFBS)	300	286	95	2	30	70-130	

Column to be used to flag recovery and RPD values

FORM III 537

FORM IV
LCMS METHOD BLANK SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Lab File ID: 2018.04.29_537B_003.d Lab Sample ID: MB 320-219207/1-A

Matrix: Water Date Extracted: 04/23/2018 07:33

Instrument ID: A8_N Date Analyzed: 04/30/2018 01:13

Level:(Low/Med) Low

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	LCS 320-219207/2-A	2018.04.29_537B_004.d	04/30/2018 01:18
	LCSD 320-219207/3-A	2018.04.29_537B_005.d	04/30/2018 01:23
NAWC-041818-RW-260	320-38340-1	2018.04.29_537B_006.d	04/30/2018 01:27
NAWC-041818-FRB-260	320-38340-2	2018.04.29_537B_007.d	04/30/2018 01:32
NAWC-041818-RW-228	320-38340-3	2018.04.29_537B_008.d	04/30/2018 01:37
NAWC-041818-FRB-228	320-38340-4	2018.04.29_537B_009.d	04/30/2018 01:41

FORM I
LCMS ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento | Job No.: 320-38340-1

SDG No.:

Client Sample ID: | Lab Sample ID: MB 320-219207/1-A

Matrix: Water | Lab File ID: 2018.04.29_537B_003.d

Analysis Method: 537 | Date Collected:

Extraction Method: 537 | Date Extracted: 04/23/2018 07:33

Sample wt/vol: 250(mL) | Date Analyzed: 04/30/2018 01:13

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.: 220561 | 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	96		70-130
STL00996	13C2 PFDA	88		70-130

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

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

GC Column: GeminiC18 3x100 ID: 3(mm) Calibration End Date: 04/11/2018 12:09

Calibration ID: 38530

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION MEAN AREA AND MEAN RT		970041	1.86	2344935	2.10		
UPPER LIMIT		1455062	2.36	3517403	2.60		
LOWER LIMIT		485021	1.36	1172468	1.60		
LAB SAMPLE ID	CLIENT SAMPLE ID						
CCVL 320-217453/10		964533	1.87	2387973	2.10		
ICV 320-217453/12		1123391	1.86	2710764	2.10		
CCVL 320-220554/1		908315	1.87	2069824	2.12		
CCV 320-220561/1 CCVIS		946267	1.86	2192267	2.10		
MB 320-219207/1-A		1002403	1.87	2434296	2.11		
LCS 320-219207/2-A		1013642	1.87	2358409	2.10		
LCSD 320-219207/3-A		905314	1.87	2157796	2.11		
320-38340-1	NAWC-041818-RW-260	942927	1.85	2281223	2.09		
320-38340-2	NAWC-041818-FRB-260	1068058	1.86	2593181	2.10		
320-38340-3	NAWC-041818-RW-228	1068321	1.85	2455515	2.09		
320-38340-4	NAWC-041818-FRB-228	1130754	1.85	2645332	2.09		
CCV 320-220561/10 CCVIS		935993	1.85	2103256	2.09		

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

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

Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Sample No.: CCV 320-220561/1 Date Analyzed: 04/30/2018 01:04

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2018.04.29_537B_001 Heated Purge: (Y/N) N

Calibration ID: 38530

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		946267	1.86	2192267	2.10		
UPPER LIMIT		1324774	2.36	3069174	2.60		
LOWER LIMIT		662387	1.36	1534587	1.60		
LAB SAMPLE ID	CLIENT SAMPLE ID						
MB 320-219207/1-A		1002403	1.87	2434296	2.11		
LCS 320-219207/2-A		1013642	1.87	2358409	2.10		
LCSD 320-219207/3-A		905314	1.87	2157796	2.11		
320-38340-1	NAWC-041818-RW-260	942927	1.85	2281223	2.09		
320-38340-2	NAWC-041818-FRB-260	1068058	1.86	2593181	2.10		
320-38340-3	NAWC-041818-RW-228	1068321	1.85	2455515	2.09		
320-38340-4	NAWC-041818-FRB-228	1130754	1.85	2645332	2.09		

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

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

Column used to flag values outside QC limits

FORM VIII 537

FORM VIII
LCMS INTERNAL STANDARD AREA AND RETENTION TIME SUMMARY

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Sample No.: CCV 320-220561/10 Date Analyzed: 04/30/2018 01:46

Instrument ID: A8_N GC Column: GeminiC18 3x100 ID: 3(mm)

Lab File ID (Standard): 2018.04.29_537B_010 Heated Purge: (Y/N) N

Calibration ID: 38530

		13PFOA		PFOS			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		935993	1.85	2103256	2.09		
UPPER LIMIT		1310390	2.35	2944558	2.59		
LOWER LIMIT		655195	1.35	1472279	1.59		
LAB SAMPLE ID	CLIENT SAMPLE ID						
MB 320-219207/1-A		1002403	1.87	2434296	2.11		
LCS 320-219207/2-A		1013642	1.87	2358409	2.10		
LCSD 320-219207/3-A		905314	1.87	2157796	2.11		
320-38340-1	NAWC-041818-RW-260	942927	1.85	2281223	2.09		
320-38340-2	NAWC-041818-FRB-260	1068058	1.86	2593181	2.10		
320-38340-3	NAWC-041818-RW-228	1068321	1.85	2455515	2.09		
320-38340-4	NAWC-041818-FRB-228	1130754	1.85	2645332	2.09		

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

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

Column used to flag values outside QC limits

FORM VIII 537

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

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1 Analy Batch No.: 217453

SDG No.:

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

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

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-217453/3	2018.04.11_537ICALB_004.d
Level 2	IC 320-217453/4	2018.04.11_537ICALB_005.d
Level 3	IC 320-217453/5	2018.04.11_537ICALB_006.d
Level 4	IC 320-217453/6	2018.04.11_537ICALB_007.d
Level 5	IC 320-217453/7	2018.04.11_537ICALB_008.d
Level 6	IC 320-217453/8	2018.04.11_537ICALB_009.d

ANALYTE	RRF					CURVE TYPE	COEFFICIENT			#	MIN RRF	%RSD	#	MAX %RSD	R^2 OR COD	#	MIN R^2 OR COD
	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5		B	M1	M2								
Perfluorobutanesulfonic acid (PFBS)	1.1422 0.9535	1.0952	1.0744	1.0454	1.0008	Ave		1.0519				6.4		30.0			
Perfluoroheptanoic acid (PFHpA)	1.0850 1.0447	1.0991	1.0649	1.0783	1.0702	Ave		1.0737				1.7		30.0			
Perfluorohexanesulfonic acid (PFHxS)	1.6457 1.6837	1.5988	1.6030	1.6384	1.6838	Ave		1.6422				2.3		30.0			
Perfluorooctanoic acid (PFOA)	1.0599 1.0325	1.0296	1.0703	1.0516	1.1300	Ave		1.0623				3.5		30.0			
Perfluorooctanesulfonic acid (PFOS)	1.0432 1.0989	1.0519	1.0326	1.0935	1.0764	Ave		1.0661				2.6		30.0			
Perfluorononanoic acid (PFNA)	0.8261 0.8363	0.8133	0.8488	0.8818	0.8480	Ave		0.8424				2.8		30.0			
13C2 PFHxA	1.0447 1.0648	1.0532	1.0875	1.0687	1.0602	Ave		1.0632				1.4		30.0			
13C2 PFDA	0.8513 0.8262	0.8714	0.8533	0.8487	0.8519	Ave		0.8505				1.7		30.0			

Note: The M1 coefficient is the same as Ave RRF for an Ave curve type.

FORM VI
LCMS BY INTERNAL STANDARD - INITIAL CALIBRATION DATA
RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1 Analy Batch No.: 217453

SDG No.:

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

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

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-217453/3	2018.04.11_537ICALB_004.d
Level 2	IC 320-217453/4	2018.04.11_537ICALB_005.d
Level 3	IC 320-217453/5	2018.04.11_537ICALB_006.d
Level 4	IC 320-217453/6	2018.04.11_537ICALB_007.d
Level 5	IC 320-217453/7	2018.04.11_537ICALB_008.d
Level 6	IC 320-217453/8	2018.04.11_537ICALB_009.d

ANALYTE	IS REF	CURVE TYPE	RESPONSE					CONCENTRATION (NG/ML)				
			LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	LVL 5
Perfluorobutanesulfonic acid (PFBS)	PFOS	Ave	870696 13871852	1696932	4015148	8010147	10764182	9.00 180	20.0	45.0	90.1	135
Perfluoroheptanoic acid (PFHpA)	13PFOA	Ave	108741 1996261	218860	489075	1044752	1450463	0.960 19.4	2.16	4.86	9.72	14.6
Perfluorohexanesulfonic acid (PFHxS)	PFOS	Ave	418640 8226588	831963	2012030	4216387	6082352	3.00 60.5	6.72	15.1	30.2	45.4
Perfluorooctanoic acid (PFOA)	13PFOA	Ave	219100 4019004	417632	1001316	2075568	3119787	1.98 39.6	4.40	9.90	19.8	29.7
Perfluorooctanesulfonic acid (PFOS)	PFOS	Ave	349354 7016962	715378	1693810	3678059	5081660	3.95 79.1	8.79	19.8	39.5	59.3
Perfluorononanoic acid (PFNA)	13PFOA	Ave	170770 3255374	329904	794076	1740422	2341235	1.98 39.6	4.40	9.90	19.8	29.7
13C2 PFHxA	13PFOA	Ave	1090690 1046576	970942	1027706	1065262	985534	10.0 10.0	10.0	10.0	10.0	10.0
13C2 PFDA	13PFOA	Ave	888742 812112	803402	806360	845990	791901	10.0 10.0	10.0	10.0	10.0	10.0

Curve Type Legend:
Ave = Average ISTD

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

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1 Analy Batch No.: 217453

SDG No.:

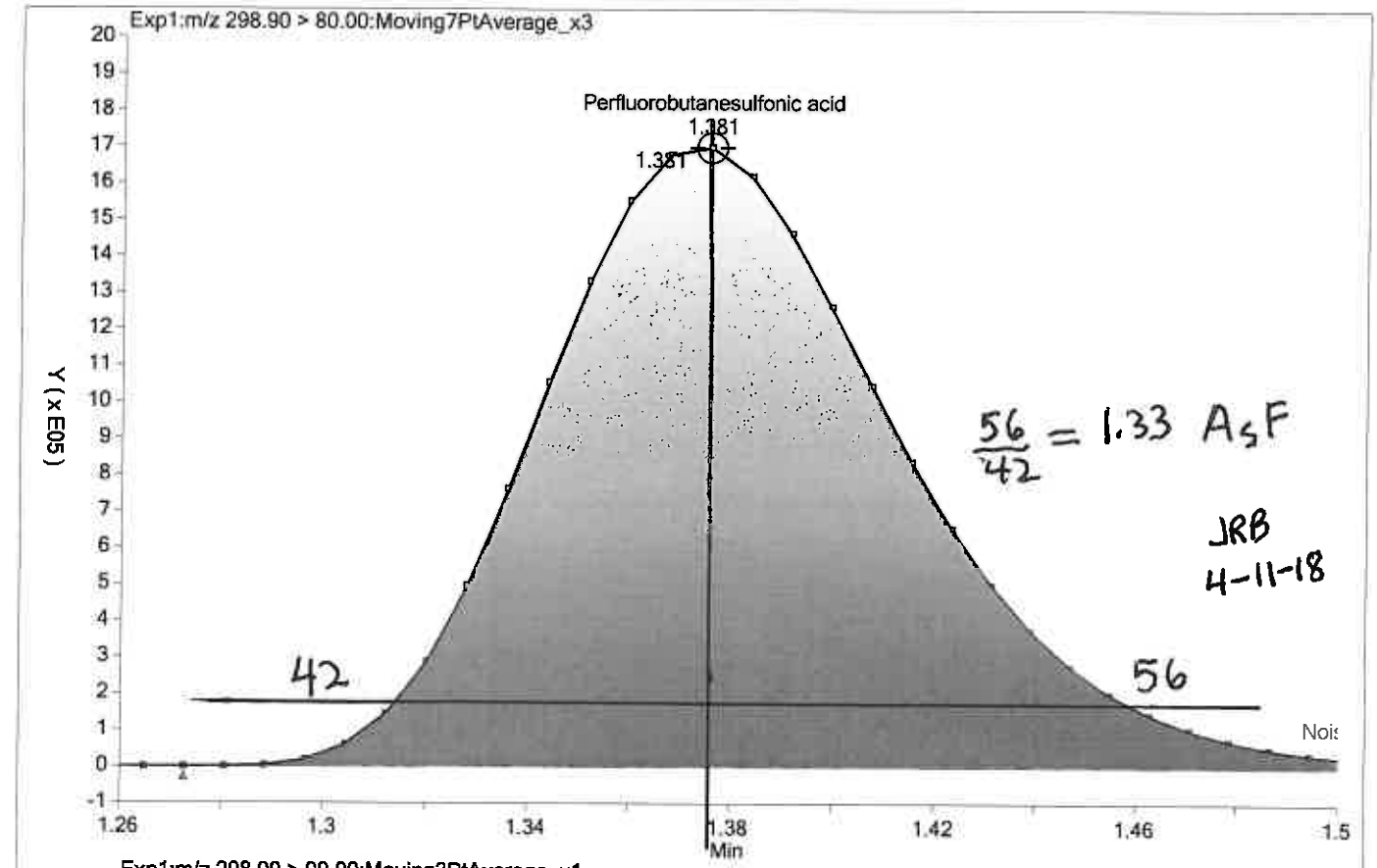
Instrument ID: A8_N GC Column: GeminiC18 3 ID: 3(mm) Heated Purge: (Y/N) N

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

Calibration Files:

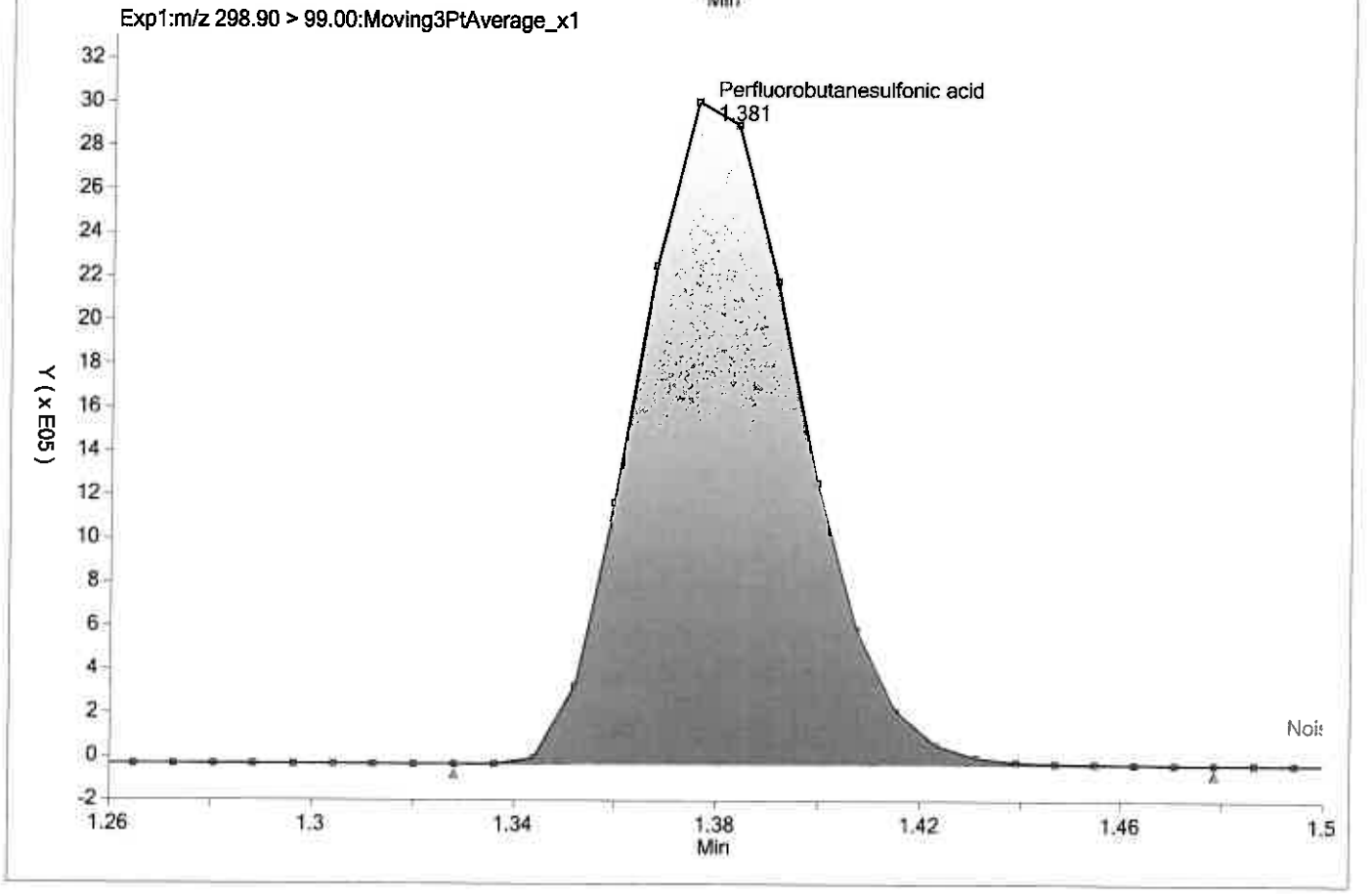
LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 320-217453/3	2018.04.11_537ICALB_004.d
Level 2	IC 320-217453/4	2018.04.11_537ICALB_005.d
Level 3	IC 320-217453/5	2018.04.11_537ICALB_006.d
Level 4	IC 320-217453/6	2018.04.11_537ICALB_007.d
Level 5	IC 320-217453/7	2018.04.11_537ICALB_008.d
Level 6	IC 320-217453/8	2018.04.11_537ICALB_009.d

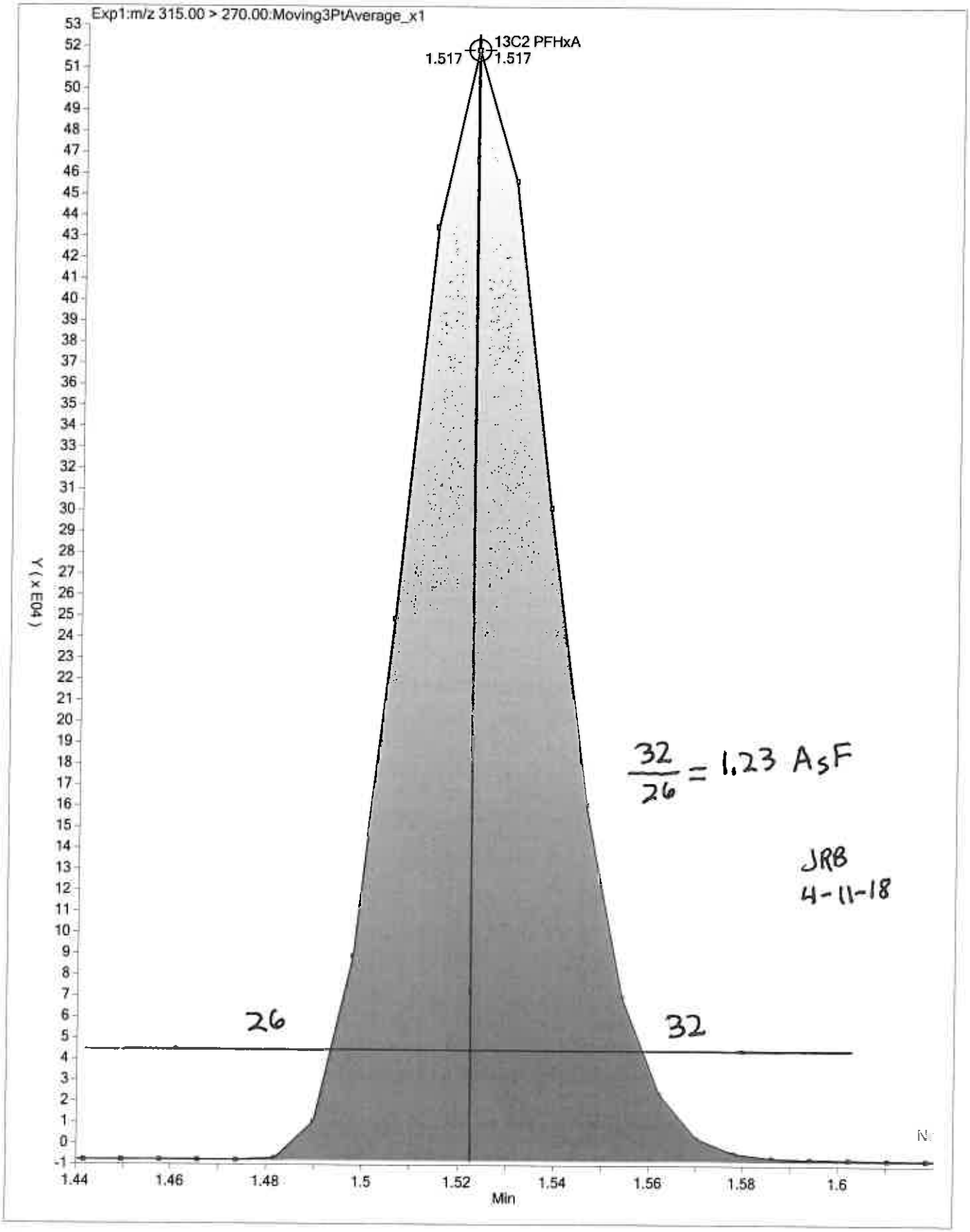
ANALYTE	PERCENT ERROR						PERCENT ERROR LIMIT					
	LVL 1 #	LVL 2 #	LVL 3 #	LVL 4 #	LVL 5 #	LVL 6 #	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 6
Perfluorobutanesulfonic acid (PFBS)	8.6	4.1	2.1	-0.6	-4.9	-9.4	50	30	30	30	30	30
Perfluoroheptanoic acid (PFHpA)	1.0	2.4	-0.8	0.4	-0.3	-2.7	50	30	30	30	30	30
Perfluorohexanesulfonic acid (PFHxS)	0.2	-2.6	-2.4	-0.2	2.5	2.5	50	30	30	30	30	30
Perfluorooctanoic acid (PFOA)	-0.2	-3.1	0.7	-1.0	6.4	-2.8	50	30	30	30	30	30
Perfluorooctanesulfonic acid (PFOS)	-2.1	-1.3	-3.1	2.6	1.0	3.1	50	30	30	30	30	30
Perfluorononanoic acid (PFNA)	-1.9	-3.5	0.8	4.7	0.7	-0.7	50	30	30	30	30	30
13C2 PFHxA	-1.7	-0.9	2.3	0.5	-0.3	0.1	30	30	30	30	30	30
13C2 PFDA	0.1	2.5	0.3	-0.2	0.2	-2.9	30	30	30	30	30	30



$\frac{56}{42} = 1.33$ A_SF

JRB
4-11-18




Exp1:m/z 315.00 > 270.00:Moving3PtAverage_x1
13C2 PFHxA
1.517
1.517
Y (x E04)
Min
26
32
32/26 = 1.23 AsF
JRB
4-11-18

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Lab Sample ID: CCVL 320-217453/10 Calibration Date: 04/11/2018 12:18

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

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 04/11/2018 12:09

Lab File ID: 2018.04.11_537ICALB_011.d Conc. Units: ng/mL

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

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Lab Sample ID: ICV 320-217453/12 Calibration Date: 04/11/2018 12:27

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

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 04/11/2018 12:09

Lab File ID: 2018.04.11_537ICALB_013.d Conc. Units: ng/mL

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

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Lab Sample ID: CCVL 320-220554/1 Calibration Date: 04/29/2018 22:39

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

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 04/11/2018 12:09

Lab File ID: 2018.04.29_537A_004.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.052	1.182		22.5	20.0	12.4	50.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	1.060		2.13	2.16	-1.2	50.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.634		6.69	6.72	-0.5	50.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	1.054		4.37	4.40	-0.8	50.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	1.041		8.58	8.79	-2.4	50.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.8313		4.34	4.40	-1.3	50.0
13C2 PFHxA	Ave	1.063	1.081		10.2	10.0	1.7	30.0
13C2 PFDA	Ave	0.8505	0.8310		9.77	10.0	-2.3	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Lab Sample ID: CCV 320-220561/1 Calibration Date: 04/30/2018 01:04

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

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 04/11/2018 12:09

Lab File ID: 2018.04.29_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)	Ave	1.052	1.222		52.3	45.0	16.2	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	1.103		4.99	4.86	2.7	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.713		15.8	15.1	4.3	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	1.080		10.1	9.90	1.6	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	1.077		20.0	19.8	1.0	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.8007		9.41	9.90	-5.0	30.0
13C2 PFHxA	Ave	1.063	1.068		10.0	10.0	0.5	30.0
13C2 PFDA	Ave	0.8505	0.8459		9.95	10.0	-0.5	30.0

FORM VII
LCMS CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Lab Sample ID: CCV 320-220561/10 Calibration Date: 04/30/2018 01:46

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

GC Column: GeminiC18 3x100 ID: 3.00(mm) Calib End Date: 04/11/2018 12:09

Lab File ID: 2018.04.29_537B_010.d Conc. Units: ng/mL

ANALYTE	CURVE TYPE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Perfluorobutanesulfonic acid (PFBS)	Ave	1.052	1.146		147	135	9.0	30.0
Perfluoroheptanoic acid (PFHpA)	Ave	1.074	1.075		14.6	14.6	0.2	30.0
Perfluorohexanesulfonic acid (PFHxS)	Ave	1.642	1.769		48.9	45.4	7.7	30.0
Perfluorooctanoic acid (PFOA)	Ave	1.062	1.087		30.4	29.7	2.3	30.0
Perfluorooctanesulfonic acid (PFOS)	Ave	1.066	1.119		62.2	59.3	5.0	30.0
Perfluorononanoic acid (PFNA)	Ave	0.8424	0.8260		29.1	29.7	-2.0	30.0
13C2 PFHxA	Ave	1.063	1.127		10.6	10.0	6.0	30.0
13C2 PFDA	Ave	0.8505	0.7863		9.25	10.0	-7.5	30.0

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

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

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

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

537

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Instrument ID: A8_N Start Date: 04/29/2018 22:39

Analysis Batch Number: 220554 End Date: 04/29/2018 22:39

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCVL 320-220554/1		04/29/2018 22:39	1	2018.04.29_537A_004.d	GeminiC18 3x100 3(mm)

537

LCMS ANALYSIS RUN LOG

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Instrument ID: A8_N Start Date: 04/30/2018 01:04

Analysis Batch Number: 220561 End Date: 04/30/2018 01:46

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 320-220561/1 CCVIS	Level 3	04/30/2018 01:04	1	2018.04.29_537B 001.d	GeminiC18 3x100 3(mm)
MB 320-219207/1-A		04/30/2018 01:13	1	2018.04.29_537B 003.d	GeminiC18 3x100 3(mm)
LCS 320-219207/2-A		04/30/2018 01:18	1	2018.04.29_537B 004.d	GeminiC18 3x100 3(mm)
LCSD 320-219207/3-A		04/30/2018 01:23	1	2018.04.29_537B 005.d	GeminiC18 3x100 3(mm)
320-38340-1		04/30/2018 01:27	1	2018.04.29_537B 006.d	GeminiC18 3x100 3(mm)
320-38340-2		04/30/2018 01:32	1	2018.04.29_537B 007.d	GeminiC18 3x100 3(mm)
320-38340-3		04/30/2018 01:37	1	2018.04.29_537B 008.d	GeminiC18 3x100 3(mm)
320-38340-4		04/30/2018 01:41	1	2018.04.29_537B 009.d	GeminiC18 3x100 3(mm)
CCV 320-220561/10 CCVIS	Level 5	04/30/2018 01:46	1	2018.04.29_537B 010.d	GeminiC18 3x100 3(mm)

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Batch Number: 219207 Batch Start Date: 04/23/18 07:33 Batch Analyst: Kouchari, Shamiran

Batch Method: 537 Batch End Date: 04/26/18 12:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	LC537-IS 00067
MB 320-219207/1		537, 537				250 mL	1.00 mL	7 SU	100 uL
LCS 320-219207/2		537, 537				250 mL	1.00 mL	7 SU	100 uL
LCSD 320-219207/3		537, 537				250 mL	1.00 mL	7 SU	100 uL
320-38340-A-1	NAWC-041818-RW-260	537, 537	T	284.13 g	28.41 g	255.7 mL	1.00 mL	7 SU	100 uL
320-38340-A-2	NAWC-041818-FRB-260	537, 537	T	280.64 g	27.99 g	252.7 mL	1.00 mL	7 SU	100 uL
320-38340-A-3	NAWC-041818-RW-228	537, 537	T	272.64 g	29.17 g	243.5 mL	1.00 mL	7 SU	100 uL
320-38340-A-4	NAWC-041818-FRB-228	537, 537	T	275.49 g	27.97 g	247.5 mL	1.00 mL	7 SU	100 uL

Lab Sample ID	Client Sample ID	Method Chain	Basis	LC537-MSP 00033	LC537-SU 00066	AnalysisComment			
MB 320-219207/1		537, 537			100 uL	Chlorine, ND			
LCS 320-219207/2		537, 537		100 uL	100 uL	Chlorine, ND			
LCSD 320-219207/3		537, 537		100 uL	100 uL	Chlorine, ND			
320-38340-A-1	NAWC-041818-RW-260	537, 537	T		100 uL	Chlorine, ND			
320-38340-A-2	NAWC-041818-FRB-260	537, 537	T		100 uL	Chlorine, ND			
320-38340-A-3	NAWC-041818-RW-228	537, 537	T		100 uL	Chlorine, ND			
320-38340-A-4	NAWC-041818-FRB-228	537, 537	T		100 uL	Chlorine, ND			

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

LCMS BATCH WORKSHEET

Lab Name: TestAmerica Sacramento Job No.: 320-38340-1

SDG No.:

Batch Number: 219207 Batch Start Date: 04/23/18 07:33 Batch Analyst: Kouchari, Shamiran

Batch Method: 537 Batch End Date: 04/26/18 12:00

Batch Notes	
Analyst ID - Aliquot Step	VPM
Batch Comment	Client labels match TA label, 04/23/18 SKD
Analyst ID - Concentration	SKD/KMK
Analyst ID - Final Volume Step	TWL
Internal Standard ID#	1208799
Manifold ID	3
Methanol ID	1217927
pH Indicator ID	3817
Pipette ID	R40536G
Analyst ID - IS Reagent Drop	VPM
Analyst ID - IS Reagent Drop Witness	TWL
Analyst ID - SU Reagent Drop	SKD
Analyst ID - SU Reagent Drop Witness	HJA
Analyst ID - TA Reagent Drop	SKD
Analyst ID - TA Reagent Drop Witness	HJA
SPE Cartridge Lot ID	6390138-03
Trizma ID	SLBR5241V
Reagent Water ID	04/21/18

Basis	Basis Description
T	Total/NA

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

PFAS Calibration Calculations:

Initial Calibration 4/11/2018
Instrument A8_N

PFHxS

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	Reported RRF
3	418640	2429483	28.7	1.64849	1.6457
6.72	831963	2220259	28.7	1.60034	1.5988
15.1	2012030	2380125	28.7	1.60672	1.603
30.2	4216387	2440107	28.7	1.64213	1.6384
45.4	6082352	2283311	28.7	1.68396	1.6838
60.5	8226588	2316327	28.7	1.68479	1.6837
			Average	1.64441	1.6422
			Standard Deviation	0.0363	
			RSD	0.0221	
			%RSD	2.20602	2.3

Continuing Calibration 04/30/2018 @ 1:04

PFHxS

Analyte Concentration	Analyte Response	Internal Standard Response	Internal Standard Amount	RRF	%D	Reported RRF	Reported %D
15.1	1980320	2192267	28.7	1.7169	4.5492276	1.713	4.3

Sample Identification	NAWC-041818-RW-260		
Compound	PFHxS		
Compound Area	295334	Average RRF	1.6422
Internal Standard Amount (ng)	28.7	Sample Volume(ml)	255.7
Dilution Factor	1	Volume Extract (ml)	1
Internal Standard Area	2281223	Injection Volume (µl)	1
Concentration	8.8485 ng/L		
Reported Result	8.8 ng/L		

Surrogate PFHxA

Compound Area	977355		
Internal Standard Amount (ng)	10		
Dilution Factor	1	Volume Extract (ml)	1

	Internal Standard Area	942927		Injection Volume (µl	1
	Average RRF	1.0623			
	Concentration	9.7572			
	Surrogate %R	97.57	Spike amount	10	

LCS %R

320-319207/2-A			
PFHxS	Spike amount	LCS concentration	
98.60	100	98.6	

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N

WARRINGTON

WARWICK

NORTHAMPTON

IVYLAND

WARMINSTER

HAGS

NASJRB
Willow Grove

HORSHAM

HATBORO

UPPER SOUTHAMPTON

UPPER MORELAND

LEGEND

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

3,000 1,500 0 3,000 6,000
Feet

NAVFAC

PFC SAMPLE RESULTS MAP
FORMER NAWC WAMINSTER
MONTGOMERY COUNTY, PENNSYLVANIA

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